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Laparoscopic Management of Retroperitoneal Masses: Our Experience and Literature Review

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Abstract

Background: Retroperitoneal growths often require surgical exploration for diagnostic and/or therapeutic purposes. Here in, we present our experience in laparoscopic management of retroperitoneal masses and review the literature to assess the feasibility of a minimally invasive approach in this setting.

Method: In the last 4 years 8 consecutive patients, aged 46 to 73 years, underwent laparoscopic surgery for isolated retroperitoneal masses at our institution. Medical records were reviewed collecting data regarding clinical presentation, dimensions of the finding, pathology, whether a preoperative biopsy was performed and its results, procedure performed (excision versus incisional biopsy), operative times, estimated blood loss, complications, hospital stay and follow-up.

Results: All procedures were successfully completed laparoscopically with no conversions. Mean operative time was 131 minutes. Blood loss was 0-200 mL and blood transfusions were not required. One bowel injury was repaired intraoperatively; postoperative course was uneventful in all cases. Hospital stay ranged from 2 to 7 days. Final pathology was local recurrence of Renal cell carcinoma in 3 cases, 1 lymphoma, 1 sarcoma, 1 schwannoma and 2 retroperitoneal cysts. With an average follow-up of over 2 years there are no recurrences.

Conclusion: Laparoscopic approach is a feasible approach in selected patients with retroperitoneal masses. In our experience, laparoscopy offers a viable and oncologically radical option with excellent results and low morbidity. This minimally invasive approach is likely to become more common practice as the experience grows and new technologies become available.

Keywords: Retroperitoneal, laparoscopy, tumor.

INTRODUCTION

Laparoscopy is now widely used in urological surgery. As surgical experience grows and more urologists acquire expertise in laparoscopic approach, possible indications for this procedure expand. This is the case of retroperitoneal masses and their management with a minimally invasive surgical technique. Retroperitoneal growths often require surgical exploration for diagnostic and/or therapeutic purposes since in many cases imaging is inconclusive and biopsy, when feasible, can be inadequate. The advantages of laparoscopic surgery over open approach may be exploited in this setting with no compromise of the outcomes.

Herein we present our experience in laparoscopic management of retroperitoneal masses and review the literature.

MATERIAL AND METHODS

In the last 4 years 8 consecutive patients, aged 46 to 73 years, underwent laparoscopic surgery for isolated retroperitoneal masses by a single surgeon (AT) in our institution. Medical records of these patients were reviewed. We collected data regarding clinical presentation, dimensions of the finding, pathology, whether a preoperative biopsy was performed and its results, procedure performed (excision versus incisional biopsy), operative times, estimated blood loss, concomitant procedures, complications, hospital stay and follow-up.

Lesion dimensions were registered using the largest dimension from imaging studies. Operative times were recorded as *skin-to-skin* times; in 2 out of 8 cases additional surgical procedures were performed simultaneously and their operative times were subtracted from total.

Standard surgical technique was used for laparoscopic approach. In a full flank position, lesion side upwards, pneumoperitoneum was established by open technique. Additional 3 trocars were placed in the upper abdomen. The retroperitoneal space was accessed by colon mobilization along the line of Toldt and the mass was identified. The finding was then dissected from adjacent structures with accurate hemostasis. The mass was then detached with adequately wide margins and extracted in an Endobag through an additional incision in the lower abdomen (3 cases) or through an extension of a port incision.

The literature was reviewed using PubMed/Medline database and keywords 'laparoscopy' or 'laparoscopic', 'retroperitoneal' or 'retroperitoneum'; lymph node dissections and adrenal surgery were excluded. Relevant abstracts and

articles in english were reviewed and summarized collecting available data as reported for our series.

RESULTS

Table 1 summarizes clinical presentation, imaging findings and demographics of the patients in our series.

Of note, in our series 3 cases (37.5%) were found on follow-up imaging due to history of RCC. It is important to note that only 3 of 8 patients were symptomatic at presentation. Average lesion size (largest diameter on imaging) was 6.88 cm ranging from 2 to 16 cm.

Surgery and postoperative course are reported in Table 2. In 2 (25%) cases preoperative biopsy was performed and only in one case its result correlated with final pathology diagnosis. Only in one case incisional biopsy was performed whether all other findings were radically excised. All procedures were successfully completed laparoscopically with no conversions. Mean operative time was 131 min (range 60-270 minutes), in two cases concomitant surgery was performed (laparoscopic ventral hernia repair and controlateral open partial nephrectomy in one case, and laparoscopic cholecystectomy in another) and its time was subtracted from total. Blood loss ranged from 0 to 200 mL and blood transfusions were not required. One bowel

injury was identified and repaired intraoperatively; postoperative course was uneventful in all cases.

Final pathology was local recurrence of Renal cell carcinoma (RCC) in 3 cases, 1 lymphoma, 1 sarcoma, 1 schwannoma and 2 retroperitoneal cysts (one of adrenal origin). It is of note that in our series malignant pathology accounted for 5 out of 8 cases (62.5%).

Hospital stay ranged from 2 to 7 days (median 3). With an average follow-up of over 2 years there are no recurrences. Patient no. 1 was lost on follow-up after 24 months.

DISCUSSION

Literature review yielded 21 papers of laparoscopic treatment of retroperitoneal masses for a total of 27 cases. Most papers are case reports[1-18] and there are 3 small series.[19-21] Table 3 summarizes the data of those cases; unfortunately some papers are incomplete with regards to several data elements. As for today, to the best of our knowledge, this is the largest series of laparoscopic treatment of retroperitoneal masses.

Within the available literature, in roughly one half of the cases (13 out of 27, 48%) the finding of a retroperitoneal process was incidental and patients were asymptomatic. Abdominal or flank pain at presentation accounted for 11 cases, abdominal

Table 1: Demographics, clinical presentation and imaging findings in our series

Patient no.	Gender (M/F)	Age (Years)	Presentation	Symptomatic (Yes/No)	Side (L/R)	Size (cm)
1	M	60	Work-up for systemic disease	Yes	L	2
2	M	56	Follow-up imaging (RCC)	No	L	2
3	M	68	Follow-up imaging (RCC)	No	R	5
4	M	56	Incidental	No	L	10
5	F	52	Incidental	No	R	4
6	M	73	Follow-up imaging (RCC)	No	R	4
7	F	53	Flank and abdominal pain	Yes	L	16
8	F	46	Flank and abdominal pain	Yes	L	12

Table 2: Surgery characteristics and postoperative course in our series

Patient no.	Preoperative biopsy	Final pathology	Malignant (Yes/No)	Procedure	Operative time (Min)	Compli-cations	Hospital stay (days)	Follow-up (months)
1	No	Lymphoma	Yes	Incisional biopsy	60	No	2	24*
2	No	RCC (local recurrence)	Yes	Excision	270**	colon injury	7	50
3	No	RCC (local recurrence)	Yes	Excision	120	No	6	38
4	No	Schwannoma	No	Excision	150	No	3	35
5	Mesenchymal tumor	Sarcoma	Yes	Excision	120	No	3	18
6	RCC	RCC (local recurrence)	Yes	Excision	110	No	2	13
7	No	Adrenal cyst	No	Excision	140	No	2	13
8	No	Retroperitoneal cyst	No	Excision	80***	No	6	5
Average					**131.25**		**3.88**	**24.5**

RCC – Renal cell carcinoma

 * Lost on follow-up

 ** Concomitant laparoscopic postoperative ventral hernia (POVH) repair and controlateral open partial nephrectomy (operative time detracted from total)

 *** Concomitant laparoscopic cholecystectomy (operative time detracted from total)

Table 3: Demographics, clinical presentation and imaging findings in literature

Author	Gender (M/F)	Age (years)	Presentation	Symptomatic (Yes/No)	Side (L/R/Median)	Size (cm)
Viani	F	49	Abdominal and flank pain	Yes	R	6
Melvin	F	36	Abdominal pain	Yes	R	2.5
Kawabata	F	43	Incidental	No	L	NA
	M	68	Incidental	No	NA	NA
Nishio	F	41	Abdominal mass	Yes	R	5
Ohigashi	F	28	Incidental	No	R	3
Shalhav	F	58	Incidental	No	L	3
	NA	50	Incidental	No	L	2
	NA	62	Loin pain	Yes	L	6
	NA	62	Back pain	Yes	R	NA
Cadeddu	F	32	Abdominal pain	Yes	R	12
	F	45	Incidental	No	L	20
	F	35	Painful flank mass	Yes	R	12
Descazeaud	F	62	Incidental	No	R	8
Funamizu	M	55	Epigastric discomfort	Yes	M	6
Ishizuka	M	36	Incidental	No	L	5
Johna	F	37	Flank pain, lower limb sensory impairment	Yes	L	12
Morrison	M	62	Incidental	No	NA	7
Akos	F	18	Incidental	No	L	8
Chung	M	46	Incidental	No	L	3
Dalpiaz	F	61	Incidental	No	L	10
Minei	M	39	Fever, suspect adrenal tumor	Yes	L	3.5
Cho	F	27	Incidental	No	M	10
Tsukamoto	F	36	Abdominal and back pain	Yes	R	11
Targarona	F	45	Abdominal pain	Yes	L	12
Celia	F	65	Abdominal pain	Yes	R	7
Trindade	M	28	Painful flank mass	Yes	R	5
Average (range)		**(18-68)**				**(2-20)**

mass, fever, and epigastric discomfort were the presenting symptoms in 1 case each. In our series only one case presented incidentally, and the most common cause of diagnosis was follow-up imaging for RCC (37.5% of cases). In found publications, average lesion size is reported to be 7.5 cm in its largest diameter, ranging from 2 to 20 cm; malignant masses in those reports are generally smaller (2-10 cm). On our experience malignant masses treated laparoscopically measured 2-5 cm indicating a cautious approach to laparoscopic indications.

Limitations of available preoperative imaging techniques and suboptimal feasibility of image-guided preoperative biopsy account for the fact that only one group[21] reported performing guided biopsies and in that setting its accuracy was quite low. In our series preoperative biopsy was carried out in 2 cases and was accurate in diagnosis in one patient. Those findings emphasize the need of novel techniques to establish a more accurate diagnosis in such challenging cases as retroperitoneal masses. An accurate preoperative diagnosis is essential to formulate an appropriate treatment plan.

Published papers report no conversions and this may be due to extreme experience of the surgical team but publication bias must be taken in consideration. It is understandable however, that the growing experience in laparoscopic surgery increases its efficiency even in those delicate cases. Only one

group[21] and ourselves reported incisional biopsies whether all others report complete excisions of the specimen. Considering that only few papers deal with malignant pathology it is to expect that the rate of incisional biopsies is higher than reported. Combining all reported cases (literature and our experience) with malignant pathology we find 3 incisional biopsies and 8 complete excisions. From another point of view, diagnostic laparoscopy is likely to produce more incisional biopsies than reported considering this surgical intervention as the last diagnostic tool available when non invasive techniques have failed.

In the published papers malignant pathology is observed only in 6 out of 27 cases (22.2%) and in those cases radical resection was performed in 4 cases whether in other 2 cases incisional biopsy was carried out in Table 4. No recurrences are reported in those papers; however this element is to be evaluated against a probable publishing bias. Moreover, in cases with malignant pathology only one group[5] stated the follow-up period and reported the absence of recurrence at 12 months.

We believe that laparoscopy is a viable and valid alternative not only as a diagnostic tool but also as a treatment option in retroperitoneal masses. Clearly, an accurate patient selection is paramount, especially when one deals with possibly malignant finding. There is little question regarding the feasibility of

Table 4: Surgery characteristics and postoperative course in the literature

Author	Preoperative biopsy	Final pathology	Malignant (Yes/No)	Procedure	Operative time (min)	Complications	Hospital stay (days)	Follow-up (months)
Viani	No	Leiomyosarcoma	Yes	Excision (gasless)	75	None	4	NA
Melvin	No	Schwannoma	No	Excision	NA	NA	1	6
Kawabata	NA	Neurofibroma	No	Excision	NA	NA	NA	NA
	NA	Mature teratoma	No	Excision	NA	NA	NA	NA
Nishio	No	Schwannoma	No	Excision	195	None	14	14
Ohigashi	No	Schwannoma	No	Excision	NA	None	NA	6
Shalhav	Necrotic tissue	Adonocarcinoma of ovary metastasis	Yes	Excision	***	Incarcerated hernia	****	NA
	Failed	Lymphoma	Yes	Incisional biopsy	***	None	****	NA
	Negative*	Lymphoma	Yes	Excision	***	None	****	NA
	TCC suspect**	Poorly differentiated malignant cells	Yes	Incisional biopsy	***	None	****	NA
Cadeddu	No	Mature teratoma	No	Excision	190	None	1	NA
	No	Mesenteric cyst	No	Excision	80	None	1	NA
	No	Retroperitoneal cyst	No	Excision	95	None	1	NA
Descazeaud	No	Schwannoma	No	Biopsy and excision	145	None	3	NA
Funamizu	No	Schwannoma	No	Excision	230	None	10	24
Ishizuka	No	Bronchogenic cyst	No	Excision	NA	None	NA	NA
Johna	No	Neurofibroma	No	Excision (hand-assisted)	180	Urinary and bowel dysfunction	5	NA
Morrison		Schwannoma	No					
Akos	No	Bronchogenic cyst	No	Excision	NA	NA	NA	NA
Chung	No	Venous aneurism	No	Excision	NA	None	3	12
Dalpiaz	No	Liposarcoma	Yes	Excision	150	None	4	12
Minei	No	Broncogenic cyst	No	Excision	NA	NA	NA	NA
Cho	No	Mature teratoma	No	Excision	NA	NA	2	NA
Tsukamoto	No	Cystic lymphangioma	No	Excision	NA	None	NA	12
Targarona	No	Cystic lymphangioma	No	Excision	90	None	3	NA
Celia	No	Cystic lymphangioma	No	Excision	NA	None	2	NA
Trindade	No	Cystic lymphangioma	No	Excision	NA	None	NA	12

NA – Not available from manuscript, TCC – Transitional cell carinoma
 * Lymph node biopsy
 ** Ureteroscopic biopsy
 *** Total average operative time 468 minutes (438-498)
 **** Average hospital stay 4.8 days (2-10)

laparoscopic surgery for retroperitoneal masses in the hands of an experienced team. It seems that laparoscopy can offer clinical outcomes comparable to open procedures in terms of disease control and better outcomes in terms of hospital stay, analgesic use, cosmesis and return to normal activities.[21] We feel that the advantages of minimally invasive surgery can be extended to selected patients with retroperitoneal masses.

In conclusion, laparoscopic approach is a valid alternative to open procedures in selected patients with retroperitoneal masses. In our experience, laparoscopy offers a viable and oncologically radical option with excellent results and low morbidity. This minimally invasive approach is likely to become more common practice as the experience grows and new technologies become available.

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Laparoscopic Dismembered Pyeloplasty: Our Experience in 15 Cases

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Abstract

Objectives: To assess the feasibility and effectiveness of transperitoneal laparoscopic pyeloplasty in the treatment of ureteropelvic junction obstruction. Laparoscopic pyeloplasty has been shown to have a success rate comparable to that of the open surgical approach. We report the results of our first 15 cases of transperitoneal dismembered pyeloplasty.

Patients and methods: From August 2006 to September 2007, 15 patients underwent laparoscopic transperitoneal pyeloplasty for ureteropelvic junction obstruction. All patients underwent dismembered pyeloplasty. All patients were followed with diuretic renography (DTPA renal scan) at 3 months and 1year of follow-up and intravenous urography at 1 year follow-up to assess the success of the surgery.

Results: Fourteen of the fifteen procedures were successfully completed. The procedure was converted to open surgery in one patient who had history of recurrent UTI and friable tissues which were not holding the sutures. Crossing vessels were identified in 7 out of 15 patients(46.7%) which required transposition of the ureter and pelvis before anastomosis. Four patients had associated calculus disease and in 3 out of 4 patients the calculus was removed. Average operating time was 3.75 hours (range 3 to 5 hours) and the mean blood loss was 150 ml. Mean hospital stay was 5.5 days. Mean duration of analgesic use was 5.2 days. Postoperative complications included urinary peritonitis in one patient and suture granuloma in 2 patients. 14 out of 15 patients(93.33%) showed definite improvement in renal function and drainage on radiographic evaluation.

Conclusion: Laparoscopic pyeloplasty (LP) is a safe and effective minimally invasive treatment option that duplicates the principles and techniques of definitive open surgical repair.The success rates associated with LP are comparable to those of the gold standard, open pyeloplasty.

Keywords: Laparoscopic pyeloplasty, transperitoneal pyeloplasty, retroperitoneoscopic pyeloplasty.

INTRODUCTION

Surgical management of PUJ obstruction has recently been revolutionized by the introduction and widespread adoption of minimally invasive techniques as alternative to standard open reconstructive procedures in an effort to reduce the morbidity of the treatment. Initially, minimally invasive approaches included antegrade and retrograde endoscopic endopyelotomy. Although these procedures are associated with relatively few complications, brief hospitalization and little disability, the reported success rates are low (71 to 88%) as compared to an open approach. Also these procedures have an increased risk of hemorrhage (0 to 12%).[1]

Traditional therapy of the obstructed ureteropelvic junction has been open reconstructive surgery (pyeloplasty). The long term success rate of open pyeloplasty has been reported to be greater than 90% in adults and children.[2] Despite the high success rate, open pyeloplasty has the disadvantage of a loin wound and consequent increased morbidity and long convalescence. Laparoscopic pyeloplasty was originally developed in an attempt to duplicate the results of open pyeloplasty while simultaneously decreasing postoperative morbidity. Laparoscopic pyeloplasty was first described in 1993 by Schuessler et al;[3] since then several groups have reported its successful use.[4-7]Although associated with greater technical complexity and a steeper learning curve, in the hands of the experienced laparoscopic surgeons, it has been shown to provide lower patient morbidity, shorter hospitalization and faster convalescence with the reported success rate matching those of open pyeloplasty (90% or higher).

In this study, we present our initial experience with laparoscopic pyeloplasty by transperitoneal approach,including

15 pyeloplasties with an average follow-up of 10.6 months (ranging from 4 to 16 months).

METHODS

Patients

From May 2006 to September 2007, a total of 15 laparoscopic pyeloplasties were performed at our center. Patients included 8 males and 7 females aged 8 to 57 years (mean age 29.8 years). 9 out of 15 patients had right sided PUJ obstruction whereas only 6 patients had left sided lesion. Flank pain was the commonest presentation (9 patients, 60%). Other symptoms were dysuria (6 patients, 40%), fever (2 patients, 13.3%) hematuria (1 patient, 6.6%). One patient (6.6%) was asymptomatic. All patients had radiographic evidence of UPJ obstruction on diuretic renography or HN with delayed function on excretory urography. All patients had primary PUJ obstruction. Four out of 15 patients had stones present in the ipsilateral kidneys. Retrograde pyelography with DJ stenting on the ipsilateral side was done in cases where the pelvis was hugely dilated and if the patients presented with fever and loin pain and when the anatomy was not properly delineated. Radiographic success was defined as improved drainage on diuretic renography. IVP was done at 1 year of follow-up mainly to compare the anatomy of the PUJ preoperatively and postoperatively in our initial cases of laparoscopic pyeloplasty.

PROCEDURE

All patients were kept on liquid diet for 1 day and T. Dulcolax was given in a dose of 2 tablets HS for 2 days. Patients were given parenteral cephalosporin and Amikacin at the time of induction of anesthesia and these antibiotics were continued postoperatively till the time of drain removal. All procedures were performed under general anesthesia. A Foley's catheter was placed in the bladder and a nasogastric tube was inserted to decompress bladder and stomach. All patients were placed in lateral decubitus position with proper padding of pressure areas. The kidney rest was elevated and table flexed to stretch the flank. Compression crepe bandages were applied to legs.

All procedures were carried out by the transperitoneal approach. The access to the peritoneal cavity was obtained with open technique. Pneumoperitoneum was created with an insufflation rate of 5 l/min and the insufflation continued till an abdominal pressure of 15 mm Hg. 30° telescope was used. The first port (10 mm) was introduced at the lateral border of rectus muscle above the umbilicus. The exact level of the port was decided by the configuration of the pelvis and the anatomical position of PUJ and the body habitus of the patient. This port

was used for telescope. The second port was placed at the mid spino umbilical line. 5 mm or 10 mm port was used. The third port (5 mm) was placed subcostally so as to make on equilateral triangle with the previous ports and a diamond with the renal angle. The fourth port was placed in the loin at a later time as and when required. The fourth port (5 mm) was used mainly to retract the kidney laterally.

All patients had dismembered Anderson Hynes pyeloplasty The colon was mobilized by incising the peritoneum laterally. The ureter was identified and dissected in cephalad direction to achieve mobilization of the ipsilateral proximal ureter, UPJ and renal pelvis. One trans cutaneous stay suture was taken on the anterior wall of pelvis to spread it which also helped in suturing. The anterior wall of renal pelvis was incised. Spatulation of the ureter was done on the lateral aspect with the posterior wall intact. Subsequently the posterior wall was divided. In cases where direction of the scissors could not be brought in line with the ureter, the spatulation was done after the circumferential transection of the pelvis. In that case, a marking suture was put on the medial aspect of the ureter before complete transaction. Suturing was done intracorporeally with vicryl 4-0 suture on a 20 mm needle. First the posterior half of the uretero pelvic anastomosis was done with a running suture beginning at the apex of the spatulated ureter. Then the DJ stent was placed and then the anterior wall suturing performed. Reduction of pelvis wherever required was done. If a crossing vessel was present, the ureter was transposed anterior to the crossing vessel. Removal of any associated calculus was tried. In case of calyceal calculi, rigid ureteroscope was used through a 10 mm working port. 20 Fr drain was placed through a 5 mm trocar site.10 mm port sites were closed in 2 layers and 5 mm ports were closed with only skin sutures. The steps of surgery are illustrated in Figures 1A and B.

Postoperatively, clear liquid diet was initiated on the post operative day 1. The Foley's catheter was removed after 2 days and the drain was removed once it was less than 50 cc. Tramadol was used routinely in the postoperative period for pain relief. Skin sutures were removed on 10th postoperative day.

Cystoscopy and DJ stent removal was done at 6 weeks after surgery. DTPA renogram was done at 3 months and one year. IVP was done at 1 year after surgery to look for patent PUJ, reduction in the grade of hydronephrosis and redundant pelvis and improved drainage. Patients were examined clinically at 3, 6 and 12 months.

RESULTS

Only one out of 15 patients required conversion to open approach where the pelvis and ureter were friable and not
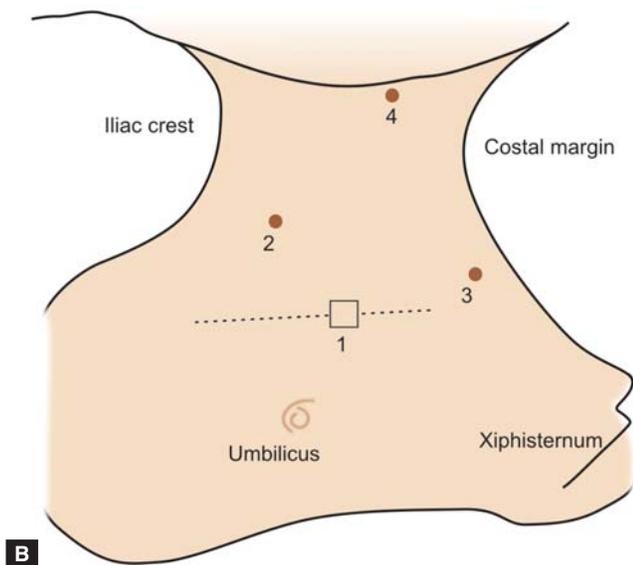
Figs 1A and B: Port sites for right transperitoneal pyeloplasty
(1) – Laparoscope pararectally above umbilicus
(2) – Surgeon's left hand at mid spino umbilical line
(3) – Surgeon's right hand subcostally
(4) – Assistant, mid axillary line

holding suture. In rest of the 14 patients the surgery could be successfully completed laparoscopically. Crossing vessels were identified in 7 (46.7%) out of 15 patients, which required transposition of the ureter and pelvis before anastomosis. Reduction of pelvis was required in 11 (73.3%) out of 15 pyeloplasties. Average operating time was 3.75 hours (range 3 hours to 5 hours) excluding one case which was converted to

open and took 4 hours. The operative time decreased with surgeons experience. Average operating time for first 7 cases was 4.36 hours and it decreased to an average of 3.14 hours for the next 7 cases excluding 1 case which needed conversion to open. Mean blood loss was 150 ml (range 70-250 ml). None of our patients required any blood transfusion. Average amount of gas used was 230 L (range 127-480 L). The mean duration of analgesic use in our series was 5.2 days (ranging from 3 days to 10 days) excluding 2 patients who required open surgery. Mean hospital stay after surgery was 7.6 days (range 3-23 days). However, if two cases which required open surgery were excluded the mean hospital stay, after surgery was 5.5 days (range 3-9 days).

There was one case of accidental division of upper end of DJ stent during pelvic transection. The upper end was subsequently removed and the rest of the stent left *in situ*. An eight years old child had very fragile pelvic and ureteral tissues and there was repeated cut through of sutures during uretero pelvic anastomosis. In this child, the procedure was converted to open approach and pyeloplasty completed. Removal of associated calculus was done in 3 out of 4 patients but clearance was achieved in only one patient who had a pelvic calculus. Rest of the patients with calyceal calculi which could not be retrieved were advised ESWL postoperatively. Our second patient had postoperative urinary extravasation and urinary peritonitis. She required abdominal exploration with interrupted suturing of anterior suture line and PCN on 7th postoperative day. Subsequently the recovery was uneventful.

Follow-up ranged from 4 months to 16 months. Mean follow-up period was 10.6 months. 4 (26.7%) out of 15 patients continued to complaints of intermittent flank pain inspite of radiological evidence of definite improvement in drainage. One patient had no improvement in symptoms and persistence of radiologic evidence of obstruction. This patient had gross HN with nil cortical thickness preoperatively.

Renogram revealed significant improvement in 12 out of 15 patients at 3 months and in 13 out of 15 patients at 1 year. Out of the remaining 2 patients, one patient had nonobstructive renogram preoperatively and it remained stable in the postoperative period. This patient had definite evidence of obstruction with secondary mobile calculi in kidney on IVP. IVP was done at 1 year of follow-up in 6 patients and revealed significant improvement in all cases. Thus, 14 (93.33%) out of 15 cases showed definite improvement in renal function and drainage on radiographic evaluation. One of them had required conversion to open surgery.Thus the success rate in our initial series of 15 cases of laparoscopic pyeloplasty was 86.66% (13 out of 15 cases).

Table1: Table showing the success rate of laparoscopic pyeloplasty in different series

Study	N	A-H pyeloplasties,n(%)	Surgical approach	Success rate (%)	Follow-up(months)
Tan HL[11]	16	16(100)	Trans	87.5%	–
Schussler et al[3]	5	5(100)	Trans	80%	–
Jarret et al[7]	100	71(71)	Trans	97%	31
Young et al[9]	60	56(93.3)	Trans	95.7%	19
Simforoosh N et al[10]	37	19(51.35)	Trans	83.8%	16.5
Eden et al[8]	50	50(100)	Retro	98%	19
Soulie et al[5]	55	48(87)	Retro	87%	14
Our series	**15**	**15(100)**	**Trans**	**86.66%**	**10.6**

DISCUSSION

Laparoscopic pyeloplasty has developed worldwide as the first minimally invasive option to match the success rates of open pyeloplasty, while achieving the added goals of low morbidity, short hospital stay and convalescence. The success rate of our cohort was 86.66% with a median follow-up period of 10.6 months which compares favorably with other series as shown in Table 1.

The operative time decreased with increasing surgeons experience and standardization of the operative steps. Laparoscopic pyeloplasty allows the surgeon to perform the operative steps similar to those in open pyeloplasties such as dissection, transection and suturing. However, it is a difficult procedure that requires careful ureteral dissection and considerable proficiency in the intracorporeal suturing.[12] Standardization of a surgeons steps and introduction of additional techniques specific for laparoscopic surgery can help to overcome the difficulties and enhance the performance. Towards this end, we placed a transcutaneous suture in the medial edge of the redundant renal pelvis just below the renal vein. We found this step very useful in the transection and suturing as it tends to open up the pelvis and acts as a stay suture holding the anterior and the posterior walls of the pelvis apart. We also tried taking a stay suture on the ureter in our initial cases, but it caused entanglement of the sutures and so to avoid confusion this step was omitted in the subsequent cases.

Crossing vessels were observed in 7 out of 15 (46.7%) patients. The contribution of crossing vessels to the functional obstruction of the PUJ is an area of controversy. There is a higher incidence of crossing vessels as detected by color Doppler ultrasonography, in relation to kidneys with known PUJO (79%) than in kidneys with no PUJO (35%).[13] Crossing vessels are commoner in adult kidneys (50 to 80%) with PUJO than in pediatric kidneys with PUJO (30%) and absent in prenatally detected PUJO.[14] Thus there may be a time dependent relation between the development of adult PUJO and the presence of crossing vessel. The identification of crossing vessels tends to be higher in laparoscopic than in open surgery.[6] The explanation for this difference may lie in the minimal mobilization of the kidney needed during the laparoscopic procedure to acess the PUJ, in contrast to the open pyeloplasty in which the entire kidney needs to be mobilized and rotated medially to expose the pelviureteric segment.[6] Van Cangh et al showed the negative association between the presence of crossing vessel and the success rate of endopyelotomy.[15] Crossing vessels are an important consideration in managing PUJO even though the relative contribution of crossing vessels to the pathophysiology of the individual PUJO will probably always be difficult to quantify as there are subtle differences in vessel size, distance from and relation to the PUJ, degree of hydronephrosis, level of kidney function and the presence of periureteric and perivascular bands and adhesions. Incidence of crossing vessels reported in retroperitoneal series is lower than those reported in most transperitoneal studies. And a retroperitoneal surgeon is less likely to transpose the anterior crossing vessel arguing that the ureter is lying naturally and anatomically as the most posterior structure in the retroperitoneum as evidenced in the series of Eden CG et al. Still there is no apparent difference in the success rate of transperitoneal or retroperitoneal laparoscopic pyeloplasty .Precise plastic repair of the PUJ is most important for the success rate of pyeloplasty with the crossing vessel either transposed or translocated cephalad from the PUJ area, as per the individual case.[4]

The necessity for reduction of the renal pelvis might be controversial. We do not reduce the pelvis when it is small and has active peristalsis. However, in a large pelvis with poor movement, we actively consider reduction, particularly when the reduction in necessary to give the PUJ a funnel like shape.

All patients in our series had primary PUJ obstruction. Laparoscopic pyeloplasty has been used even in patients in whom previous endoscopic and/or open pyeloplasty had failed. Sundaram CP et al[16] reported an overall success rate of 94% in a series of 36 patients with secondary PUJO. Siqueria et al[18] also reported success in 8 of 9 patients. Jarrett[7] reported 17 laparoscopic pyeloplasties with secondary PUJO, with a success rate of 88%. Notable point recorded in these studies was the longer mean operative time. Soulie et al[5] and Lachkar et al[17] report that any previous retroperitoneoscopic procedure makes a new retroperitoneoscopic pyeloplasty unlikely. So a transperitoneal approach is preferred for such cases over the retroperitoneal approach.

We used transperitoneal approach in all our patients. This approach offers more working space and a better field of view which is important for a reconstructive surgery. However , several disadvantages have been reported for this approach. For access to the retroperitoneum the colon has to be mobilized and separated from the Gerota's fascia. In addition the renal pelvis is not completely exposed as the renal artery and vein cross ventrally. In Rasweiler's experience[19] this approach is also more invasive as reflected by the higher postoperative moribidity rates relative to the retroperitoneoscopic nephrectomy. However, we did not experience any technical difficulty or increased morbidity in the postoperative period in our series of transperitoneal pyeloplasty. 14 out of our 15 patients did not suffer from ileus or distention of abdomen and we started oral sips from the evening of the surgery which was tolerated well by all patients. 1 out of 15 patient developed urinary peritonitis due to leak from the anterior suture line of the ureteropelvic anastomosis and required open exploration. Others have reported shorter operative times(Souli et al,[5]2001) but higher complication rates (Slama et al,[20] 1999) for the retroperitoneoscopic approach. The success rates seem to be better with transperitoneal pyeloplasty (97 to 99%) than with the retroperitoneoscopic approach (87 to 98%).[12]

Long-term outcomes need to be assessed because in rare cases PUJ obstruction can recur a year or more postoperatively. Several investigators recommend assessment of outcome by at least a 1 year follow-up with diuretic renal scan or IVP[12.] Jarrett et al[7] reported the results of 100 laparoscopic pyeloplasties with a mean clinical and radiographic follow-up of 2.7 and 2.2 years respectively. The overall success rate was 96% and no late failure (after 1 year) was observed. We intend to follow all our patients for a period of 1 year after surgery with IVP and DTPA renal scan. At the present time 8 patients are under follow-up and 7 patients have completed the 1 year follow-up and there was only 1 failure.

CONCLUSION

LP is a safe and effective minimally invasive treatment option that duplicates the principles and techniques of definitive open surgical repair.The success rates associated with LP are comparable to those of the gold standard, open pyeloplasty.

Laparoscopic pyeloplasty is associated with significant reductions in overall morbidity, including less discomfort, shorter hospital stay, lower complication rate, and shorter time to convalescence and is cosmetically superior to the open pyeloplasty.Varied surgical anatomy associated with PUJ like the crossing vessels and high insertion of the ureter in the pelvis can be successfully repaired with laparoscopic pyeloplasty which have been shown to compromise the results of other endourological procedures. The disadvantages include the longer operative duration as compared to open pyeloplasty, steep learning curve and requires technical expertise. With the steady increase in worldwide laparoscopic experience and education, LP is indeed emerging as the new gold standard of care for symptomatic UPJ obstruction.

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Hand Assisted Laparoscopic Appendicectomy (HALA): A Safe Alternative Minimal Access Technique

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Abstract

Introduction: Appendicectomy is a commonly performed surgical procedure. Conventional open appendicectomy is sometimes met with difficulties, particularly when the appendix is malpositioned, in obese patients and patients having peritonitis. On the other hand, laparoscopic appendicectomy conferring several advantages over the open technique is time consuming and requires complex maneuvers like intra and extracorporeal knotting. Understanding the advantages and disadvantages of the above two techniques, we have been using a combination of both which we will be terming as 'Hand Assisted Laparoscopic Appendicectomy (HALA)'.

Material and methods: 83 cases were subjected to appendicectomy using the mentioned technique both for acute and recurrent cases. Patients having gangrenous appendicitis or with necrotic and friable appendix were excluded from the study.

Observations and results: The results are as follows:
1. Duration of hospital stay: 2.4 days
2. Wound infection: 5/83
3. Duration of follow-up: till 1 month postoperative.
4. Paralytic ileus: 3/83
5. Operating time (mean): 30 minutes.

Conclusion: Hand assisted laparoscopic appendicectomy (HALA) is a safe alternative technique providing all advantages of minimal access surgery while reducing the complexities associated with it.

INTRODUCTION

Appendicectomy is a commonly performed surgical procedure. Conventional open appendicectomy is sometimes met with difficulties, particularly when the appendix is malpositioned, in obese patients and in patients having peritonitis. The above difficulties, mandates extension of incision many a times leading to increased operating time, pain and hospital stay and compounds other problems related to large incision.

On the other hand, Laparoscopic appendicectomy confers the advantage of better pain management, lesser wound infection, and faster recovery to normal.[1] Moreover, it gives the opportunity for performing diagnostic laparoscopy, particularly in the women of child bearing age group. Lastly, it lowers the risk of adhesions, infection, dehiscence, and herniation.[2] However it is time consuming and requires complex measures like intra and extracorporeal knotting.

Understanding the advantages and disadvantages of the above two techniques we have been using a combination of both which we will be terming as '**Hand Assisted Laparoscopic Appendicectomy(HALA)**'.

In summary, 'Hand Assisted Laparoscopic Appendicectomy' means performing diagnostic laparoscopy, locating the appendix and delivering it out through the port and performing appendectomy in a way similar to the open technique.

PATIENT AND METHODS

An optical port, 5 mm or 11mm is inserted in the supra umbilical region using open technique through the umbilical cicatrix (Fig. 1). After creating pneumoperitoneum, diagnostic laparoscopy is done to firstly, rule out any intra-abdominal injury, secondly to evaluate the cause of abdominal pain and lastly to localize the base of the appendix. Once the base is localized, a 5 mm or 10 mm port is inserted exactly above the base of the appendix. Appendix is delivered out of the later port using a Babcock (endoscopic) or atraumatic grasper (Fig. 2). If the appendix is located in the retrocecal position with lots of peri appendiceal adhesions, an additional port is inserted in the right upper quadrant. This helps in adhesionolysis, bipolar coagulation of mesoappendix if required and diagnostic laparoscopy (running the terminal ileum). In cosmetically conscious patients, this optional port can be inserted in
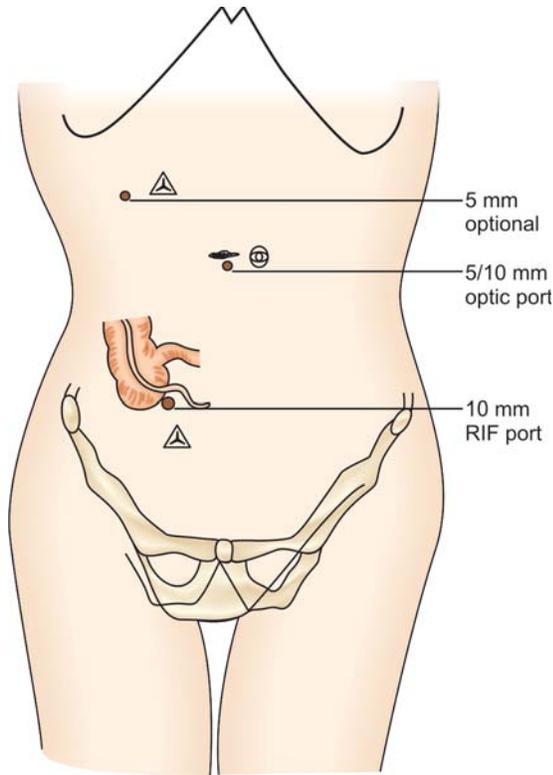
Fig. 1: The port positioning. 10 mm optical port, 5 mm operating port exactly opposite to the base of the appendix, 5 mm optional port either in Rt hypochondrium or suprapubic region

Fig. 2: Delivering the appendix through the port incision using an atraumatic grasper

suprapubic area as well. The rest of the procedure is conducted similar to the open technique that is mesoappendix is clamped, cut and ligated, and the base of the appendix is transfixed (Figs 3 and 4). After distal ligation, the appendix is cut in-between
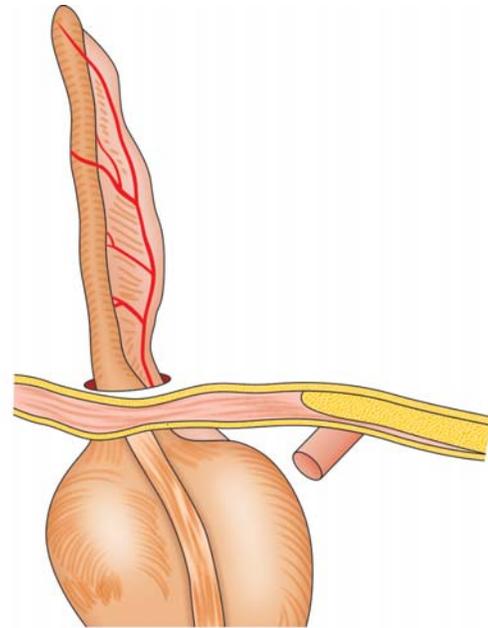

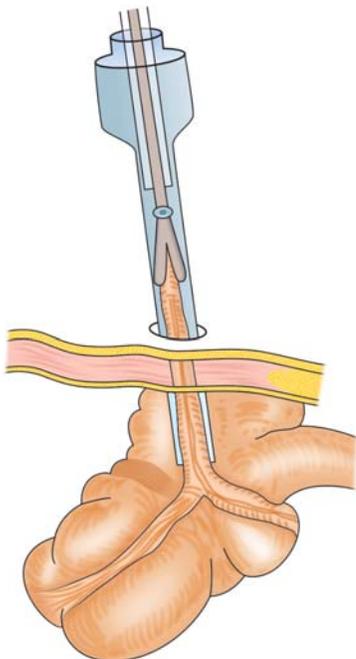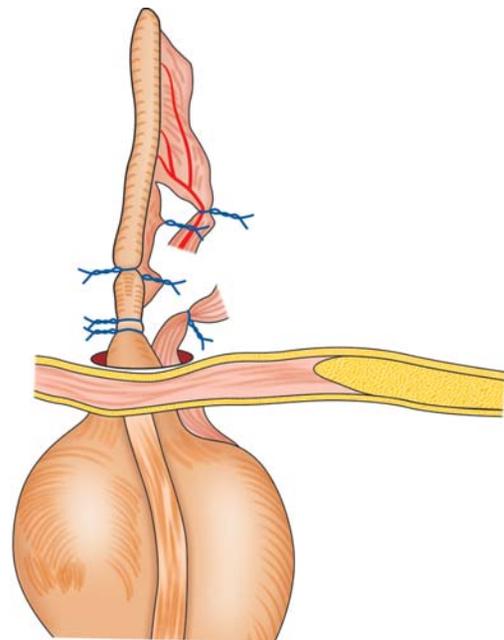**Fig. 3:** Appendix brought out through the port incision

Fig. 4: Performing the appendectomy similar to the open technique, i.e. mesoappendix clamped, cut and ligated and the base of the appendix is transfixed. After distal ligation the appendix is cut in between and removed

and removed. The mucosa of the appendiceal stump is cauterized. Hemostasis is confirmed. Appendiceal stump is pushed inside and a 10 mm port is reinserted, to examine the terminal ileum, colon, female pelvic organs and mesentery and lastly, to take biopsy, if necessary. In case of difficulty in delivering out the appendix through the port (as in Fig. 2) due to kinking of the appendix, a serial ligation of the mesoappendix has to be deployed. This helps in delivery of the appendix bit by bit. Thorough wound toileting/irrigation is done, in case of acute appendicitis, at the end of the procedure.

Eighty-three cases were subjected to appendicectomy using the mentioned technique. This was used for acute and recurrent cases. Patients having gangrenous appendicitis or necrotic and friable appendix were not subjected to the above technique.

OBSERVATION AND RESULTS

The results are as follows:
1. Duration of hospital stay: 2.4 days
2. Wound infection: 5/83
3. Duration of follow-up: till 1 month postoperative.
4. Paralytic ileus: 3/83
5. Operating time (mean): 30 minutes.

CONCLUSION

Hand assisted laparoscopic appendicectomy (HALA) is a safe alternative technique providing all advantages of minimal access surgery while reducing the complexities associated with it.

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Management of the Normal Appendix during Laparoscopy for Right Iliac Fossa Pain

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Abstract

The advent of laparoscopic surgery raises the question of what to do with a normal appendix at laparoscopy for right iliac fossa pain of uncertain origin. We assess the views of all members of the Association of Laparoscopic Surgeons of Great Britain and Ireland (ALSGBI) via means of a survey. Of 135 responses to the questionnaire 61% of surgeons remove a macroscopically normal appendix and 26% do not. 13% of surgeons do not commit. Of those removing a normal appendix the most common reasons given were the possibility of endoluminal appendicitis (87%) and avoiding future confusion as to whether the appendix had been removed (64%). When asked whether there were sufficient guidelines on this topic 68% said no, 6% said yes and 5% were unsure. 16% said that it was a matter for common sense rather than guidelines and 5% felt that the evidence was contradictory. This study highlights a lack of consensus in the management of a normal appendix found at laparoscopy for right iliac fossa pain and demonstrates most surgeons feel guidelines would be useful. In the absence of guidelines the options may be discussed with the patient before operation.

Keywords: Laparoscopic appendicectomy, normal appendix, diagnostic laparoscopy

INTRODUCTION

The lifetime risk of developing appendicitis in the USA is 8.6% for men and 6.7% for women.[1] In the era of open appendicectomy15-30% of appendices removed were normal.[2,3] Scoring systems have been put forward as an aid to diagnosis.[4] Ultrasound is user dependent and while computed tomography may be diagnostic it involves exposure to radiation.

There is a lack of consensus in the literature over what to do with a normal appendix. The main argument for removing a normal appendix is that endoluminal appendicitis may not be recognized at operation leading to concern that an abnormal appendix is left in place. This may result in the need for subsequent appendicectomy.[5,6] Endoluminal appendicitis is reported in 11-58% of apparently normal appendices removed.[5,7,8] Navez argues that since endoluminal appendicitis is confined to the mucosa it does not cause localized pain and questions whether there is progression to suppurative appendicitis.[7]

Many patients are unsure as to whether their appendix has been removed. Murphy et al 2001 reported that of 176 patients who had laparoscopy for right iliac fossa pain 61% were under the misapprehension that their appendix had been removed.[9] They suggest that the removal of a normal appendix adds little to the morbidity of laparoscopy and that the appendix should be removed regardless of its appearance at laparoscopy.[10] This is supported by studies where incidental appendicectomy has been performed during total abdominal hysterectomy[11] and cystectomy.[12] However other studies report increased complications following the removal of a normal appendix.[13-17]

Data on follow-up of patients who have not had their appendix removed suggest that it is safe to leave a normal appendix in place. Van den Broek et al 2000 reported a prospective study of 109 diagnostic laparoscopies for suspected appendicitis where the appendix was left in place if it looked normal. There were 9 readmissions with only one requiring an appendicectomy.[18] Van Dalen et al 2003 reported a prospective randomised study of 63 patients with 10 years follow-up. Patients found at laparoscopy to have a normal appearing appendix were randomised to laparoscopy + open appendicectomy or laparoscopy only. No patients in the diagnostic laparoscopy group developed appendicitis subsequently.[19] Teh et al 2000 reported that of 41 patients who had laparoscopy alone for a normal appendix 13 continued to have symptoms and 2 eventually had their normal appendix removed.[20]

In this study we assess the practice of members of ALSGBI and their views on whether guidelines are desirable.

MATERIAL AND METHODS

A literature review was performed using the Pubmed database and searching using the words laparoscopy and normal appendix.

Following questionnaire was sent to 588 members of ALSGBI:

Do you perform laparoscopic appendicectomies?

Approximately what proportion of these are in females?

In a patient undergoing laparoscopy for right iliac fossa pain with an uncertain diagnosis, if the appendix appears normal and there is no other pathology do you remove the appendix?

If yes, is this for any of the following reasons?

- To prevent future appendicitis
- For possible endoluminal appendicitis (inflammation of the mucosa of the appendix with an externally normal appendix)
- To avoid future confusion for the patient as to whether or not they have an appendix
- Other (please specify).

Do you feel that there are sufficient clear guidelines on this topic? If so from what source?

RESULTS

135 (23%) responded to the questionnaire. 134 answered all questions, of which 98% currently perform laparoscopic appendicectomy. 62% perform laparoscopy for right iliac fossa pain mostly in females and 4% only in females. 4% perform laparoscopy mostly in males and for 28% sex does not affect the decision. 2% were unsure of the sex distribution of their patients.

61% of surgeons remove a macroscopically normal appendix at laparoscopy for right iliac fossa pain of unknown origin and 26% do not. 13% of surgeons do not commit either way.

Of those removing a normal appendix the most common reasons given were the possibility of endoluminal appendicitis (87%) and to avoid future confusion as to whether the appendix had been removed (64%). Some (44%) remove a normal appendix to prevent future appendicitis and 38% gave various other reasons (Table 1).

Table 1: Reasons for removing a 'normal' appendix in the groups that always remove or sometimes remove the appendix

Reason	Percent
Endoluminal appendicitis	87
To avoid future confusion as to whether it was removed	64
Prevention of future appendicitis	44
Recurrent pain to clarify diagnosis	7
To remove as a future diagnosis of nonspecific abdominal pain	6
Continuing pain	6
Ease of procedure/Doesn't add to morbidity	5
Patient satisfaction	3
Fecolith giving rise to colic	3
To exclude other pathology	3
Same rationale as open	2
Training of juniors	1
Surgeon more content	1
Possible missed diagnosis	1

When asked whether there were sufficient guidelines on this topic 68% said no, 6% said yes[21] and 5% were unsure. 16% said that it was a matter for common sense rather than guidelines and felt that clinical judgment was needed as opposed to guidelines. 5% felt that the evidence was contradictory making it difficult to issue guidelines.

DISCUSSION

Of those who responded to the questionnaire 98% were currently performing laparoscopic appendicectomy. However only 23% of the population surveyed responded to it. Most often laparoscopy for right iliac fossa pain is performed in women who may have gynecological conditions which can mimic appendicitis.

61% of surgeons always remove the appendix and the most common reason given was the possibility of endoluminal appendicitis followed by the avoidance of future confusion as to whether the patient has an appendix. Both these arguments are backed up by data in the literature. However 44% remove an appendix to prevent future appendicitis for which there is no evidence.

68% felt there were no adequate guidelines for surgeons to follow. However since the available evidence is contradictory it does not at present allow the formulation of clear guidelines. The 16% who said that clinical judgment was more important are justified in their view.

This leaves the question of what should be done to satisfy the demand for clear guidelines found in this survey. A large prospective randomized multicenter clinical trial would provide the evidence but would prove logistically difficult and if patients were to be blinded to their operation an accessible data base would be mandatory. Possibly a more feasible study (admittedly with a lower level of evidence) would be a large multicenter study on the long-term follow-up of all patients who have had a normal appendix left *in situ* after diagnostic laparoscopy for right iliac fossa pain as previous similar studies have low numbers of patients making it difficult to form conclusions.[18-20] Meanwhile it is suggested that in the absence of guidelines the options are discussed with the patient before the procedure and that they are made fully aware that there are arguments for both removing and leaving the appendix.

In conclusion, this study shows that there is a lack of consensus in the management of a normal appendix found at laparoscopy for right iliac fossa pain and most surgeons feel that guidelines would be useful. In the absence of guidelines the options may be discussed with the patient before their operation as part of the consent procedure.

ACKNOWLEDGMENTS

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Intratubal Methotrexate versus Laparoscopic Salpingotomy

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Abstract

Introduction: Though laparoscopic salpingotomy is the preferred conservative surgery of choice in patients desirous of future fertility, the management of ectopic pregnancy has changed extensively. Other modalities like medical management with Methotrexate are being reviewed for conservative management of tubal pregnancy.

Objectives: To compare intratubal Methotrexate instillation with laparoscopic salpingotomy for conservative management of tubal pregnancy.

Methods: A literature review was conducted using search engines Google, Highwire press. Success rate after treatment and future reproductive outcome were analyzed.

Conclusion: Laparoscopic salpingotomy was more superior to with Methotrexate as conservative treatment of ectopic pregnancy.

Keywords: Laparoscopic salpingotomy, pregnancy, tubal, ectopic.

INTRODUCTION

Each year, women all around the world present with ectopic pregnancy, accounting for upto 2% of pregnant women.[1] This pathology occurs due to the implantation of fertilized ovum outside the uterus, the most common site being the fallopian tube. If left untreated, it eventually causes life-threatening hemorrhage following the rupture of the fallopian tube. It is therefore a significant cause of maternal mortality and morbidity.[2-4] It is known to account for 10-12% of maternal mortality.[5-6]

Ectopic Pregnancy usually occurs 98% of cases in the uterine tube. Trophoblast can be implanted at various sites. These are as follows:

• The ampulla (64%)
• The Isthmus (25%)
• The infundibulum (9%)
• The intramural junction (2%)
• Ovarian (0.5%)
• Cervical (0.4%)
• Abdominal (0.1%)
• Broad ligament (0.05%)

RISK FACTORS ASSOCIATED WITH ECTOPIC PREGNANCY

Previous tubal surgery
Previous ectopic pregnancy
In utero diethylstilbestrol exposure
Previous genital infections
Infertility
Current smoking
Previous intrauterine device use[7,8]

A diagnosis of ectopic pregnancy is made by history and examination, ultrasonography, bHCG serial assays.

HISTORY AND PHYSICAL FINDINGS

Ectopic pregnancy is usually diagnosed around seven weeks of gestation in reproductive women who present with abdominal pain and vaginal bleeding.[9] The overall risk of developing ectopic pregnancy is 39 percent in a patient with abdominal pain and vaginal bleeding but no other risk factors and increases to 54 percent if the patient has other risk factors.[10] Exclusion of ectopic pregnancy based solely on history and physical examination is not reliable.[11-14]

BETA HUMAN CHORIONIC GONADOTROPIN (bhCG) MEASUREMENT

Beta-hCG levels increase by at least 53 percent every two days, and reach a level greater than 100,000 mIU per mL (100,000 IU per L) in a normal intrauterine pregnancy.[1,15] in ectopic pregnancy serial beta-hCG levels do not increase appropriately. Serial assays are only 36 percent sensitive and approximately 65 percent specific for detection of ectopic pregnancy.[16,17]

SERUM PROGESTERONE MEASUREMENT

Eighty-five percent of patients with ectopic pregnancy will have normal serum progesterone.

Levels.[10] It is, therefore, not diagnostic of ectopic pregnancy, though patients at risk for developing ectopic pregnancy can be identified.

ULTRASOUND IMAGING

Ultrasonography is the test of choice. If transabdominal ultrasonography does not show an intrauterine gestational sac and the patient's beta-hCG level is greater than 6,500 mIU per mL (6,500 IU per L) or Transvaginal ultrasonography does not show an intrauterine gestational sac with beta-hCG level of 1,500 mIU per mL (1,500 IU per L) or greater, ectopic pregnancy can be suspected. Transvaginal ultrasonography and serial beta-hCG measurements have sensitivity of 96 percent and specificity of 97 percent in diagnosing ectopic pregnancy.[2,18]

The mortality and morbidity has declined in the recent in the recent years due to improvements in diagnosis by transvaginal ultrasonography and serial assays of bHCG.[19,20] Improved diagnosis, desire for future fertility have changed the treatment modality of tubal pregnancy more in favor of conservative approach with successful results.[21]

The criteria for selecting appropriate candidates for conservative management of an ectopic pregnancy is:
1. A highly compliant and reliable patient, since close follow-up is required and resolution may take up to 7 weeks.
2. Healthy woman, unruptured tubal ectopic pregnancy and hemodynamically stable.
3. Ultrasound without evidence of intrauterine pregnancy and ideally a dilatation and curettage failing to find villi.
4. Ectopic size less than 4 cm in greatest diameter CG titer of less than 5,000 mIU/mL.
5. Absence of fetal heart tones.

Every patient must satisfy Criteria 1 and 2, Criteria 3 to 6 being relative contraindications to medical therapy.[22] Conservative approach can be medical or surgical.

Medically, Methotrexate is the drug of choice and can be administered via various routes. One of which is locally, under ultrasound guidance into the gestational sac directly. The main potential advantages of this method are:
1. A greater antitrophoblastic effect;
2. A shorter treatment period;
3. Reduced dosage, and
4. Absence of side effects.[23]

Laparoscopic approach is the preferred approach now and laparoscopic salpingotomy is the conservative surgery of choice. The mesosalpinx is infiltrated with vasopressin (5 IU in 20 mL of normal saline). A 1 to 2 cm incision on the antimesenteric side of the tube is made . Copious irrigation is used to dislodge trophoblast. The bed is irrigated well. The products of conception are then removed through the 10 mm sleeve. The opening of fallopian tube was left to heal by secondary intention. This review was carried out to compare treatment for tubal pregnancy using intratubal Methotrexate or by laparoscopic salpingotomy. Short-term outcome measures (primary treatment success, reinterventions for clinical symptoms or persistent trophoblast, tubal preservation) and long-term outcome measures (tubal patency and future fertility)were focused upon.

MATERIAL AND METHODS

A literature search was performed using the search engine Google and Highwire Press. The following search terms "Laparoscopic salpingotomy, pregnancy, tubal, ectopic" were used. Selected papers were taken for the further references.

INCLUSION CRITERION

Published RCT (randomized controlled trial) were included in the review if it dealt with the comparison of Methotrexate and laparoscopic salpingotomy for the treatment of tubal pregnancy

OUTCOME MEASURES

1. Short-term
   • Evaluation of success of the treatment which was based on uneventful decline of serum bhCG to undetectable levels.
   • Need for reintervention in view of persisting clinical symptoms or inadequately declining serum bhCG levels.
2. Long-term
   • Patency of the fallopian tube on further follow-up which was established by passage of dye on hystero-salpingography
   • Future fertility.
3. Others
   • Hospital stay and
   • Cost effectiveness.

DISCUSSIONS

Success Rate

In a study of one hundred patients, conducted by Shalev E et al, in 1995, to test the effectiveness of laparoscopic intratubal Methotrexate (MTX) injection or salpingotomy in the treatment of ectopic pregnancy, Salpingotomy was successful in 51 of 55 patients (92.7%), whereas intratubal MTX injection was successful in only 27 of 44 women (61.4%). Methotrexate injection particularly was unsuccessful if the initial bhCG was > 2,000 mIU/mL (conversion factor to SI unit, 1.00) or the size of the tubal mass was > 2.0 cm as measured during laparoscopy.[24] Fernandez (1998), in a study of Methotrexate (group 1), or laparoscopic salpingotomy (group 2), reported successful treatment in 45 of 51 patients in group 1 (88.2%) and 47 of 49 group 2 (95.9%). success rate.[25]

That Methotrexate had a lesser success rate as compared to laparoscopic salpingotomy was also concluded in similar comparative studies, even though criterion for conservative management had been strictly followed.[26, 27]

Reintervention

An advantage of linear salpingotomy was the predictable and consistent decline of circulating bhCG, and consequently a reduced need for reintervention. This was concluded by Porpora et al in a study performed to compare local injection of Methotrexate (MTX) and linear salpingotomy in the conservative treatment of ectopic pregnancy.[27]

Tubal Patency

No significant difference in tubal patency on follow-up hysterosalpingography was observed between the two groups. This was concluded in a number of studies.

In an original randomized study done by Fernandez in 1995 comparing intratubal Methotrexate with laparoscopic salpingotomy, tubal patency was assessed in 35 women with hysterosalpingography on follow-up after 3 months. No difference was found.[28]

Two similar randomized controlled trials reported on tubal patency in 36 women and no significant differences were found.[26,27]

Fertility Outcome

Fertility restoration and pregnancy outcome following conservative approach by minimal access surgery proved no significant difference when compared with Intratubal Methotrexate. The number of intrauterine pregnancies was comparable, 83.5% in the group treated with laparoscopic pregnancy and 81% in the other group treated with Methotrexate.[29]

Hospital Stay

A randomized control trial conducted by Porpora et al, comparing laparoscopic surgery versus Methotrexate in treatment of ectopic pregnancy, showed longer hospital stay of 2.7 days (range 1-5 days) to 1.7 days (range 1-3 days in the Methotrexate group.[27]

Cost Effectiveness

It was concluded in various studies that single dose of Methotrexate was more cost effective in comparison to laparoscopic salpingotomy.[30-32]

CONCLUSION

Methotrexate is not suitable for treatment of every ruptured ectopic even after choosing patients according to the inclusion criterion and is found to be more effective for small tubal pregnancies with low values of bhCG. Thus laparoscopic salpingotomy has an edge over Methotrexate and should be the gold standard for conservative approach in an unruptured tubal pregnancy.

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Laparoscopic Cholecystectomy in Patients Over 80 Years is Feasible and Safe: Analysis of 68 Consecutive Cases

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Abstract

Background: Wide variations are reported in morbidity, mortality and conversion rates for laparoscopic cholecystectomy in the octogenarian population. As a retrospective review, this paper reports the experience of a district general hospital unit in the management of gallstone disease in an elderly population.

Methods: The case notes of all patients over 80 years of age undergoing laparoscopic cholecystectomy over a 7 years period were retrospectively analyzed. Primary outcome measures were conversion to an open procedure and complications of surgery.

Results: Sixty-eight octogenarians (mean age of 84 years [range 80-96 years], 37 female) undergoing laparoscopic cholecystectomy were identified. Five (7.3%) operations were converted to open surgery.

The total number of patients having complications was 16 (24%), 8 (12%) being grade 1 and 8 (12%) grade 2. Forty-eight (71%) patients had complicated gallstone disease. Grade 2 complications were related to the presence of CBD stones (p = 0.0003).

Conclusion: Octogenarians should be considered for laparoscopic cholecystectomy for symptomatic gallstones. Although the overall risk of complications remains higher in octogenarians, conversion rates can be low. Octogenarians with common bile duct stones may be best managed with ERCP as this group of patients appears to be at particular risk from surgical intervention.

Keywords: Octogenarian, cholecystectomy, conversion

INTRODUCTION

Improvements in perioperative care for the ageing population have resulted in an increasing number of elderly patients being considered for surgery. With an incidence of gallstone disease of 14-27%,[1] it is inevitable that significant numbers of elderly symptomatic patients are referred for surgery despite historical concerns over comorbid conditions and more complex gallstone disease.

Increased risks and complications of surgery in the elderly[2] may be reduced by minimally invasive surgery which is associated with a shorter hospital stay and fewer complications in elderly patients.[3] However, even with laparoscopic surgery the population over 80 years old undergoing laparoscopic cholecystectomy may have morbidity rates of 2.2-24% and mortality rates of up to 2.8%.[3-7]

The potential benefits of laparoscopic surgery may be lost if conversion to an open operation is necessary. If not unduly delayed, conversion carries similar risks to open cholecystectomy, whereas 'enforced' conversion usually following severe iatrogenic injury or bleeding is associated with higher morbidity and mortality.[8] Patients over 80 years generally have higher conversion rates of 2.2-37%,[3-5,9-11] the most significant factor being the increased incidence of complex pathologies related to gallstones. The incidences of acute and chronic cholecystitis, severe scarring and adhesions, common bile duct stones, gallstone pancreatitis, previous upper abdominal surgery and gallbladder cancers are all increased in the elderly population.[5,6,12]

This paper reports the experience of a district general hospital unit in the management of gallstone disease in a population over 80 years old.

MATERIAL AND METHODS

The records of all patients over the age of 80 years undergoing laparoscopic cholecystectomy between January 2000 and June 2007 were retrospectively analyzed. Age, sex and American Society of Anesthesiologists (ASA) grade and indications for surgery were recorded. The method of evaluation of bile duct stones was noted on preoperative ultrasound, MRCP or ERCP, or intraoperative cholangiography. The difficulty of surgical dissection of the gallbladder and Calot's triangle was assessed from the operating notes. 'Difficult' dissections were considered as those where the operation note commented on dense adhesions of colon, duodenum or omentum, a thick walled gallbladder, empyema of the gallbladder or a shrunken fibrotic gallbladder. The mode of surgery was classified as either elective or emergency. For elective cases the patient with no acute symptoms had a planned admission either on the day of surgery

or the preceding day. Emergency cases were defined as those where admission was for acute symptoms, which persisted or worsened indicating urgent surgical intervention.

Laparoscopic cholecystectomy was performed using a three or four port technique. Cholangiography was performed selectively. Common bile duct (CBD) stones were managed with either laparoscopic bile duct exploration or postoperative ERCP according to the operating surgeon's preference. The grade of the operating surgeon was noted. The duration of the procedure was recorded from anesthetic charts.

Primary outcome measures were conversion to an open procedure and complications of surgery, including 30 days mortality. Complications were recorded according to a previously described classification:[13]

- Grade 1: Minor complications treated with bedside therapy such as urinary retention.
- Grade 2: Complications that require potentially morbid interventions such as treatment of arrhythmias, surgery or other invasive procedure.
- Grade 3: Complications that result in a residual disability such as myocardial infarction or CVA.
- Grade 4: Death.

Length of postoperative hospital stay was also recorded.

Statistical analysis was performed using Chi-square test for categorical variables and t-test for continuous variables. Significance was accepted at a level < 0.05.

RESULTS

Sixty eight patients over 80 years [mean age of 84 years (range 80-96 years), 37 female] were identified as having undergone laparoscopic cholecystectomy as a primary procedure. This represented 0.03% of all laparoscopic cholecystectomies performed during this period.

Significant medical comorbidity was recorded in 32 (47%) patients with ASA $\geq$ 3.

Forty-eight (71%) patients had complicated gallstone disease, 23 (34%) with cholecystitis, 28 (41%) with common bile duct stones and 7 (10%) with pancreatitis. Thirty-eight (56%) had a difficult dissection. Fifty-five (81%) of operations were performed electively and 42 (62%) cases were performed by a consultant surgeon. Of the 26 cases started by specialist registrars, 12 had to be completed by consultants (Table 1).

The mean duration of surgery (excluding 1 case of a planned combined antireflux procedure) was 90 minutes (s.d. ± 47 minutes). Five (7.3%) operations were converted to open surgery. The total number of patients having complications was 16 (24%), 8 (12%) being grade 1 and 8 (12%) grade 2. The median length of hospital stay was 3 nights (interquartile range 2-7). Outcome measures are summarized in Table 2. Reasons for conversion to open surgery are summarized in Table 3.

Table 1: Demographics of octogenarians (n = 68) undergoing laparoscopic cholecystectomy

Age; years*	84 (80-96)
Sex; M : F	31 : 37
ASA grade;	
I	2 (3%)
II	50 (%)
> III	32 (47%)
Complicated gallstone disease	48 (71%)
Cholecystitis	23 (34%)
Common bile duct stones	28 (41%)
Pancreatitis	7 (10%)
Difficult dissection	38 (56%)
Timing of surgery	
Elective	55 (81%)
Emergency	13 (19%)
Operating surgeon	
Consultant	42 (62%)
Specialist registrar	14 (21%)
Specialist registrar, completed by consultant	12 (17%)

*Mean

Table 2: Outcome measures for octogenarians (n = 68) undergoing laparoscopic cholecystectomy

Duration of surgery; minutes*	90 (± 47)
Conversion to open surgery	05 (7.3%)
Complications	16 (24%)
Grade 1	08 (12%)
Grade 2	08 (12%)
Grade 3	00
Grade 4 (30 day mortality)	00
Length hospital stay; postoperative nights§	03 (2-7)

*Mean and standard deviation
§Median and interquartile range

Table 3: Reasons for conversion to open cholecystectomy

Reasons for conversion	Number of cases
Gallbladder carcinoma	1
Acute inflammation Calot's triangle	2
Chronic inflammation/ scarring	2

The grade 1 complications were: three cases of acute urinary retention, one minor respiratory tract infection, one wound infection, one urinary tract infection, one intraoperative bleed not requiring transfusion and one case of surgical emphysema complicating a difficult first port insertion. The grade 2 complications necessitated transfusion or operative intervention. One patient had laparoscopy and washout to investigate severe postoperative pain although no bile leak or perforation was identified. There were four cases of significant hemorrhage, two managed by transfusion and two requiring laparotomy and washout. One case of bile leak was managed with laparotomy, CBD exploration and removal of CBD stones. There were two (3%) cases of bile duct injuries, one presenting

as a postoperative bile leak managed by laparoscopy, washout and laparoscopic repair of a CBD injury. The second, a hepatic duct injury complicating laparoscopic bile duct exploration, was recognized at the time of surgery and repaired laparoscopically. The grade 2 complications are summarized in Table 4.

Subgroup analyses were performed for the cases converted to open surgery and those having grade 2 complications. These two groups were compared to the remainder of the cohort for significant differences in ASA grade (≥ III), age, sex, complications of gallstone disease, difficulty of dissection, timing of surgery and grade of operating surgeon. The converted cases had significantly higher incidences of emergency surgery and difficult dissections (Table 5). For patients with grade 2 complications there was a significant difference in the history or presence of CBD stones (Table 6).

Table 4: Summary of grade 2 complications from laparoscopic cholecystectomy (n = 8)

Grade 2 complication	Intervention	Number of cases
Postoperative hemorrhage	Blood transfusion	2 (3%)
Postoperative hemorrhage and peritonism	Laparotomy and washout of hematoma	2 (3%)
Postoperative peritonism	Laparoscopy — no bile leak/hematoma	1 (1%)
Bile-leak and peritonism	Laparotomy, CBD exploration and extraction of stones	1 (1%)
Bile duct injuries	Laparoscopic repair	2 (3%)

Table 5: Comparison of the timing of surgery and the difficulty of dissection between cases converted to open surgery and those completed laparoscopically

	Converted (n = 5)	Laparoscopic (n = 63)	p-value
Timing of surgery			
Emergency	3	10	0.016
Elective	2	53	
Dissection			
Difficult dissection	5	33	0.039
Straight forward dissection	0	30	

Table 6: Comparison of the incidence of common bile duct stones between patients suffering grade 2 complications and those with either grade 1 or no complications

	Grade 2 complications (n = 8)	Grade 1 or no complications (n = 60)	p-value
Common bile duct stones	8	20	0.0003
No common bile duct stones	0	40	

DISCUSSION

This series demonstrates that laparoscopic cholecystectomy is safe and efficacious in the patients over 80 years. Thirty seven (54%) of our patients with an age range 80 to 91 years left hospital within 5 days without complications from surgery. Symptomatic gallstones can have a significant impact on an individual's quality of life and with the increasing life expectancy and quality of health of octogenarian patients, a substantial number will realize the benefits of surgery.

Our conversion rate of 7.3% compares favorably with previous studies. Lower conversion rates (2.2%) have only been quoted for cohorts with a small proportion of urgent cases (4.4%). The importance of the learning curve of the operating surgeon is well-documented for the incidence of bile duct injury, conversion rates and morbidity associated with laparoscopic cholecystectomy.[8] Increasing confidence and experience in the techniques of laparoscopic dissection are likely to have contributed to the low conversion rate in this series. An improvement in conversion rates over time has been noted previously for elderly patients (65-79 years) although not in patients over 80 years.[6]

Whilst we have shown favorable outcomes this data does reaffirm that laparoscopic cholecystectomy in the elderly can be a challenging surgical undertaking. Thirty two (47%) patients had serious comorbidity with an ASA grade ≥ III. Forty eight (71%) had complex gallstone disease and 38 (56%) a complex surgical dissection.

The high percentage of ASA grades ≥ III is not unexpected in our population and in keeping with previous octogenarian populations undergoing laparoscopic cholecystectomy.[5,6] The associated comorbidities would account for the prolonged median length of hospital stay of 3 (i.q. range 2-7) nights seen in our patients. The ASA grade however did not show any association with either conversion to open surgery or grade 2 complications from surgery.

The high incidence (71%) of complicated gallstone disease was consistent with the previous studies of laparoscopic cholecystectomy in the elderly,[5,6,12] partly explaining a difficult dissection in 38 (54%) cases and in defining outcomes for these patients. In the group of patients requiring conversion to open surgery there was a significantly increased number of emergency procedures (p = 0.016) and difficult dissections (p = 0.039) with dense adhesions or scarring around the gallbladder and Calot's triangle. Difficult dissection is probably the commonest cause for conversion.[8] Whilst complicated gallstone disease should alert the surgeon to a potentially difficult dissection, even patients reporting only biliary colic may have difficult dissections, as in 9 of our cases.

The grade of operating surgeon (consultant vs specialist registrar) starting the operation was not related to conversion rates or grade 2 complications (p > 0.05). However almost half

of the cases started by a specialist registrar had to be completed by a consultant, underlining the need for senior surgical involvement in these cases.

The complication rate (24%) was comparable to rates of 2.2-26% from previous studies of laparoscopic cholecystectomy in octogenarians.[3,5-7] The grade 2 complications were all directly related to cholecystectomy. The most striking feature of these cases was the statistically significant incidence of CBD stones (p = 0.0003). Whilst the bile duct injuries and bile leak can be directly related to the presence of CBD stones, this was not an exclusive factor. Three patients in our series underwent laparoscopic bile duct exploration, one of which was complicated by a hepatic duct injury. The debate concerning ERCP or laparoscopic bile duct exploration has favored laparoscopic exploration,[14] dependent upon local expertise and availability. Little of the existing data comes from octogenarians and this series suggests that the risks of an operative approach are higher.

CONCLUSION

Patients over 80 years should be considered for laparoscopic cholecystectomy for symptomatic gallstones. Although the overall risk of complications remains higher in these patients, conversion rates can be low. Patients over 80 years with common bile duct stones may be best managed with ERCP as this group of patients appears to be at particular risk from surgical intervention.

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A 3 Years Review of Hysteroscopy in a Private Hospital in Nigeria

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Abstract

Background: Hysteroscopy is a valuable tool in the evaluation and treatment of infertility and many other gynecological procedures. Its use has relegated blind procedures for the investigation and treatment of endometrial pathologies and in some instances obviates the need for open surgeries. Unfortunately the equipment is only available in a few private hospitals in Nigeria.

Objectives: To describe our experience with hysteroscopy in a private hospital setting in Nigeria.

Material and methods: Retrospective reviews of all cases of hysteroscopy done between January 2003 and December 2005 at Nisa Premier Hospital (Nordica Fertility Centre), a dedicated fertility center in Abuja, Nigeria was carried out. Relevant information was extracted from the patients' case notes and theater records. The hysteroscopic procedures were carried out during the proliferative phase of the patients' menstrual cycle. All but nine patients had paracervical block with xylocaine in addition to intravenous pentazocine and promethazine for pain relieve. Normal saline was used as distention medium.

Results: A total of 87 hysteroscopies were carried out during the period under review. Eighty-five patients (97.7%) presented with infertility. Forty four patients (48.3%) had single pathology while 23 (26.4%) had multiple pathologies. The commonest pathology was intrauterine adhesions (64.2%). There were 3 cases (3.5%) of retained fetal bones within the endometrial cavity. Sixty-four (73.6%) patients underwent hysteroscopic surgical procedures. The commonest surgical procedure performed was intrauterine adhesiolysis (67.2%), followed by polypectomy (35.9%). One complication occurred during the study period (anesthetic).

Conclusion: Hysteroscopy is a valuable tool in the assessment of the uterine cavity. The equipments and skills are however presently lacking in Nigeria.

Keywords: Hysteroscopy, infertility, adhesiolysis.

INTRODUCTION

Hysteroscopy involves the passage of a small diameter telescope either flexible or rigid, through the cervix to directly inspect the uterine cavity.

It can be used for both diagnostic and operative purposes and remains a valuable tool in the evaluation and treatment of infertility, recurrent pregnancy loss and abnormal and postmenopausal uterine bleeding. It is also useful when saline infusion sonography findings are equivocal.[1]

Different distention media are available for both diagnostic and operative hysteroscopy. Among these are high viscosity dextran 70 and low viscosity fluids such as hypotonic, electrolyte free and isotonic, electrolyte containing solutions such as glycine 1.5% and normal saline respectively. A flexible hysteroscope which is used as an outpatient procedure commonly uses carbon dioxide as a distention medium. Although carbon dioxide is not used in the presence of uterine bleeding mainly because of the high-risk of embolism, many gynecologist still prefer it for its optimal clarity and patient comfort during insufflations for diagnostic hysteroscopy.[2]

Complications following hysteroscopy could be procedure related, media related or postoperative.[1] The most common procedure related complication is uterine perforation.[3] Cervical injuries could also occur. Media related complications include anaphylactic shock, noncardiogenic pulmonary edema; common with high viscosity fluids and gas embolism with carbon dioxide. Postoperative ascending infections, hematometria and pregnancy following endometrial ablation could also occur.[1]

OBJECTIVES

To describe our experience with hysteroscopy in a private hospital setting in Nigeria.

MATERIAL AND METHODS

Retrospective reviews of all cases of hysteroscopy done between January 2003 and December 2005 at Nisa Premier Hospital (Nordica Fertility Center), a dedicated fertility center in Abuja, Nigeria was carried out. Relevant information was extracted from the patients' case notes and theater records.

A 4 mm 0° rigid telescope was used. The hysteroscopic procedures were carried out during the proliferative phase of the patients' menstrual cycle. All but nine patients had paracervical block with xylocaine in addition to intravenous pentazocine and promethazine for pain relieve. The nine patients had general anesthesia as they had combined hysteroscopy and laparoscopy. Normal saline was used as distention medium. Therapeutic procedures were performed with hysteroscopic grasping forceps and scissors.

RESULTS

A total of 87 hysteroscopies were carried out during the period under review. Eighty-five (97.7%) patients presented with infertility. The parity ranged from 0-5. Table 1 shows the age distribution of the patients. The age range was 24-47 years (35.5 ± 4.7). Majority of the patients were aged between 35 and 39 years (39.1%). As shown in Table 2, sixty three (72.4%) patients were nulliparous. Among the nulliparous patients, 14 (22.2%) had primary infertility. Seven of the fourteen patients (50%) had intrauterine adhesions at hysteroscopy.

Twenty patients (23%) had normal hysteroscopic findings. As shown in Table 3, forty-four (48.3%) patients had single pathology while 23 (26.4%) had multiple pathologies. The commonest pathology was intrauterine adhesions (43 or 64.2%). There were 3 (3.5%) cases of retained fetal bones within the endometrial cavity. Table 4 shows the different hysteroscopic procedures carried out. Sixty-four (73.6%) patients underwent hysteroscopic surgical procedures. The commonest procedure performed was adhesiolysis (43 or 67.2%) followed by polypectomy (23 or 35.9%). While 21 (48.8%) patients had an intrauterine contraceptive device (IUCD), 4 (9.3%) had Pediatric Foley's catheter inserted following adhesiolysis. One complication (1.2%) occurred during the study period and

Table 1: Age distribution of patients

Age (years)	n	%
20-24	1	1.1
25-29	10	11.5
30-34	24	27.6
35-39	34	39.1
≥ 40	18	20.7
Total	**87**	**100**

Table 2: Parity distribution of patients

Parity	n	%
0	63	72.4
1	15	17.2
2-4	6	6.9
≥ 5	3	3.5
Total	**87**	**100**

Table 3: Findings at hysteroscopy

3A: Single pathology		
Pathology	n	%
IUA only	25	28.7
Endometrial polyp	10	11.5
Bone pieces	3	3.5
Cervical stenosis	3	3.5
Submucous fibroid	2	2.3
False passage	1	1.1
Total	**44**	**50.6**

3B: Multiple pathologies		
Pathology	n	%
IUA and polyp	8	9.2
IUA and cervical stenosis	7	8.1
Cervical stenosis and Endo. polyp	5	5.7
IUA and uterine perforation	3	3.5
Total	**23**	**26.5**

IUA = Intrauterine adhesions
Endo. polyp = Endometrial polyp

Table 4: Hysteroscopic procedures

Procedure	n	%
Adhesiolysis	43	67.2
Polypectomy	23	35.9
Cervical dilatation	15	23.4
Removal of bone piece	3	4.1
Submucous myomectomy	1	1.6

involved a 33 years old woman who developed apnea following completion of the procedure under general anesthesia.

DISCUSSION

During the last few years, diagnostic hysteroscopy has become a standard procedure in the diagnosis of fertility disorders, abnormal uterine bleeding and sonographically suspicious endometrial reflection.[4] Today, hysteroscopic resection of uterine myomas, dissection of uterine septa and endometrial ablation are standard procedures.[4] Performed concomitantly with laparoscopy, hysteroscopy becomes the most effective technique for evaluation of the uterine and tubal conditions that may play a role in female fertility.[5]

As would be expected being a fertility center, majority of the patients were nulliparous (72.4%). Of the 2 patients who did not present with infertility, 1 presented with dysfunctional uterine bleeding. She was a 38 years old para 4^{+1} lady who had normal findings at hysteroscopy. The other was a 44 years old para 5^{+3} lady who presented with recurrent spontaneous miscarriages. Hysteroscopy showed minimal uterine adhesions which would not account for the miscarriages. Cervical os appeared intact and a chromosomal cause was suspected. Being advanced in age and a grandmultipara she was equally

counseled against further pregnancies but refused as it was customary where she comes from to deliver 12 times!

Adhesiolysis for intrauterine adhesions constituted 67.2% of all the surgical procedures performed. This was much higher than the 16.6% reported at the Aga Khan hospital in Kenya.[6] Majority of our patients (71.1%) had previously terminated one or more pregnancies and these are usually unsafe abortions, as abortion is still illegal in Nigeria. The result could be an increase in uterotubal infections and hence adhesions. There is equally a high-rate of pelvic inflammatory disease in Nigeria.[7]

Prior to the advent of hysteroscopy, the diagnosis of intrauterine adhesions depended upon historic criteria, physical findings and laboratory data while the treatment consisted of an attempt to bluntly disrupt the adhesions by using a uterine sound or small curette.[8] Presently the use of hysteroscopy for the diagnosis and treatment of intrauterine adhesions has been shown to be mandatory and is equally the preferred method for the treatment of intrauterine septa, removal of foreign bodies, polyps and submucous myomas.[8,9] Unfortunately there is still a paucity of both instruments and hysteroscopic skills in Nigeria. As at the time of this study only six centers had a functional hysteroscope, serving a population of over 140 million people! Only one of the six centers is a public institution.

Of the 43 patients who had hysteroscopic adhesiolysis, majority (21 or 48.8%) had IUCD inserted following adhesiolysis. An inert IUCD with a large surface area is generally recommended.[10] Lippes loop will fit effectively into this description but is no longer being marketed. We usually improvise with a copper T 380A, with the copper element removed before insertion into the uterine cavity to prevent any inflammatory reaction that may be caused by the copper element. Foley's catheter has however been shown to be significantly superior to IUCD in terms of improvement in normal menses as it reduces the need for a repeat adhesiolysis.[10] Fortunately, only 2 of the 21 patients needed repeat adhesiolysis. All the patients were placed on prophylactic antibiotics for 7 days while those with an indwelling intrauterine device had oral estrogen to promote a regrowth of the endometrium and later a progestogen for withdrawal bleeding. Although 23 patients had endometrial polyps at hysteroscopy, 21 had hysteroscopy guided polypectomy with the use of hysteroscopic forceps and scissors. In the other two patients, one had a blind curettage as the polyps were too numerous to be removed individually under hysteroscopic guidance. The other had a large solitary polyp which was removed blindly with an oven forceps. One submucous fibroid was successfully removed with a hysteroscopic scissors, it measured approximately 1.2 × 1 cm and had no myometrial extension. A resectoscope is the preferred instrument of choice for submucous myomectomy but unfortunately was unavailable at the center during the study period. Fetal bones within the endometrial cavity were an interesting finding. Secondary infertility due to intrauterine fetal bones has been reported by various authors.[11,12] All three patients had previous second trimester termination of pregnancies by dilatation and curettage between 3 and 25 years prior to presentation and were experiencing regular normal menstrual periods. One achieved a spontaneous pregnancy two months after the fetal bone retrieval and had a vaginal delivery of a 2.8 kg female baby. It was suspected at transvaginal ultrasound scan that one of the patients probably had some retained bones within the myometrial tissues following repeated attempts at uterine evacuation for suspected adhesions on hysterosalpingogram. Our suspicion was based on the finding of the same hyper echoic shadow within the endometrial cavity and myometrium at transvaginal ultrasound scan. Her last pregnancy was terminated at 16 weeks gestation, 25 years before presentation!

The complication rate was 1.2%. This compares favorably with the 0.7% reported in Kenya[6] and 0.28% by Jansen et al.[3] The patient in our study was a 33 years old para 1^{+1} lady who had general anesthesia for combined hysteroscopy and laparoscopy. She developed apnea after the procedure for which she needed mouth to mouth resuscitation, cardiac massage and oxygen by face mask. Intermittent positive pressure ventilation was instituted by the anesthetist. She recovered fully an hour later.

Hysteroscopic diagnosis and treatment has become very important in patients with infertility. It is one of the safest and most easily acquired surgical skills in gynecology.[1] Acquisition of the equipment and skills especially in the public hospitals in Nigeria are urgently needed to obviate the need for blind procedures like endometrial curettage within the endometrial cavity.

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Laparoscopy as a Diagnostic Tool in the Evaluation of Chronic Pelvic Pain in Women

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Abstract

Chronic pelvic pain is a common and significant disorder of women. Often the etiology of chronic pelvic pain is not clear.

Chronic pelvic pain is a common problem and presents a major challenge to health care providers because of its unclear etiology, complex natural history, and poor response to therapy. Diagnostic laparoscopy is an important tool in the evaluation of women with chronic pelvic pain.

Keywords: chronic pelvic pain, laparoscopy, pelvic adhesions, endometriosis, pelvic congestion, fibroids.

INTRODUCTION

Chronic pelvic pain is defined as a noncyclic pelvic pain of greater than six months, which is not relieved by nonnarcotic analgesics. Chronic pelvic pain has been found to be one of the most common symptoms attending gynecological outpatient department in gynecology. Prevalence of chronic pelvic pain has been reported as 3.8% in women aged 15-73, which is higher than the prevalence of migraine (2.1%) and similar to that of bronchial asthma (3.7%) or back pain (4.1%).[1] In primary care practices, 39% of women complain of pelvic pain.[2] Chronic pelvic pain is estimated to account for 10% of all referrals to gynecologists, it is the indication for 12% of all hysterectomies and over 40% of gynecologic laparoscopies.[1] Clearly, pelvic pain is an important issue in the health care of women. Chronic pelvic pain seem to occur during reproductive years although some particular enigmatic pain syndromes may occur in young adolescents and other causes may occur after menopause and in the elderly.

Chronic pelvic pain is characterized by six common characteristics; duration of six months or longer, incomplete relief by previous treatment, pain out of proportion to tissue damage, loss of physical function at home or work, vegetative signs of depression and altered family and social roles.

Laparoscopy is a valuable clinical tool in the diagnosis of chronic pelvic pain. It can confirm a clinical impression, establish a definite diagnosis, follow the course of a disease and modify therapy accordingly.

AIMS AND OBJECTIVES

The main aim of the study is to assess the various causes of chronic pelvic pain with the help of laparoscopy as a diagnostic tool.

MATERIAL AND METHODS

A literature search was performed using Medline, Pubmed (National Library of Medicine, Bethesda, MD), search engine Google, Springerlink and Highwire press (Stanford University Libraries). In the searches of Medline, Google, Springerlink and Highwire press, the following search terms were used *laparoscopy, chronic pelvic pain, pelvic adhesions, endometriosis, pelvic congestion and fibroids.* Potentially relevant papers were reviewed. Selected papers were further screened for references. Criteria for selection of literature were that all were limited to human subjects who were all females, the number of cases more than 20.

COMMENTS

The causes of chronic pelvic pain maybe somatic or nonsomatic (psychogenic). Somatic causes of chronic pelvic pain in women are commonly gynecological and the most common are pelvic adhesions, endometriosis, pelvic congestions, fibroids, adenomyosis, ovarian cysts and pelvic inflammatory disease. Nongynecological causes include irritable bowel syndrome, insterstitial cystitis, diverticulitis and mysofascial pain symptoms.

Laparoscopy, because of its availability and safety, provides a valuable tool in the evaluation of undiagnosed chronic pelvic pain. It is a simple and often definitive means of establishing the presence or absence of pelvic pathology without resorting to major abdominal surgery.

Marana et al[4] performed laparoscopy in 137 patients with chronic pelvic pain and abnormal laparoscopic findings were detected in 102 (80%) patients whereas 25 (20%) patients had a normal laparoscopic examination.[4] Kontoravdis et al[5]

laparoscopically assessed 1629 patients with chronic pelvic pain and detected abnormal pathology in 76% and a normal pelvic examination in 24% of the patients. Mara et al[6] performed 480 laparoscopies in patients with chronic pelvic pain and pathology was detected in 82.3%. Swanton et al[7] did laparoscopy with conscious pain mapping in 39 women and identified the cause of pain in 35 (90%) women and none in 4 (10%) women.

Thus, the use of laparoscopy allows the detection of potentially treatable pathology not detected or detectable by other types of evaluation such as ultrasonography, imaging studies, endoscopy, and laboratory studies.

LAPAROSCOPY AND PELVIC ADHESIONS

Adhesions are among the most common organic findings noted at the time of diagnostic laparoscopy performed for the evaluation of chronic pelvic pain. They form after trauma to the visceral and parietal peritoneum and thus can be secondary to surgery, infection and endometriosis. Between 70-85% are thought to occur after surgery.[3] Cheong et al in 2006 reported that endometriosis was a typical finding in 24% of patients with chronic pelvic pain.[8] Drozgyik et al in 2007 performed laparoscopy on 1061 patients with chronic pelvic pain and found that the most common cause was pelvic adhesions, which detected in 32.5% patients.[9]

LAPAROSCOPY AND ENDOMETRIOSIS

Sampson in 1921, defined endometriosis as "presence of ectopic endometrial tissue which possesses the histological structure and function of the uterine mucosa", and still remains the accepted definition. Thus, endometriosis is a histological diagnosis and thus a tissue specimen is required. Thus laparoscopy is essential in the diagnosis of endometriosis, and an exploratory laparotomy is not warranted until the symptoms are extreme or laparoscopy is not available.

Endometriosis is also a common diagnosis in patients evaluated for chronic pelvic pain using diagnostic laparoscopy. The prevalence of endometriosis that was detected in laparoscopy is 20.4 to 22.3%.[6,9] Some studies report confirmation of suspected endometriosis during diagnostic laparoscopy in 78 to 84% of patients.[10,11] Based on several randomized control trails, endometriosis appears to be responsible for chronic pelvic pain in more than half of confirmed cases.[12]

LAPAROSCOPY AND PELVIC CONGESTION

Pelvic congestion is associated with pelvic varicosities and it is often found in women with chronic pelvic pain in whom no other obvious cause of their pelvic pain can be found. However laparoscopy is not the recommended method for making the diagnosis of pelvic congestion syndrome and thus retrograde

ovarian venography and transuterine retrograde venography is thus required. However, decreasing the intra-abdominal pressure and gradually placing the patient in reverse Trendelenburg position can demonstrate pelvic varicosities when diagnostic laparoscopy is performed.[13] The prevalence of pelvic varicosities in the broad ligament is reported as 7.3%.[9]

LAPAROSCOPY AND OVARIAN CYSTS

Ovarian cysts rarely cause chronic pelvic pain as most are hemorrhagic and corpus luteal or follicle cysts and are cyclical and are usually asymptomatic and when they do cause symptoms they are usually acute. However, ovarian cysts which are associated with endometriosis, residual ovarian syndrome or ovarian retention syndrome are associated with chronic pelvic pain. Swanton et al detected trapped ovary in 7.7% of patients undergoing laparoscopy.[7]

LAPAROSCOPY AND FIBROIDS

Leiomyomas are the most common tumors found in the female genital tract. Almost one of four women have palpable fibroids by the time she reaches the 4th decade of life. The incidence of small nonpalpable tumors discovered by endovaginal ultrasonography examination or laparoscopy is even higher. Uterine fibroids have been detected in 5.2 to 8.9% in women who have undergone laparoscopy for chronic pelvic pain.[7,9]

DISCUSSION

The results of research on chronic pelvic pain must be reviewed carefully before the data can be generalized to primary care populations. Few studies have evaluated patients with chronic pelvic pain who present to family physicians. Much of the research has been performed on well-delineated referral populations; in women who were treated by gynecologists, in women who were treated in clinics for chronic pain in general or chronic pelvic pain specifically and in women with chronic pelvic pain that persisted despite hysterectomy. Women with chronic pelvic pain responsive to simpler and less invasive treatment seldom have been participants in these studies. Chronic pelvic pain has a myriad of possible causes, most with very little correlation between clinical evidence and the extent of disease and the quality, quantity or appearance of pain. Often, the woman with chronic pelvic pain has seen several physicians, has used alternative methods of care, may have already had a hysterectomy, may have used narcotics for pain relief and usually has multiple other complaints that span several organ systems, including dyspareunia, anorgasmy, postcoital pain, disturbances in menstrual cycle, backache, nausea, malaise, diarrhea, headaches and vertigo.

Psychological evaluation is necessary in the initial evaluation and treatment of all women with chronic pelvic pain. Even when

there is no suspicion of a psychological diagnosis, it helps provide the doctor with specific information about the patient that may be related to therapeutic responsiveness and prognosis, and can be used in treatment planning, however this may not always be possible.

Not all women who experience chronic pelvic pain consult their doctor and of those who do, not all are referred for hospital investigations let alone laparoscopy. It was noted that among 483 Oxfordshire women with chronic pelvic pain, 195 (40%) had not sought a medical consultation, 127 (26%) reported a past consultation and 139 (27%) reported a consultation for pain.[14]

CONCLUSION

Chronic pelvic pain is a common problem and presents a major challenge to health care providers because of its unclear etiology, complex natural history, and poor response to therapy.

Laparoscopy has a major role in the gynecologist's evaluation of potential visceral causes of chronic pelvic pain. Significant judgment is required in individualizing each woman's evaluation. Missing treatable disease prolongs the patient's suffering and may even be life-threatening in rare cases. In patients who have undergone laparoscopy, reassurance derived by the procedure may lead to improvement in their symptoms. Therefore laparoscopy has an important role in the diagnosis and treatment of patients with chronic pelvic pain and should be done in all patients with chronic pelvic pain.

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Laparoscopic Myomectomy: Does it have any Advantages over Conventional Laparotomy?

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Abstract

Uterine myoma commonly referred to as fibroids, are so far the commonest benign tumors of the female genital tract and are the commonest soft tissue tumors of all. Worldwide, several thousand patients suffer yearly and some undergo surgery as a result of symptoms and complications of fibroids. Myomectomy, the removal of fibroids has always been done by laparotomy but recently, laparoscopic myomectomy has been started and is really getting support from endoscopic surgeons. Laparoscopic myomectomy, a heterogenous procedure, ranges from a simple procedure to a more complex one requiring expert laparoscopic suturing skills. Large pedunculated myomas are easily removed laparoscopically, but intramural ones really pause a challenge for these surgeons. Several studies have been conducted mainly nonblind ones and the results, though encouraging, do not look scientifically convincing. Laparoscopic myomectomy has its advantages but as is any new mode of treatment or surgery, it has its opponents and proponents.

The few double blind studies done have good convincing conclusions but more really needs to be done. The biggest challenge in laparoscopic surgery in general, is the cost of the equipment and therefore the cost of surgery.

When this study was undertaken, initially it was thought no data would be obtained, but by the time of completion of the study, there was enough data collected. Only that, different investigators, looked at different issues differently. It was concluded that more research work needs to be done so that we may have more convincing, well researched issues to lay the fears of the doubting at rest.

Keywords: Myoma, myomectomy, laparoscopy, hysteroscopy, GnRH agonists.

INTRODUCTION

Uterine leiomyomas are the commonest tumors of the uterus and the female pelvis. The incidence amongst women ranges from 20 to 25%[1] but have been shown to be as high as 70 to 80% in studies using histologic or sonographic examinations.[2-4] Women of African and Caribbean origin are said to have the highest incidences.[5]

Myomas arise from the smooth muscle cells of the uterus and as they grow, depending on the resistance against them, they may remain within the muscle (intramural), push their way to just below the serous covering of the uterus (subserous), or just beneath the mucous lining of the endometrial cavity (submucous). Myoma symptoms have a good correlation with their location explaining why some patients with large myomas may not complain while some suffer debilitating symptoms from very small myomas.

The pathogenesis of myomas is ill understood though it is well known that multiple myomas in the same uterus are derived from individual myometrial cells and not through a metastatic process.[6] Myoma growth is hormone dependent explaining why they are rare prior to menarche and regress after the menopause. This is the time when sex steroids mainly estrogens and progesterone are at their lowest. Studies have found that estrogen and progesterone receptors are over expressed in myoma tissues compared to other normal myometrial tissue.[7] Uninterrupted estrogen supply encourages myoma growth; however growth is interrupted in low levels as in smokers and pregnancy. Growth may at times be excessive in pregnancy. This is explained by increased blood flow to the uterus during pregnancy.[8]

The main symptoms which make patients visit their doctors are:
1. Abnormal uterine bleeding
2. Pressure
3. Pelvic/abdominal pains
4. Rapid growth
5. Infertility
6. Repeated abortions.

Management of fibroids is varied and may depend on the physician the patient visits first. This can be medical or surgical. Medical treatment uses GnRH analogues which produce an estrogen deficient milieu thereby reducing the symptoms of the patient. Unfortunately for the medical treatment, it cannot be offered over a long time. It is therefore used while waiting for the patient to make up their mind through proper counseling. GnRH analogues help reduce the size of myomas enabling easy surgery or building up of the hemoglobin levels of the patient before surgery.[9-11]

Myomectomy or hysterectomy are the other treatment modes a patient with symptomatic fibroids is offered. Hysterectomy is usually proposed to those who might have completed their family size while, myomectomy is proposed for those who for one or other reason (fertility or personal) would want to keep their uterus. A patient should also be educated to help her or together with her spouse to make an informed decision.

Myomectomy can be performed either through an abdominal incision (laparotomy) or through small holes made using canulas and trocars and using a special telescope to perform the surgery (laparoscopic). After laparoscopic myomectomy, the myomas are removed from inside the abdomen by either an instrument called a morcillator, or through an incision through the posterior cul de sac of Douglas and through the vagina.

Hysteroscopic myomectomy can also be done for endometrial or submucous myomas.

AIMS AND OBJECTIVES

The aim of the study was to compare whether there are any advantages by doing laparoscopic myomectomy over the conventional 'open' myomectomy. The following parameters were evaluated for both the procedures:
1. Method of patient selection
2. Operative technique
3. Operating time
4. Intra- and postoperative complications
5. Postoperative pain and use of narcotic analgesia
6. Postoperative morbidity
7. Hospital stay
8. Cost effectiveness
9. Quality of life analyses.

MATERIAL AND METHODS

A literature search was performed using Medline, Highwire press, Springerlink and the Google search engine. The following search terms were used: *myoma, myomectomy, laparoscopy, laparotomy*. GnRH analogues and hysteroscopy. 1400 citations were found in all. Selected papers were screened for further references. Criteria for selection of literature were the number of cases (excluded if less than 20), methods of analysis (statistical or nonstatistical), operative procedure (only universally accepted procedures were selected) and the institution where the study was done (specialized institutions for laparoscopic surgery).

RESULTS

Out of a total of 30 articles reviewed, only six had the important information for analysis and presentation. This is shown in the matrix above.

Dr Paul Indman in his reviews of the patients he had attended to in his surgery, found that most of the patients he operated on by laparoscopic technique recovered earlier and even resumed duty much earlier than the ones undergoing laparotomy. He found that within two weeks of surgery, the patients had resumed duty while those operated by the open method stayed

Article/Year	Method	Surger	No.Sub	P/c72h	H/Stay	Re/ Per	O/Par
P Indman 2006[12]	Review	Lap	–	–	24	2 weeks	–
	Review	Conv	–	–	> 48	6 weeks	–
A Cagnacci et al 2003[13]	Random	lap	17	min	10	–	–
	Random	Conv	17	max	0	–	–
Mais V et al 1996[14]	Random	lap	20	17	–	2 w/18	–
	Random	Conv	20	3	–	2 w/1	–
C Chapron et al 2002[16]	Random	lap	1809	–	–	–	O/r
	Random	Conv	1802	–	–	–	O/r
Holzer et al 2006[17]	D/Blind	lap	19	A/nil	–	–	–
	D/Blind	Conv	21	A/all	–	–	–
Alfonso R et al 2001[19]	Random	Lap	81	–	–	–	Rec/11
	Random	Conv	81	–	–	–	Rec/9

Keys

Surger—Operation type
No.Sub—Number of subjects
P/c72h—Pain control by 72 hours and need for narcotic analgesia
H/Stay—Hospital stay before discharge
RE/Per—Recovery period
O/Par—Other parameters observed
Lap—Laparoscopic myomectomy
Conv—Conventional open
A/nil—Almost all did not need pain killers
A/all—Almost all needed pain killers
O/r—Other risks
Rec/11/9—Recurrences of myomas postsurgery.

in hospital longer and even took long to recover and resume duty.[12]

A Cagnacci et al in a randomized prospective study looked at pain control in their patients and duration of hospital stay before discharge. Of the patients operated by laparoscopy, only a very small number required analgesia by 72 hours after surgery, while almost all who underwent laparotomy were still on analgesics 72 hours after surgery. On hospital stay ten of the 17 patients of laparoscopic surgery had been discharged while none in the laparotomy group.[13]

Mais V et al in another randomized clinical study in 1996 involving 40 subjects had similar findings that pain control was better tolerated by those in the laparoscopy group than the laparotomy group. While only 3 patients needed analgesics in the laparoscopy group, 17 of the laparotomy patients needed analgesia. By the 15th day of surgery, 18 of the patients who had laparoscopic surgery had left hospital while only one had been discharged from the laparotomy group.[14]

C Chapron et al in a meta-analysis in 2002 of published data, from a randomized clinical trial looked at risks facing patients after laparoscopic myomectomy. (1809-laparoscopy and 1802-laparotomy). He found that the overall risk of complications was significantly lower for the patients operated by laparoscopy.[17]

Holzer et al is accredited with the first double-blind study in pain control after laparoscopic myomectomy. After sugery, all the patients had similar dressings and therefore none of them new which patients had which type of surgery.19 had laparoscopy and 21 had laparotomy. The investigators were also kept in the dark. On completion of the study, analysis done clearly showed that laparoscopic surgery had clear advantages over laparotomy as far as pain control is concerned.[18]

Alfonso Rossetti et al in their review published in April 2001 looked at the rate of myoma recurrence following either laparoscopic or laparotomy myomectomy. 162 patients were involved, 82 for each type of surgery. These were followed up to 40 months. At the end of this duration, 11 in the laparoscopy and 9 in the laparotomy had recurred. Analysis of this did not show any statistical significance.[19]

DISCUSSION AND CONCLUSION

Laparoscopic myomectomy is still a highly debated procedure. In spite of the progress made towards this surgery since it was first described at the end of the 1970s (Semm and Mettler), laparoscopic myomectomy has remained a challenge to gynecologic surgeons. It is said to take more time,[21] with more intraoperative complications. With proper training, laparoscopic myomectomy is not necessarily a long procedure only that the tactile advantage of palpating the myoma uterus is lost and this could lead to some small myoma being left.[20] Postoperative pain control has been shown to be very good from the various

reviews indicating clear advantages over the open conventional type of myomectomy.[13,14,18] The time taken to recovery is also short following laparoscopic myomectomy. This clearly is an advantage to the patient and the surgeon. Hospital bed space is also created for other patients to occupy. Early return to duty is also an added advantage although still patients may suffer from fatigue as a result of the anesthesia; they still recuperate at home.[12-15] Patient satisfaction is also another factor. The operation site does not have a big incision as is the case with conventional myomectomy. This is especially satisfying in the cosmetically conscious patients.

Despite all the mentioned advantages, laparoscopic myomectomy is an expensive procedure and the surgeon must be sure of what she/he is doing. Proper and complete training is a must as there are no short cuts to operative laparoscopy. The patient must be explained what to expect including the possibility of conversion if need be.

Laparoscopic Myomectomy has been given a lot of attention and publicity worldwide but still it remains such a controversial subject. Several studies conducted are either against or for laparoscopic myomectomy-a clear case of bias. This should however not discourage those for it as they are the ones who will improve and refine the surgery.

From the foregoing, it is clear that despite the many controversies and the bias against laparoscopic myomectomy, the several studies reviewed may not have given a clear picture of the way forward, but a clear foundation has been laid down to have more studies carried out in the future to clearly show whether there are clear advantages of laparoscopic myomectomy over the conventional way- laparotomy. Most of the drawbacks in the study resulted from the fact that;

1. There were no clear reviews for research.
2. There was very minimal scientific blinding, which is usually the main stay of scientific research.
3. Some investigators might have clear publication bias of results.

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Laparoscopic Drainage Procedures for Pancreatic Pseudocyst: A Review Article

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Abstract

Cystogastrostomy for pseudopancreatic cyst can be performed laparoscopically getting all the benefits of minimal invasive surgery.

This is however an advance laparoscopic surgery requiring experience and upmost skills for safe outcome.

Nowadays it is gaining popularity as it is now standardized and surgeons are gaining more and more experience.

Aim: To evaluate the benefits of laparoscopic procedures for pancreatic psudocyst over open surgery based on these parameters:
a. Selection of patient
b. Time and technique of surgery
c. Postoperative pain and use of analgesics
d. Recovery and hospital stay
e. Complications
f. Quality of life
g. Cost effectiveness

Keywords: Pseudopancreatic cyst, internal drainage, laparoscopic cystogastrostomy, cystojejunostomy, acute pancreatitis.

INTRODUCTION

Pseudocyst of pancreas is collection of fluid in the lesser sac due to pancreatic inflammation and is rich in pancreatic enzymes, necrotic material and serosangenious fluid.[1]

Its wall is made up of granulation tissue so it is called Pseudo (false) cyst as all the true cysts are lined by endothelium.

It occurs as sequele of acute pancreatitis or acute/ progressive pancreatic ductal obstruction in chronic pancreatitis.

Causes of acute pancreatitis are mainly alcohol and gallstones in 75-80% cases, other causes are trauma, drugs, etc.

About 70-80% of all masses in pancreas are pseudocysts.[2,3]

Pseudocysts can be single or multiple, small or large, outside or within the pancreas.

It takes about 4-6 weeks for the maturation of the wall after acute attack of pancreatitis, many of them can resolve during this period.[2-4]

Many of the pseudocysts are asymptomatic but they commonly presents as pain and heaviness in upper abdomen, feeling of indigestion and belching. Sometimes presents with complications like infection leading to abscess, bleeding due to erosion of artery, or compression of intestine or stomach.

Asymptomatic cysts are managed conservatively by observation and repeated radiological follow-up by ultra-sonography or CT scans.[5] If the pseudocyst persists for more than 6 weeks or the size is more than 5 cm then they are less likely to resolve spontaneously and there are more chances of complications like infection, bleeding, obstruction, pseudoaneurism and needs decompression to prevent the complications.[4]

It is treated either by internal or external drainage by percutaneous, endoscopic, laparoscopic, or by open surgical procedure.[1]

MATERIAL AND METHODS

Articles were searched from Internet of the relevant study (pseudopancreatic cyst) using Yahoo, Highpower Press, Google, Springerlink, Pubmed at Laparoscopy Hospital, New Delhi and analysis done.

PATHOGENESIS

A pseudopancreatic cyst is fluid collection around pancreas, it has pancreatic juice which was leaked out of damaged duct or from cells of inflamed pancreas.[1]

These secretions are rich in enzymes which results in digestion of adjacent tissues.[4]

Fluid in pseudocyst contains pancreatic enzymes, hemolyzed blood and necrotic debris.[2] It mar resolve spontaneously or become organized with thick wall of granulation tissue and fibrosis over weeks forming pseudocyst.[5]

ETIOLOGY

Causes of acute pancreatitis are mainly alcohol and gallstones in 75-80% cases, other causes are trauma (blunt or penetrating), drugs, etc.

Chronic pancreatitis as a result of acute exacerbation or due to progressive ductal obstruction.

CLINICAL PRESENTATION

Most of them are asymptomatic.[2,4]

Clinical symptoms may differ from patient to patient and may mimic any other medical condition. Symptoms occur due to expansion of cyst, Intra-abdominal bleed, fistula formation, obstruction, pleural effusion and infection.

Symptoms includes:
a. Abdominal pain—vague upper abdomen
b. Nausea and vomiting
c. Loss of appetite
d. Flatulent dyspepsia or belching
e. Fever
f. Weight loss
g. Lump in abdomen
h. Ascites
i. Pleural effusion causing difficulty in breathing.

DIAGNOSIS

After detail medical history and examination following diagnostic tests are carried out.
a. Routine blood test including S amylase and liver function tests
b. Abdominal ultrasound
c. CT scan (90-100%) sensitive[5] information regarding site of pseudocyst, size, type of material or necrotic debris, psudoaneurism, psudocyst wall thickness, etc.
d. MRCP
e. Endoscopic ultrasound-EUS more useful when endoscopic drainage is also planned
f. Endoscopic reterograde cholangio pancreatography (ERCP) helpful in recurrent, chronic pseudocyst or suspected ampullary obstruction.

MANAGEMENT

There are various types of treatment available, as treatment is complex it should be performed in an institution where multidisciplinary team of surgeon, radiologist, gastroenterologist and physician work together.[1]

Treatment modalities are:
1. Conservative treatment
2. Percutaneous drainage
3. Endoscopic drainage
4. Open surgical drainage
5. Laparoscopic internal drainage
1. *Conservative treatment:* In asymptomatic patients on regular follow-up with ultrasonography or CT scan for serial monitoring.
    It takes 4-6 weeks for pseudocyst to mature and it may resolve during this period.[4]
    Complications increases by 50% after 6 weeks which includes bleeding, infection, pseudoaneurism and obstruction.[4-6]

Asymptomatic cysts of less than 5 cm can be treated conservatively with regular follow-ups and serial monitoring.[4]
2. *Percutaneous drainage:* Usually performed by Interventional radiologist under sonology or CT guided and aspiration of the cyst is done by a 8-14F catheter .
    It has significant numbers of complications such as introduction of Infection, hemorrhage and high recurrence rate (70%) as it is not possible to drain the necrotic material.[1,6]
3. *Endoscopic drainage:* In this gastroenterologist creates a small opening between posterior wall of stomach and cyst endoscopically after passing guide wire, dilating the tract and putting a stent in between. This can be performed through transpapillary approach.
    This method is gaining popularity and is highly successful in cysts without much necrotic material.[8,9]
    The disadvantage is that it is not possible to remove necrotic material and in such cases or in large psudocysts recurrence rate is high.
4. *Open internal drainage:* Open internal drainage is Conventional method for treating symptomatic pseudocyst more than 5 cm size.[10]
    It can be performed depending on the site of cyst with stomach, jejunum, or duodenum.
    Cystogastrostomy is most commonly performed as most of the cysts are retrogastric in lesser sac.[2,10]
    Open procedures includes:
    a. Cystogastrostomy
    b. Roux-en-Y cystojejunostomy
    c. Cystoduodenostomy
    d. Distal pancreatectomy
    Indications includes infection, pseudoaneurism, necrosis, need for concomitant drainage for obstruction, distal stricture, etc and if surgeon is not confident for laparoscopic internal drainage.
5. *Laparoscopic internal drainage:* In 1994, J Petelin, Kansas; USA performed first laparoscopic cystogastrostomy.[2,10]
    Laparoscopic intraluminal cystogastrostomy was first described by Gagner and Way et al.[2,11,12]
    Like open internal drainage, pseudopancreatic cyst can be drained into stomach, jejunum, or duodenum depending upon the location of the cyst.

OPERATIVE TECHNIQUE

In intraluminal cystogastrostomy 5 mm trocars are inserted in radially expanding fashion into stomach allowing introduction of 5 mm laparoscopic instruments.[2,11,12]

Laparoscopic anterior cystogastrostomy was initially described by Meltzer and Amaral and later reported by Holeczy and Danis and is preferred method for mature pseudocyst.[2,13,14]

Morino et al and later Park et al described posterior cystogastrostomy using endoscopic linear staplers through lesser sac.[2,15-17]

Laparoscopic anterior transgastric cystogastrostomy is described here for treatment of retrogastric pseudocysts.

Patients Position and Team

Patient is put in modified lithotomy position.

Surgeon stands in between the legs, 1st assistant and nurse on right side and 2nd assistant on left side of patient.

Steps of Surgery

Pneumoperitoneum is created by open or Verres needle technique.

A 10 mm 30° telescope is placed at umbilicus, a right 5 mm and left 10 mm midclavicular ports placed as working ports. A 5 mm subxiphoid port is placed for retracting left lobe of liver if necessary.

Body of stomach was displaced laterally and about 7 cm long anterior gastrotomy was performed by diathermy scissors or monopolar hook or harmonic scalpel.

Position of the cyst was confirmed by needle aspiration and aspirate is sent for biochemical and cytological analysis.

With the help of harmonic or monopolar hook or diathermy scissors, circumferential incision of not less than 4 cm is made taking full thickness of posterior wall of stomach together with cyst wall.

Scope is then introduced into the cyst cavity and debridement performed to remove all the necrotic material followed by thorough cleansing with normal saline.

Hemostasis was secured and interrupted or continuous intracorporeal suturing done between posterior stomach wall and cyst wall.

Nasogastric tube is placed into cyst cavity.

Closure of anterior wall of stomach is performed in one or two layers by intracorporeal suturing or by linear stapling devices.

Peritoneum is lavaged and a drain is placed at Morrison's pouch.

Trocars are removed under vision and large ports are closed.[1,2]

REVIEW OF ARTICLES

a. In a study by Andrian E. Park and Todd Heniford B, of North Carolina, in 2002, out of 29 patients selected for laparoscopic pancreatic pseudocyst (LPP) surgery, LPP was completely successful in 28 while the procedure aborted in one patient due to extensive gastric varices that were encountered.[18] Laparoscopic distal pancreatectomy (LDP) was attempted in 25 patients and was successfully performed in 23 patients. The mean operating time was 2.8 hours and the mean postoperative hospital stay was 4.4 days.

    No major complications were reported in this study.

b. A case note review of all 15 patients who had undergone stapled LCG in Norwich, UK was performed by Hindmarsh, A. et al in 2004.[19] Three procedures were converted to open due to technical problems. Early complications recorded included systemic sepsis in one patient, bleeding gastric ulcer in 2 patients and a pseudocyst recurrence due to partial closure of the CG in two patients. No late recurrences or other complications were noted after a median follow-up of 37 months.

c. At GEM Hospital, India, in 2007, Chinnusamy Palanivelu et al evaluated 108 cases with PP managed laparo-scopically.[20] LCG was performed in 90 cases (83.4%), LCJ in 8 cases (7.4%), open CG in 2 cases (1.8%), and laparoscopic external drainage in 8 cases (7.4%). The mean operating time was 95 minutes and mean hospital stay was 5.6 days. All operations were successful without any significant intraoperative complications. Two patients were reoperated for bleeding and gastric outlet obstruction while another patient had a late recurrence due to inadequate stoma size and was managed by open CG later. No mortality was reported in the postoperative period.

d. In the UK, Aljarabar, M and Ammori; B, J in 2007, reviewed a total of 118 and 569 patients in 19 and 25 reports respectively, who underwent 118 and 583 laparoscopic and endoscopic drainage procedures, respectively and compared the two groups.[21]

    Success rates of achieving resolution of PPs in the laparoscopic and endoscopic series were 98.3% and 80.8% respectively, with morbidity rates of 4.2% and 12%, and mortality rates of 0% and 0.4%, respectively. During follow-up period with a mean of 13 and 24 months, respectively, recurrence rates of 2.5% in the laparoscopic group and 14.4% in the endoscopic group were observed with reintervention rates of 0.9% and 11.8%, respectively.

e. Alejandro Oria et al of a tertiary referral center in Argentina evaluated 10 consecutive patients with giant pancreatic pseudocysts measuring 10 cm or more in diameter in the year 2000.[22] Video-assisted pancreatic necrosectomy was performed and a Rouexen-Y jejunostomy performed. Complete necrosectomy was successful in all the cases with no postoperative retroperitoneal complications or mortality. The mean hospital stay was 8.2 days and no recurrence at a mean follow-up period of 6.9 months.

f. Hauters P, et al of Belgium, in 2004, evaluated 12 patients with pancreatic pseudocyst and operated on by laparoscopic cystogastrostomy (LCG) between 1997 and 2002.[23]

    The median operating time was 90 minutes (range: 60-140) and a median postoperative hospital stay of 6 days (range: 4-24). One patient developed a postoperative port hematoma and no mortality was recorded. One other patient was readmitted on the 20th postoperative day with cyst infection

due to partial closure of the cystogastrostomy and was treated by endoscopic stenting. No recurrence of pseudocyst was reported.

g. Ramachandran; C, S. et al performed 5 LCGs for PPs between 1998 and 2001.[24] The mean operating time was 110 minutes (range: 92-128) and the mean hospital stay was 4 days. There were no postoperative complications and a postoperative follow-up with ultrasound for over 1 year revealed complete resolution of the cysts in all the patients.

h. In another series of 17 patients with PP and managed laparoscopically between 1996 and 2001 by Hauters P et al, he observed that 15 patients developed PP after acute pancreatitis and 2 patients had an associated chronic pancreatitis.[25] LCG was performed in 10 patients while LCJ was performed in the rest. LPP surgery was successful in 16 patients with a median operative time of 100 minutes (range: 80-300) with no mortality or immediate morbidity recorded and a median postoperative hospital stay of 6 days. There were two patients readmitted within the first 3 weeks with secondary PP infection the first one due to an early closure of the CG who was managed with a stent inserted endoscopically while the second patient who had a large right retrocolic abscess after LCJ was treated by percutaneous drainage. After a median of 12 months (range: 6-36), no recurrence of PP was observed in 16 patients since 1 patient was lost for follow-up.

i. Teixeira J et al of New York, USA, reported their experience with 8 Roux-en-Y LCJs in 2003 where 6 had alcoholic pancreatitis and two had gallstone pancreatitis patients.[26] The mean operating time was 150 minutes (range: 100-215 minutes), mean EBL of 78 cc and a minor complication rate of 20%. No major complications or mortality was reported.

DISCUSSION

Pancreatic pseudocyst has been treated mainly by open surgery by most of the surgeons however with changing trends towards minimal access surgery, it is slowly gaining momentum towards laparoscopic cystogastrostomy which offers all the benefits of minimal access surgery.

As it is an advanced laparoscopic procedure requiring adequate training and experience in intracorporial suturing technique.

It is advisable to carry out this procedure in a multispeciality setup with all the facilities available.

As discussed above many articles are cited with good number of cases for laparoscopic cystogastrostomy at various centers all over the world.

Most surgeon performs cystogastrostomy as it is safe and easy to perform.

Laparoscopic cystojejunostomy and cystoduodenostomy are more difficult and are less commonly performed.

Operating time in most of articles in cystogastrostomy was 90-120 minutes and 150 minutes in cystojejunostomy.

The authors of various studies have not found any significantly high rates of mortality or morbidity.

The average duration of hospital stay was about 5.5 days ranging from 4-8 days but the recovery rate and postoperative pain and use of analgesics was minimal as compared with open surgery.

Most of the articles shows follow-up from 6 to 36 months, in few cases recurrence was reported mainly due to inadequate stoma formation.

CONCLUSION

Laparoscopic surgery for internal drainage of pseudocyst of pancreas is a safe procedure but needs expert skills.
It offers all the benefits of minimal invasive surgery.
As this is an advance laparoscopic surgery careful patient selection and good experience in laparoscopic procedures is necessary.

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Diagnostic and Therapeutic Laparoscopy in Various Blunt Abdomen Trauma

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Abstract

The abdomen is the "Black box" i.e., it is impossible to know what specific injuries have occurred at initial evaluation. The key to saving lives in abdominal trauma is NOT to make an accurate diagnosis, but rather to recognize that there is an abdominal injury. Minimal-access surgery is an integral component of the alternative surgery management paradigm. The addition of videoscopic technology to intracavitary endoscopy has led to a tremendous expansion of indications for minimal-access procedures in all fields of surgery. The use of laparoscopy to assess the peritoneal cavity for injury is not a new concept. Reports by Tostivint et al, Gazzaniga et al, and Carnevale et al discussed the possibilities of using this minimally invasive approach to evaluate the peritoneal cavity for injuries. Laparoscopy has become an important diagnostic and therapeutic tool in the treatment of both blunt and penetrating traumatic injuries. Laparoscopy has been shown to be valuable in detecting occult diaphragmatic injuries in locations where computed tomography (CT) scanning and diagnostic peritoneal lavage have recognized limitations. Notably, laparoscopy can also provide therapeutic interventions in certain circumstances as well. Simultaneous gastric and diaphragmatic injuries have been repaired using this approach. Laparoscopy has been used to repair blunt traumatic solid organ injuries, including a subcapsular splenic hematoma. Blunt hepatic injuries have been successfully treated laparoscopically with the instillation of fibrin glue. A duodenal hematoma has been decompressed laparoscopically. Importantly, in trauma patients with potential intracranial injuries, laparoscopy should be used cautiously because of the risk of increased intracranial pressure. Laparoscopy is also potentially hazardous in patients with acute respiratory distress syndrome, because lung compliance and effective gas exchange may be further decreased by the pneumoperitoneum. Laparoscopy can be performed safely and effectively in stable patients with abdominal trauma. The most important advantages are reduction of morbidity, shortening of hospitalization and cost effectiveness. In the future, new development in laparoscopy equipment and the introduction of computer technology and robotic devices can be expected to have a decisive influence on the treatment of trauma patients.

Keywords: Diagnostic and therapeutic laparoscopy, blunt abdomen trauma, minimal access surgery, exploratory laparotomy.

INTRODUCTION

In the environment that human being has created exposes him to variety of injuries caused by numerous forces like vehicular accident, social conflict, crimes, terrorism, wars, industrial accident, fall from height. In this situation the incidents of blunt abdominal injuries has also been increasing with other injuries of the body part being injured. Road traffic accidents (RTA) are a major cause of blunt abdominal injuries nowaday responsible for 45 to 50% of BATs.[1] Assaults, falls, automobile–pedestrian accidents and work-related injuries are also common.[2] Abdominal injuries in blunt trauma result from compression, crushing, shearing, or deceleration mechanisms. Fortunately, the incidence of BAT requiring laparotomy is only 6%. The most frequently injured organs are the spleen (40 to 55%), the liver (35 to 45%), and the retroperitoneum (15%).[3]

Management of blunt trauma abdomen (BTA) requires an art of resuscitation early diagnosis and initial evaluation and management then lastly the perfect surgical skill. In blunt trauma abdomen most commonly injured organs are liver, spleen, kidney, intestines, pancreas, stomach, urinary bladder and vessels accordingly.[1,3] Previously all BTA ended up in laparotomy and managed according to organ injury, however in such cases chances of negative laparotomy were high but, due to research and advances in diagnostic field like USG, DPL, CT-scan abdomen the chances of negative laparotomy significantly reduced and sometimes managed conservatively.[16]

With advent and development of new technology, laparoscopy-minimally access surgery (MAS) has diagnostic as well as definitive therapeutic role in blunt trauma abdomen (BTA).[4] In the past it was limited only as diagnostic procedure

because of time consumption, need for specialized instruments and need of general anesthesia (GA). As there is availability of sophisticated equipments, instruments and easy availability of anesthetists, laparoscopy is being used more and more for diagnosis as well as therapeutic measure in BTA.[4]

Laparoscopy was first used for a trauma patient in 1956 by Lamy, who observed two cases of splenic injury. Since then, Gazzaniga et al.[5] noted that laparoscopy is useful for determining the need for laparotomy. In 1991, Berci et al.[6] reported that he had reduced the number of nontherapeutic laparotomy performed for hemoperitoneum by 25% through the use of laparoscopy in 150 patients with blunt abdominal trauma. Chol et al reported reduced negative and nontherapeutic laparotomy rates in this identified population.[7] Hemoperitoneum associated with stable vitals with liver injury, splenic injury, bowel injury, mesenteric injury, or bladder injury can be managed very well by means of laparoscopy. Advanced laparoscopic technique including bowel resection and anastomosis, ligation of blood vessels can be utilized in BTA, as good as in elective open surgery.[8-11] One can visualize peritoneal cavity and act expeditiously if needed (i.e. laparotomy, laparoscopic assisted intervention or only observation) at time of laparoscopy.[12] Laparoscopy is cost effective, reduces the rate of negative laparotomy, reduces the patient's stay in hospital and mortality and allows early mobilization and resumption of work.

However with advancement in techniques and equipments, it 'MAY' happen so that laparoscopy may replace laparotomy in near coming future.

AIMS AND OBJECTIVES

1. To know the mode of injury and incidence of organ involvement in blunt trauma abdomen in developing country.
2. To study the management of blunt trauma abdomen in tertiary center in developing countries like India.
3. To find out the role of laparoscopy (diagnostic as well as therapeutic) in management of blunt trauma abdomen (BTA).
4. To reduce the incidence of negative laparotomy.
5. To find out the limitation of laparoscopy in blunt trauma abdomen.
6. To review the method of patient selection, operative technique, operating time, intraoperative and postoperative complications.
7. To find out the impact of laparoscopy on patient with blunt trauma abdomen in terms of early rehabilitation, cost effectiveness and decreased hospital stay and lastly cosmesis.

MATERIAL AND METHODS

To know the role of laparoscopy in the blunt abdominal injury, we have carried out a prospective study among the patients of surgical wards of Sir T hospital, Bhavnagar, Gujarat, India. All the patients of blunt abdominal injury with hemoperitoneum who were relatively stable hemodynamically after adequate resuscitation taken into study and treated as per the standard protocol of laparoscopic management after investigated thoroughly.

CONTRAINDICATION TO LAPAROSCOPY IN PATIENT WITH BTA [13]

1. BTA with associated head injury with EDH/SDH (GC scale < 13-15)
2. BTA with polytrauma (compound fracture, spine fracture, severe chest injury with $SPO_2 < 90\%$)
3. BTA with hemodynamic instability
4. BTA with difficulty in endotracheal intubation.
5. Pregnancy

Patients were given general anesthesia and supine position. First trocar inserted at supraumblical ridge with open Hassan's method with pneumoperitoneum with pressure of 12-15 mm Hg. Other port site created under direct vision from within. The standard three main ports are (a) umbilical port (10 mm) (b) right sided port (5 mm / 10 mm) (c) Left sided port (5 mm/10 mm) (d) others: Extra port made according to organ injury and difficulty in its management usually, subxiphoid 5 mm in epigastrium and in lower abdomen in case of pelvic organ injury.

Diagnostic laparoscopy was done through out the all quadrant from splenic fossa to liver as clock vise. All small bowel and large bowel are thoroughly checked by walk over. Lesser sac and duodenum are checked and lastly retroperitoneum was explored. Blood was aspirated and suction and irrigation done.

In our prospective study, we have done therapeutic laparoscopy by laparoscopic primary closure of the jejunal perforation, primary repair of bladder rupture in two layer, and electro cauterization and hemolock solution spraying locally at liver or splenic injury (either contusion, laceration or tear) with no active bleeding without disturbing the preformed hematoma. All patients were kept under observation in CCU and then after shift to the ward as they were stabilized postoperatively. Due postoperative care given and good follow-up done for every patients. Our results are as below.

OBSERVATION AND DISCUSSION

In present series total 25 cases of blunt abdominal trauma were studied. All have gone through the emergency exploratory laparoscopy, out of which 24 cases (96%) managed laparoscopically and only 1 case (4%) converted into open exploratory laparotomy.

i. *Indication for laparoscopy:*[13,17]
- Hemodynamically stable.
- Some abdominal injury.
- DPA (Diagnostic peritoneal aspiration) positive.
- USG/FAST–positive.

ii. *Sex distribution ratio (Table 1):*[14,15]

Thus in our study male patients are more then female patients who are comparable to others study. This may be due to involvement of male mainly into traveling, alcohol abuse, earning.

Table 1: Sex distribution ratio

Sr. no.	Series	No. of cases (% of total cases) Male	Female	Total
1	Timothy-C Fabian et al(1992)[15]	149 (82%)	33 (18%)	182 (100%)
2	YB Chol et al(2002)[14]	49 (63%)	29 (37%)	78 (100%)
3	Present study(2006)	19 (76%)	06 (24%)	25 (100%)

iii. *Age distribution (Table 2):*[14,15]

In our study the most common age group involved is 11-20 years and 21-30 years age group. The median age group in our study is 23 years. The median age group in YB Chol et al series[14] is 40.9 years and in Timothy C Fabian et al series[15] is 32 years. This higher incidence in this particular young age group is mainly because of economic status, high mobility and increased in utilization of vehicles by this young age groups and exposure to bed environment and alcohol abuse and early involvement in earning, etc particularly in India.

Table 2: Age distribution

Sr. no.	Age (yrs)	No. of patients	Total
1	0-10 years	03	12%
2	11-20 years	08	32%
3	21-30 years	09	36%
4	31-40 years	05	20%

iv. *Mode of injury (Table 3):*

In present study it shows that the blunt trauma abdomen is mainly due to road traffic accidents (68%) nearer to 2/3 of total cases which is same as in Jason Smith et al series.[18] This may be due to increased transportation and mobilization of people from here to there mainly through the vehicles

which make them susceptible to road traffic accident. Blunt abdominal injury due to fall down is second leading cause.

v. *Incidence and pattern of organ injury (Table 4):* Liver injury is most commonly seen injury in BTA in this present series followed by spleen. In Nance and Cohn's series and in Town send and colleagues series[22] spleen is commonly involved. Pattern of organ injury and no. of patients are different due to different countries, different mode of injuries in India as compared to western countries.

Table 4: Incidence and pattern of organ injury

Sr.no.	Organ injured in BTA	Michael lenience series (%)	Town send and colleagues series (%)	Present series (%)
1	Liver	15(15%)	8(47%)	14(56%)
2	Spleen	27(27%)	7(41%)	06(24%)
3	Kidney	27 (27%)	0	0
4	Small bowel	06	2(2%)	02(8%)
5	Stomach	01	0	0
6	Colon	02	0	0
7	Pancreas/duodenum	05	0	0
8	Others (e.g. retro-peritoneal bladder injury, no injury)	17	0	03(12%)

vi. *Mode of management (Table 5):*[19,20] In this present series a laparoscopy used as a diagnostics well as therapeutic tool for patients with blunt trauma abdominal (BTA). Here 25 cases studied out of which only 1 converted to exploratory laparotomy.

Table 5: Mode of management

Sr. no.	Series	Laparoscopy			Laparo-tomy	Total
		Non-operative	Operative	Total		
1	Pascal Fabian et al (2002)	06	20	26	6(19%)	32
2	Sarmiento et al (2003)	20	03	23	2(34%)	35
3	Present study	22	02	24	1(4%)	25

• All patients were undergone emergency diagnostic laparoscopy, out of which 22 had either liver or splenic injury in the form of contusion, laceration or tear with no active bleeding from the sight of injury with non expanding hematoma in surrounding. All these cases

Table 3: Mode of injury resulting in blunt trauma abdomen

Sr. no.	Series	No. of cases (% of total case)				Total
		RTA	Fall from height	Assaulted injury	Others	
1	Jason Smith et al[18]	591(61%)	67(7%)	232(24%)	79(8%)	969(100%)
2	Present study	17(68%)	07(28%)	01(04%)	00(0%)	25(100%)

managed conservatively by draining the hemo-peritoneum with spraying of the hemolock solution (ferricrylum) at injury site which lead to foam formation locally and promotes hemostasis and stops minute oozing.

- There were two cases found with only retroperitoneum hematoma with 100-150 cc of hemoperitoneum, but no active bleeders found.
- On laparoscopy 3 patients have major injuries, one has Jejunal perforation (single, small, traumatic with size of 1 cm with healthy margin which get closed primarily in two layers with mersilk (2-0) by simple interpreted suture.
- One patient with intraperitoneal bladder rupture with spillage of urine and contrast dye into the abdominal cavity with hemoperitoneum treated laparoscopically by primary closure of bladder tear in two layers with vicryl (2-0) simple interpreted suture.
- Another case with large single traumatic perforation in ileum with large mesenteric hematoma found with moderate fecal contamination which had immediately converted into the exploratory laparotomy by small mid-midline scar through the supraumblical port site.
- The ileum was delivered out through small incision and that necrosed segment with perforation with mesenteric hematoma gets resected and end to end ileo ileal anastomosis done with thorough peritoneal lavage. Almost all patients were given peritoneum lavage with normal saline and drainage of peritoneal cavity done according to injury site.
- Hence in our study emergency laparoscopy has very good diagnostic and therapeutic role in management of patients with blunt abdominal injury in 96% of total number. of cases. Only 4% of chances of open laparo-tomy in our study. There were No Missed Injury and all treated patients made uneventful recovery.
- Finding of our present study are correlating with the another study carried out by Pascal Fabian et al in year 2000 with 81% of total patients managed by means of laparoscopy and only 19% had conversion to open laparotomy with no any missed injury and all patients had uneventful recovery.

vii. *Incidence of negative laparoscopy (8%):*[19] In our present series there are two cases in which no any visible injury found in abdominal organ, but only the retroperitoneal nonexpanding hematoma which left undisturbed. Only 100-200 cc of hemoperitoneum was present which get drained. In Pascal Fabian et al series incidence of negative laparoscopy was 6(18.8%) cases.[19]

viii. *Diagnostic accuracy of laparoscopy:* Diagnostic accuracy in our study is of 92% which is correlating with the other series (89 to 97%) (Table 6). Hence laparoscopic has got tremendous role in diagnosis of blunt trauma abdomen.

Table 6: Diagnostic accuracy of laparoscopy

Name	Series	No. of cases	Diagnostic Accuracy
1. Gustavo Kuster	General	140	97.9%
2. Hamish Foster[25]	General	227	89.0%
3. Present series(2008)	General	25	92%

ix. *Decreased incidence of negative laparotomy:* In Present study and study of Meyer et al[23] the incidence of negative laparotomy is almost nil (Table 7). The other above mention study also had average 8 to 10% of negative laparotomy, which are quite less as compared to open laparotomy study.

Table 7: Incidence of negative laparotomy

Sr. no.	Name	Year	No. of patients	Laparo-scopy	Lapa-rotomy	No. of negative laparo-tomy
1	Cuschieri et al[24]	1985	29	16	13	3 (10.3%)
2	Townsend et al[22]	1990	15	8	07	01 (6.6%)
3	Gruppel et al	1995	118	52	45	04 (8.8%)
4	Meyer et al[23]	2002	20	19	01	0%
5	Present series	2008	25	24	01	0%

x. *No of port's used:*[14] In present study we had used 3-4 ports. Most commonly 3 in number out of which 2 are of 10 mm 1 is of 5 mm which is common in all cases. Umbilical port is usually of 10 mm. 4th trocar usually needed in complex injuries to left lobe of liver, posterior pole of spleen or for diaphragmatic or stomach injuries for better visualization. It is usually taken in subxiphoid/eipgastic region. YB Chol et al series number of port used were three-umbilical port (10 mm), right and left port-5 mm ,10 mm and 12 mm.[14]

xi. *Total duration of surgery:* Average duration of surgery is in minutes, approximately 45 to 50 minutes which is quite less than for standard laparotomy which required minimum of at least 1 hour. Hence patient had less surgical stress and less postanesthetic complication. In YB Chol et al series average duration of surgery is 142 minute.[14]

xii. *No of blood transfusions:* On an average amount of blood required for any laparoscopic surgery in present study is approximately 2.5 unit (1 unit = 350 cc) of whole blood on an average is required in each patients who is hemodymically found to be stable. Another study carried out by Nasr and Cynthia et al 1995 on average blood requirement is 2 units in each patient who is stable.

xiii. *Failure of laparoscopy and conversion to laparotomy:* In our present study only in one case laparoscopy fail to manage injury to ileum with large traumatic perforation with mesenteric hematoma, which was managed by open mini laparotomy with resection and anastomosis. Here only small strategic incision taken through umbilical port (vertical midline incision) and traumatized part delivered out and

treated accordingly as mentioned above. Hence the rate of failure of laparoscopy and conversion to open laparotomy in our study is 4%. In Pascal et al study rate of conversion to open laparotomy was 18.8%.[19]

xiv. *Postoperative management :*
- Most of the patients[18] kept NBM for only day 1 and started liquids orally on 2 days. Only 4 patients kept NBM (2 for 3rd POD and 2 for 4th POD) and made oral on 4th and 5th POD respectively. Almost 80% of patients[20] made mobile on 3rd POD with or without drain *in situ* which helpful in early recovery which is main advantage of patients treated laparoscopically. In study by Pascal Fabian et al[19] patients made mobile on average 4th + 1 POD. Drain removal done approximately in 50% cases on 3rd POD, 36% cases on 4th POD. Most of the patients were discharge between 4th to 8th days. Mostly are on 7th day. Stitches are removed in 80% of patients[20] in 7th POD while in others stitches removed in follow up. Other study like YB Chol et al[14] mentioned mean hospital stay of 9.8 days while Pascal-Fabian et al has mentioned 4 days of hospital stay.[19]

xv. *Complication:* Apparently there is no any complication found related to laparoscopic procedure in present series. There was a one patient having persistent low SPO_2 level even with continuous O_2 inhalation (6 to 8 lit. per minute) which was postanesthetic complication hence not calculated in presence study. Patients referred to higher center for further management. In YB Chol et al series the complication had occurred only in three cases (Wound infection -1, Paralytic ileus-1, Atelectasis -1).[14]

xvi. *Mortality and missed injury:* In present study as such there is no any morbidity and mortality. There is no any missed injury also found. This all findings are comparable to other two studies (YB Chol et al and Timothy C Fabian et al). So laparoscopy is quite safe and effective method.[14,15]

The role of laparoscopy in diagnosis and management of BTA is a topic of much debate. In this present series we have reported 25 cases of BTA in which laparoscopy were used as a therapeutic tool in the management of BTA with hemoperitoneum. In patient with spleen or liver injury, though we have CT scan or USG report, we are more comfortable only after seeing the organ injury by naked eye and knowing the amount of hemoperitoneum. The other main advantage of laparoscopy is significantly reduced hospital stay. Patients with laparoscopy have very small incision with less surgical manipulation with early mobilization from very 3rd day in out study. Allow the patient to sent at home early as compared to patients who had undergone laparotomy, Hence it is helpful in terms cost effectiveness and early resumption of work. Laparoscopy provide patient early mobilization, oral intake hence patient had good nutrition with less chance of complication to develop because of prolonged bedridden condition in patient of laparotomy who need at least 5 day's

NBM and bed rest to recover from stress of abdominal open surgery.

As in trauma surgery more effects toward organ preservation should also be made in elective/emergency laparoscopy in patient with BTA. It is found that laparoscopic partial Splenectomy or same for liver lobectomy or segmentectomy is a safe method and readily mastered. If the blood vessels are dissected carefully and in accordance with anatomical principle, hemisplenectomy or liver resection can be done very quickly and with less blood loss than with open surgery.[21,9]

With the improvement of laparoscopic techniques and instrumentation more blunt injuries can probably be managed laparoscopically with all the benefits observed with the shift from open to laparoscopic procedure, and it is likely that laparoscopy will find its place as an integral part of evaluating and treating patients with blunt abdominal injury.

CONCLUSION

1. Blunt injuries becoming more common than before with RTA are highest, Over all liver and spleen are commonly injured solid organ, Solid organs and hollow viscera at points of fixation are more injured in blunt abdominal injuries. Serious intra-abdominal injuries can occur from minor trauma.

2. Highest incidence is seen in males in 2nd and 3rd decade of life.

3. Associated injury delay and mask the symptoms of blunt abdominal trauma.

4. Ultrasound examination plays a key role in diagnostic armamentarium in our institute. Diagnostic Peritoneal aspiration is used less in our institute. CT scan is optional at secondary center, in developing country like India, CT scan facility is available near by trauma center. When CT scan is out side the hospital premises say in tertiary center of the developing county like India, It is dangerous to shift the patient having blunt abdominal injuries with hemoperitoneum for CT scan Abdomen. In developing country the portable ultrasonography machine play a major role in management of BTA.

5. Conservative line of management for visceral trauma is to be considered whenever possible.

6. Laparoscopy is newly emerging diagnostic as well as therapeutic modality in management of blunt abdominal injury which is getting acceptance world wide, subjective to availability of equipments and skilled team.

7. Laparoscopy provides early oral intake and early mobilization of the patient which help in fast recovery and early resumption of work.

8. Laparoscopy significantly reduces the number of negative laparotomies. Practically zero percent chances of negative laparotomy when patient subjected to laparoscopy.

9. In selected cases laparoscopic repair (e.g. Bowel perforation, Bladder rupture) can also avoid laparotomy.

10. Laparoscopically treated patient has reduced postoperative analgesia requirement, shorten duration of hospital stay with early discharge with fast recovery with early resumption of routine work as compared to those who are treated by laparotomy.

11. Laparoscopy is associated with less/or no complication as compared with open laparotomy.

12. The ultimate outcome the laparoscopy is very much satisfactory and cost effective to the patient.

13. A combined effort of efficient trauma surgeon, orthopedic surgeon, critical care specialist and skilled nursing and paramedical staff is the key to successful laparoscopic management of patients with blunt abdominal trauma.

14. Limitations of laparoscopy are that it can not be performed in patients who are hemodynamically unstable. Patient who is hemodynamically stable with or without resuscitation can under go laparoscopy. Another limitation is, it is difficult to visualize second part of duodenum, pancreas, posterior wall of stomach, posterior pole of spleen and retro-peritoneum, hence chances Missed Injuries are more, if this organ gets injured in blunt abdominal injury.

The question addressed by this article is whether the introduction of an aggressive laparoscopy program would find acceptance and will make a difference or not. Our data clearly show that this indeed will do occur, however it requires further prolonged prospective study for having an even more conclusion and interpretation. With the advancement in equipment and more and more people get trained and doctors are being able to perform more and more techniquelly difficult maneuvers laparoscopically, it appear that laparoscopy is now nearer to take the place of laparotomy in forthcoming future in management of blunt abdominal injury. In the future, new development in laparoscopy equipment and the introduction of computer technology and robotic devices can be expected to have a decisive influence on the therapeutic laparoscopic management of abdominal trauma patients.

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Role of NOTES in the Diagnosis of Women Pelvic Pathologies

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Abstract

Standard diagnostic laparoscopy is considered the gold standard to investigate pelvic pathologies (tubal pathology, endometriosis, and adhesions...). It gives a panoramic view of the pelvis. But the invasiveness of diagnostic laparoscopy has almost eliminated its pure diagnostic role from contemporary management of common pelvic pathologies. It consequently appears interesting to propose an endoscopy diagnostic procedure as powerful as the laparoscopy but less invasive which doesn't require general anesthesia and full operative facilities. This is the case of transvaginal hydrolaparoscopy (THL) which proved its efficiency while being as precise as standard diagnosis laparoscopy.

Keywords: Laparoscopy, transvaginal hydrolaparoscopy, NOTES, pelvic pathologies, fertiloscopy, infertility.

AIMS AND OBJECTIVES

The aim of the present review is to evaluate the usefulness and to establish the diagnostic accuracy of the transvaginal hydrolaparoscopy as an alternative method to investigate the woman pelvis in comparison of standard laparoscopy in the same patient, using different parameters like: patient selection, operative technique, operating time, intraoperative and postoperative complications, postoperative pain and amount of narcotic used, time until resumption of diet, postoperative morbidity, hospital stay, cost effectiveness and quality of life analyses.

MATERIAL AND METHODS

A literature search was performed using Google, Yahoo, AltaVista and Highwire press. The following search terms were used: "diagnostic laparoscopy and pelvic pathologies almost 3000 citations were found. When we have searched "the role of NOTES in the diagnostic of pelvic pathologies" 0 citation was found. Then we're used the terms of "transvaginal hydrolaparoscopy" more than 20 articles were founded.

INTRODUCTION

Pelvic inflammatory disease (PID) is a common and costly condition among women of reproductive age that can lead to infertility, ectopic pregnancy, and chronic pelvic pain. Patients often have lower abdominal pain, fever, an elevated blood C-reactive protein level, and adnexal tenderness, but the clinical diagnosis of PID has serious limitations because the symptoms vary in large scale and may be atypical. Gastroenterologic problems, urinary tract infections, and other gynecologic problems may simulate PID. Thus, the clinical diagnosis of PID on the basis of symptoms and signs is often inaccurate. The delay of care increases the risk of long-term complications. Laparoscopy has long been the standard of reference in the diagnosis of PID, but it requires general anesthesia. Laparoscopy is usually performed in patients with moderate to severe pelvic pain. Laparoscopy performed to diagnose PID is an invasive procedure and may lead to complications. Endometrial biopsy is less invasive than laparoscopy, but the results are not readily available.

Transvaginal ultrasonography (US) is a noninvasive bedside procedure that is routinely performed in patients with pelvic pain. Earlier studies have shown that transvaginal US performs well in the diagnosis of PID when the criteria include thickened fluid-filled tubes. Transvaginal US is superior to transabdominal US in the diagnosis of endometrial abnormalities, pelvic masses, and PID.

One option for the noninvasive diagnosis of PID is magnetic resonance (MR) imaging but we don't have the direct view and the same result as in diagnostic laparoscopy[1] (Table 1). It consequently appears interesting to propose an endoscopy diagnostic procedure as powerful as the laparoscopy but less invasive which doesn't require general anesthesia and full operative facilities. This is the case of transvaginal hydrolaparoscopy (THL) which proved its efficiency while being as precise as standard diagnosis laparoscopy.

Table 1: Summary of MR imaging, transvaginal US, laparoscopic, and histologic[1]

Patient No.	MR Imaging finding	Transvaginal US finding	Laparoscopic finding	Histologic finding*
Patients with PID				
1.	Abscess and pyosalpinx	Pyosalpinx 1.a.	Pyosalpinx, bilateral	Chronic salpingitis
2.	Abscess	Ovarian tumor	Abscess	Salpingoophoritis
3.	Abscess	Abscess	Abscess	Positive culture†
4.	Abscess and fluid-filled tube	Abscess	Abscess	Salpingoophoritis
5.	Abscess and pyosalpinx	Endometrioma and salpingitis	Abscess and salpingitis	Positive culture†
6.	Fluid-filled tube and polycystic-like ovaries	Abscess	Salpingitis	Salpingoophoritis
7.	Endometrioma and pyosalpinx	Endometrioma	Endometrioma and pyosalpinx	Positive culture†
8.	Abscess	Pyosalpinx	Abscess	Abscess
10.	Pyosalpinx	Pyosalpinx	Pyosalpinx	NA
11.	Pyosalpinx, bilateral	Pyosalpinx, bilateral	Pyosalpinx, bilateral	NA
12.	Abscess	Pyosalpinx	Pyosalpinx	Salpingitis
13.	Fluid-filled tube and polycystic-like ovaries	Salpingitis	Salpingitis	Positive culture†
16.	Abscess	Ovarian tumor	Abscess	NA
17.	Fluid-filled tube and hemorrhagic cyst	Endometrioma and salpingitis	Endometrioma and salpingitis	NA
18.	Endometrioma and hemorrhagic cyst	Endometrioma and salpingitis	Endometrioma and salpingitis	Endometrioma
22.	Abscess, bilateral	Abscess, bilateral	Abscess, bilateral	NA
23.	Cyst, free fluid, and polycystic-like ovaries	Cyst	Salpingitis	Salpingitis
24.	Abscess, bilateral	Abscess	Pelvic peritonitis	Salpingitis
25.	Abscess	Abscess	Abscess	NA
26.	Fluid-filled tube, endometrioma, and polycystic-like ovaries	Salpingitis	Endometrioma and peritonitis	Endometrioma with infection
27.	Pyosalpinx	Salpingoophorititis	Pyosalpinx	NA
Patients without PID				
9.	Dermoid cyst	Ovarian tumor	Dermoid cyst	Dermoid cyst
14.	Free fluid	Free fluid	Rupture of a cyst	Cyst
15.	Tubal torsion and pyosalpinx	Tubal torsion	Tubal torsion and hydrosalpinx	Necrosis
19.	Endometrioma, bilateral	Abscess	Endometrioma, bilateral	Endometrioma
20.	No signs of gynecologic disorder	No signs of gynecologic disorder	No signs of gynecologic disorder	NA
21.	Tubal torsion	Tubal torsion	Tubal torsion	Necrosis
28.	Cyst	Cyst	Cyst	Cyst
29.	Tubal torsion	Abscess	Tubal torsion	Necrosis
30.	Free fluid	No signs of gynecologic disorder	Free fluid	NA

*NA = Not applicable, histologic examination was not performed.

†Culture of the abscess fluid showed bacterial growth.

CONTENT

Endoscopic examination of the female genital tract may be performed via either the abdominal or vaginal route. The vaginal approach was initially proposed in the USA (Decker, 1944) and was subsequently described (Kelly and Rock, 1956) using the term 'Culdoscopy', a technique in which the endoscope is introduced through the posterior vaginal fornix.

This procedure was later abandoned because transabdominal laparoscopy provided a panoramic view of not only the pelvic cavity but also the abdominal cavity, in addition to obviating the need for the knee-chest position, providing better access for surgical treatment, and also reducing the risk of infection. More recently, the concept of hydroculdoscopy was introduced (Odent, 1973); the technique was then modified

(Mintz, 1987) to allow a dorsal decubitus position, and the procedure of transvaginal hydrolaparoscopy (THL) was described[8,9] with abdominal distension with saline and exploitation of the newly developed smaller endoscopes (Tables 2 and 3). The patients were placed in the dorsolithotomy position. Following disinfection, a Foley catheter number 8 was introduced into the bladder and another catheter was introduced into the uterus. The posterior lip of the cervix was grasped by a tenaculum in order to expose the posterior fornix. The insertion of the Veress needle was facilitated by a stab incision in the posterior fornix, 1.5 cm below the cervix. A 3 mm blunt trocar was introduced into the posterior fornix. A 2.7 mm diameter semirigid endoscope was used, with an optical angle of 30°. Normal saline solution (250 ml) was instilled into the pouch of Douglas under gravity. Illumination was provided by a high-intensity cold-light source (250 W) via a fiber-optic lead. The images were viewed on a high-resolution color monitor. Examination started at the posterior wall of the uterus, and by rotation and deeper insertion of the endoscope, the tubes and the ovaries were evaluated.

Evaluation by THL was defined as complete when the pouch of Douglas, the posterior wall of the uterus, the uterosacral ligaments (USL), the tubes and the fimbriae, the ovaries from all sides and fossae were all visible (Table 4). After examination of the whole pelvic cavity, tubal patency was evaluated using dye injection through the uterine catheter. At the end of the examination the instruments were removed and the posterior fornix was sutured using 3/0 absorbable suture. All procedures were followed by hysteroscopy to evaluate the uterine cavity.

The patient is fully conscious. She can follow the procedure on the video screen as it is explained to her and her partner. The transvaginal access with hydrofloatation has the advantage of exposing the tubo-ovarian structures in their natural position.

The more global concept of fertiloscopy (which includes THL as well as salpingoscopy, microsalpingoscopy and hysteroscopy) was introduced in 1998.[12,14] An examination of the cul-de-sac (pouch of Douglas) in which the ovaries and their relation to the fimbriae of the fallopian tubes are easily visualized, was the primary purpose of the investigation, as this is where the major event in reproduction, oocyte retrieval by the fimbria, occurs.[7,13]

Consequently, fertiloscopy was proposed as an alternative to diagnostic laparoscopy as the primary endoscopic procedure in the routine assessment of an infertile woman.[12,14] Laparoscopy is currently considered to be the 'gold standard' of pelvic endoscopic procedures as it provides not only a panoramic view of the pelvic and abdominal cavities but also the opportunity to perform extensive surgery. More recently, it was emphasized[4,5] that transvaginal hydrolaparoscopy, from which fertiloscopy was derived, provides the opportunity to demonstrate fine periovarian and peritubal adhesions, which are not easily detected using transabdominal laparoscopy (Table 5). This statement could be interpreted to mean that laparoscopy should no longer be considered as a 'gold standard'.

As a result of these suggestions, it was felt appropriate to review whether laparoscopy should remain the primary diagnostic endoscopic procedure in the routine surgical assessment of women pelvic.

Table 2: Successful evaluation of the pelvis and its structures by transvaginal hydrolaparoscopy (THL) versus standard laparoscopy[2]

Characteristics	Laparoscopy (n = 54)	THL (n = 54)
Pouch of Douglas	54 (100)	54 (100)
Posterior wall of the uterus and USL	54 (100)	54/54 (100)
Tubes and fimbriae	108 (100)	94/108 (87.0)
Ovaries	108 (100)	97/108 (89.8)
Ovarian fossae	108 (100)	72/108 (66.7)

USL = Uterosacral ligament.

Values in parentheses are percentages.

Table 3: Tubal findings by transvaginal hydrolaparoscopy (THL) versus standard laparoscopy[2]

Characteristics	Laparoscopy (n = 54)	THL (n = 54)
Normal	40/54	41/54
Abnormal (%)	14/54 (25.9)	13/14 (92.9)
Proximal obstruction		
• Unilateral	2/54	2/2
• Bilateral	1/54	1/1
Tubal phimosis		
• Unilateral	3/54	3/3
• Bilateral	2/54	2/2
Hydrosalpinx		
• Unilateral	6/54	5/6
• Bilateral	0/54	0

Table 4: Evaluation of the endometriosis by transvaginal hydrolaparoscopy (THL) versus standard laparoscopy. Most patients had endometriosis lesions in more than one location[2]

Characteristics	Laparoscopy (n = 54)	THL (n = 54)
Normal	43/54	48/54
Abnormal (%)	11/54 (20.4)	6/11 (54.6)
Posterior wall of uterus and/or USL	8/54	3/8
Pouch of Douglas	1/54	1/1
Ovarian fossa		
• Unilateral	4/54	1/4
• Bilateral	1/54	0/1

Contd...

Contd...

Characteristics	Laparoscopy (n = 54)	THL (n = 54)
Ovarian surface		
• Unilateral	4/54	1/4
• Bilateral	2/54	0/2
Endometrioma		
• Unilateral	2/54	0/2
• Bilateral	0	0
USL = Uterosacral ligament.		

Table 5: Evaluation of the adhesions by transvaginal by hydro-laparoscopy (THL) versus standard laparoscopy. Most patients had adhesions in more than one location[2]

Location of adhesions	Laparoscopy (n = 54)	THL (n = 54)
Normal	33/54	38/54
Abnormal (%)	15/54 (27.8)	10/15 (66.7)
Pouch of Douglas	8/54	8/8
Periovarian		
• Unilateral	3/54	1/3
• Bilateral	4/54	1/4
Ovarian fossa		
• Unilateral	5/54	1/3
• Bilateral	6/54	1/6
Peritubular		
• Unilateral	7/54	4/7
• Bilateral	3/54	1/3
Other locations	7/54	2/7

DISCUSSION

Disadvantages

THL has limitations when compared with laparoscopy. First, the view is limited to the posterior part of the true pelvis. Second, most gynecologists are more familiar with the panoramic view of the pelvis and its organs as seen at laparoscopy. Third, without manipulating the adnexa not all the pathologies are seen. Furthermore, the range of interventions that can be performed is limited in comparison to laparoscopy. The current practice in most centers is to treat pathologies such as endometriotic lesions, or adhesions, surgically, whenever seen during laparoscopy. This cannot yet be performed by THL. However, using this method will allow a more critical selection of patients likely to benefit from laparoscopy.

Transvaginal access may fail to diagnose endometriosis of the vesicouterine fold, but endometriosis is found exclusively in the anterior compartment in only, 4% of cases, when it is usually associated with a severely anteflexed uterus.[3] Nonobstructive proximal tubal lesions may also be missed, but in any case surgical or medical therapy is not indicated if the tubes are patent.

Other procedures have shown that the transvaginal access carries a low risk of complications.[2,6] Transvaginal ovum retrieval procedures carry a risk of infection, which is estimated at 0.4%, whether or not vaginal disinfection is performed (Dicker et al, 1993; Roest et al, 1996). Culdocentesis in developing countries is accepted as a safe procedure for the diagnosis of ectopic pregnancies (Falfoul et al, 1991). Bowel perforation is a risk, but the perforation is usually extraperitoneal and if caused by a small diameter instrument can be managed expectantly.[10,11]

Advantages

The main advantage of THL is the ability to perform the procedure on an outpatient basis with local anesthesia, as was reported previously.[8,9] When local anesthesia is used, the procedure is associated with minimal discomfort and is well accepted and tolerated by the patients. Another important advantage of the THL by local anesthesia is that the patient can follow the procedure on the video screen, and this allows it to be explained to her and her partner.[4]

THL is a safe and reproducible method. Retroverted uterus should be considered as a relative contraindication to THL. When a complete evaluation by THL is available, it is a highly accurate technique in comparison with the laparoscopy.

These results confirm fertiloscopy as a minimally invasive safe procedure that may be considered as an alternative to diagnostic laparoscopy in the routine assessment of women without clinical or ultrasound evidence of pelvic disease. On the basis of the additional advantages of fertiloscopy, namely salpingoscopy or microsalpingoscopy, it is considered that fertiloscopy could replace laparoscopy as a routine procedure in such women.

Additional advantages of THL include the ability to perform concurrent procedures such as conscious pelvic pain mapping.

The appendix can also be explored for pathology and pain reaction. The abdominal wall can be inspected and transvaginal endoscopy has been suggested for safe abdominal entry in standard laparoscopy when bowel adhesions are suspected (van Lith et al, 1979). Even the upper abdominal wall including the liver can be inspected via the transvaginal route if the patient is anesthetized. For these reasons the transvaginal approach has been termed laparoscopy rather than Culdoscopy.

CONCLUSION

Laparoscopy is an invaluable diagnostic tool especially for symptomatic patients. Apart from establishing a definitive diagnosis, laparoscopy has been found to be a safe procedure, and one of considerable cost effectiveness in terms of hospital stay. The safety of transvaginal hydrolaparoscopy is founded on the use of local anesthesia, transvaginal access, Veress needle technique, peritoneal distension by warm saline and small diameter optical system. The transvaginal approach therefore merits to be revisited as a new, safe technique of diagnostic laparoscopy with better patient health condition.

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Hysteroscopic Myomectomy: Is There a Place for Pretreatment with GnRH Agonist?

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Abstract

Uterine fibroids (also known as myomas or leiomyomas) are the commonest benign solid tumours found in the female genital tract. Hysteroscopic myomectomy presently represents the standard minimally invasive surgical procedure for treating submucous fibroids. Whether treatment with GnRH agonist before hysteroscopic myomectomy offers significant advantages is still a matter of debate.

A literature search was performed using Medline and the Google search engine, Springerlink and Highwire Press. A total of 11 articles were selected for review.

GnRH agonist use prior to hysteroscopic myomectomy probably has potential benefits in terms of reduction in size of the fibroid and improvement of hemoglobin level, especially in patients with underlying secondary anemia. However, universally acceptable guidelines on the indications and duration of pretreatment whether administered monthly or as daily injections are lacking. Large randomized controlled trials are urgently needed to clarify the gray areas.

Keywords: Hysteroscopy, myomectomy, GnRH agonist, submucous fibroids.

INTRODUCTION

Uterine fibroids (also known as myomas or leiomyomas) are the commonest benign solid tumors found in the female genital tract, with an incidence of 20-25% amongst women in the reproductive age group.[1,2] The incidence is increased in women of Afro-Caribbean origin.[3]

Uterine fibroids arise from the muscular part of the uterus. As they grow, they usually migrate to a place of lower resistance. This can be towards the peritoneal cavity in which case the subserous variety develops or towards the uterine cavity giving rise to submucous fibroids, which constitutes 5-10% of uterine fibroids.[4] The pathogenesis of uterine fibroids is not well understood. It is however known that multiple tumors in the same uterus are derived from individual myometrial cells and not through a metastatic process.[5] Fibroids are hormone dependent and are rarely present prior to menarche while typically regressing after menopause when sex steroids are low. Studies have found that estrogen and progesterone receptors are over expressed in fibroid tissues compared with normal myometrium.[6] Submucous fibroids are classified based on the degree of myometrial penetration. G0 represents a fibroid that is completely within the uterine cavity and appears only connected to the cavity wall by a thin pedicle; G1 has its larger part (>50%) in the uterine cavity while G2 has its larger part (>50%) in the myometrium.[7,8]

Submucous fibroids may induce severe clinical symptoms such as excessive uterine bleeding usually during menses, colicky dysmenorrhea and are thought to predispose patients to reproductive failure.[2,9] They also have been associated with preterm delivery, abnormal presentation, postpartum hemorrhage and puerperal infection.[10]

Hysterectomy and laparotomic excision have long been considered the two standard routes of surgical treatment for symptomatic submucous fibroids.[11,12] While hysterectomy is usually proposed to those patients who have completed their family size, abdominal myomectomy was reserved for younger patients still desirous of a pregnancy. Abdominal myomectomy however comes with complications such as increased need for cesarean section and increased risk of postoperative pelvic adhesions.[4] Hysteroscopic myomectomy presently represents the standard minimally invasive surgical procedure for treating submucous fibroids.[13,14] The first reported hysteroscopic myomectomy was performed by Neuwirth and Amin in 1976.[15]

Because of the dependence of fibroids on steroid hormones, it follows that medications to reduce the levels of gonadal steroids are options for the treatment of uterine fibroids. The use of gonadotropin releasing hormone agonist (GnRH agonist) in a woman with uterine fibroids was first reported by Filicori in 1983.[16] The patient had a 77% reduction in the size of the fibroid, cessation of excessive bleeding and an increase in hemoglobin concentration from 7.4 to 12.8 g/dl. Although a recent review by Gutmann and Corson[17] reported that "the most clinically relevant indication for preoperative GnRH agonist use appears to be in patients with submucous fibroids", whether treatment with GnRH agonist before hysteroscopic myomectomy offers significant advantages is still a matter of debate.[18,19]

The aim of this study is to review the available literature on the use of GnRH agonist before hysteroscopic myomectomy with a view to determining its role if any.

MATERIAL AND METHODS

A literature search was performed using Medline and the Google search engine, Springerlink and Highwire Press. The following

search leads were used: Hysteroscopy, myomectomy, GnRH agonist, submucous fibroids, resectoscope. Criteria for selection of articles were: Title; this must be relevant to the review, Methodology; should be a comparative analysis of the benefits or otherwise of GnRH agonist as pretreatment before hysteroscopic myomectomy, preferably randomized controlled trials with standard statistical analysis. Review articles were equally considered.

Karaq'ozov[23] showed a significant increase in hemoglobin levels from 8.9 ± 0.9 g/l to 11.7 ± 1.2 g/l after three months of treatment with GnRH agonist. In addition, total uterine volume decreased by 30% before surgery while the fibroid volume decreased by 39%. After three months of treatment, the patients in Mencaglia and Tantini's study[24] had $61 \pm 10\%$ reductions in fibroid size with an associated reduction in vascularization. Similar findings were reported by Arcaini et al.[25] Perino et al [26] in a prospective

RESULTS

Article (Year)	Method -ology	N	Duration (Months)	Amenorrhea	Intra Op Bleedn	Fibroid size	Op Time	Fluid Abs	Recurr -ence
Crosignani et al 1996	Review		2-3	Yes		↓	↓	↓	
Moghissi 1991	Review				↓	↓			
Hart et al 1999	Prospective observe	122							No
Nikelov and Kara-q'ozov	Randomised	34	3	Yes		↓			
Mencaglia andTantini 1993	NR	25	3		↓	↓			
Perino et al 1993	Randomised	58			↓		↓		
Romer et al 2000	Review			Yes	↓	↓			
Parazzini et al 1998	Comparative Review			Yes			↓	↓	
Fedele et al 1990	Randomised	24	3		No diff	↓			Yes
Campo et al 2005	NR	80	2				↑		
Arcaini et al 1994	NR	17	2-3	Yes	↓	↓		↓	Yes

N = Number of subjects
Intraop bleedn = Intraoperative bleeding
Op time = Operative time (Duration)
Fluid Abs = Fluid absorption
NR = Not randomized
No diff = No difference

A total of 11 articles were selected for review. Crosignani et al in 1996[20] reviewed data from the English language literature and found that inducing amenorrhea in patients with menorrhagia and severe anemia before both conservative and definitive surgeries for uterine fibroids raises hemoglobin and hematocrit values to within normal range, limits homologous blood transfusion and enables surgeries to be scheduled with the patients in better condition. It was also shown that GnRH agonist use before hysteroscopic myomectomy induced endometrial thinning, reduced bleeding and mucous debris and also decreased the diameter of submucous fibroids improving visibility and limiting operating time. Administration of GnRH agonist for two to three months was therefore recommended. Moghissi[21] in an earlier article had also suggested that GnRH agonist therapy reduces the risk of surgical complications and excessive blood loss. Hart[22] in a prospective observational study showed that pretreatment with hormonal agents did not significantly influence the need for submucous fibroid reintervention. In a small prospective study, Nikolov and

randomized study showed a decreased volume of distention fluid, reduced surgical time and bleeding in those patients (n =33) preoperatively treated with GnRH agonist in comparison with controls (n = 25).

Romer et al[27] in 2000 suggested preoperative treatment with GnRH agonist prior to hysteroscopic myomectomy for submucous fibroids greater than 3 cm in diameter and/or with an intramural portion or if the patient suffers from secondary anemia. Donnez et al[28] had earlier suggested a diameter of > 4 cm as cut off for pretreatment with GnRH agonist. Parazzini et al[29] in a literature review found that pretreatment with GnRH agonist was associated with a reduction in operating time (between 2 and 25 minutes) and a further reduction in fluid absorption during hysteroscopic myomectomy.

On the other hand, in a small randomized study by Fedele et al,[30] induction of a period of hypoestrogenism with GnRH agonist before myomectomy was associated with an increase in recurrence rate. Indman[31] considers a large sized uterine fibroid as a contraindication for GnRH agonist therapy because of the

risk of severe hemorrhage. Bradley[32] in 2002 showed an increase in uterine perforation during hysteroscopic myomectomy due to reduced myometrial thickness in those patients pretreated with GnRH agonist while Lin et al[33] described an increase risk of the "sinking" phenomenon due to a decreased elasticity of myometrial tissue caused by estrogen deficiency. Furthermore, in a retrospective study by Campo et al[12] it was suggested that preoperative treatment with GnRH agonist did not seem to offer advantage in terms of long and short-term outcomes. Patients who had GnRH agonist had significantly longer surgical times compared with untreated patients. Hallez[34] in his published reports did not recommend any preoperative hormonal treatment before myomectomy.

DISCUSSION

Abnormal uterine bleeding was a common indication for hysteroscopic myomectomy in most of the studies reviewed with a percentage range of 60-84.1%.[12,15,20,22,31,34] Carlson et al[35] found that symptomatic fibroids accounted for 27% of all hysterectomies performed in the United States with more than 100,000 cases performed for fibroids that caused abnormal uterine bleeding. While the studies reviewed did not agree on all the parameters assessed, most however agree on certain outcomes. There is a resolution of preoperative anemia as GnRH agonist creates a state of amenorrhea[20,21] enabling the patients suffering from menorrhagia to build-up their blood counts thus reducing the need for blood transfusion.[25,36] There is equally a reduction in endometrial thickness as well as the size and vascularity of the fibroids.[24,25] This apparently leads to reduced fluid absorption (through a reduction of uterine blood flow) and possibly operating time. The few minutes reduction in operating time were however of questionable clinical significance while also the 100-150 ml reduction in intravasation may not influence the risk of severe complications which ensues only when the fluid deficit is greater than 1 liter.[29] Campo et al[12] however beliefs there is an increase in cervical resistance in patients pretreated with GnRH agonist leading to an increase in operating time. Another possible inference that can be drawn is that there is a possibility of surgical scheduling. Indeed, as patients do not necessarily have to be operated upon in the early proliferative phase, preoperative treatment also has a practical benefit in that it allows surgery to be performed at any time[29] which could be beneficial to the Surgeon as well as the patients. The potential risk of GnRH agonist therapy resulting in a delay of the surgical treatment of an unsuspected leiomyosarcoma should however be borne in mind.[37]

There is still a debate with respect to the cut off in terms of fibroid size at which point GnRH agonist should be commenced. Donnez et al[28] suggested that fibroids up to 2 cm do not require any preoperative treatment, while 2-4 cm should be treated for 3

weeks with a progestogen or danazol and GnRH agonist only reserved for those fibroids > 4 cm. However Indman[31] considers a large sized fibroid as contraindication for the fear of severe hemorrhage. Larger randomized controlled trials are still needed to resolve this.

In terms of duration of therapy, most of the studies used three months of treatment. There seems to be an agreement that a 6-8 weeks course will be sufficient to shrink the fibroid by 30-50%.[24,26] In a recent study Stamatellos and Bontis[38] suggested a prolongation of therapy for 2-4 months in patients presenting with anemia with the addition of iron supplements to correct for the anemia.

It must be appreciated that GnRH agonist is not without some well known disadvantages. These would include the high cost of the drug as well as problems with storage especially in temperate countries. In addition side effects such as hot flushes could occur.[1]

Majority of the publications were nonrandomized small studies and therefore lack enough statistical power. Another limitation is that of publication bias; positive studies tend to be over presented in the literature, as the decision to publish data is often based on informal observation of favorable outcomes.[29,39]

CONCLUSION

GnRH agonist use prior to hysteroscopic myomectomy probably has potential benefits in terms of reduction in size of the fibroid and improvement of hemoglobin level, especially in patients with underlying secondary anemia. However, universally acceptable guidelines on the indications and duration of pretreatment whether administered monthly or as daily injections are lacking. Large randomized controlled trials are urgently needed to clarify the gray areas.

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