

Laparoscopic management of peritoneal endometriosis

DR HASHMI HAJRASI

MBBCh; DGO; MRCOG; D.MAS

CONSULTANT OBSTETRICIAN & GYNAECOLOGIST

LECTURER AT THE OBS & GYN DEPARTMENT

ALFATEH UNIVERSITY MEDICAL SCHOOL

MEMBER OF THE SCIENTIFIC COMMITTEE LIBYAN OBSTETRICS & GYNAECOLOGY SOCIETY

TRAINING MEMBER IN OBS & GYN. LIBYAN BOARD FOR MEDICAL SPECIALTIES

MEMBER OF WORLD ASSOCIATION OF LAPAROSCOPIC SURGEONS

PROJECT SUBMITTED TOWARDS COMPLETION OF DIPLOMA IN MINIMAL ACCESS SURGERY, LAPAROSCOPY HOSPITAL, NEW DELHI, INDIA. JUNE 2007

ABSTRACT

Diagnosis and treatment of endometriosis is one of the most frequent reasons for gynaecologic operative laparoscopy. Medical management of the disease is lengthy and frequently associated with recurrence of symptoms not to mention drug side effects. There is an increasing tendency for managing the disease laparoscopically as it has the advantage of establishing the diagnosis, immediate intervention, rapid relief of symptoms and less recurrence. There are several operative laparoscopic options that one can choose depending upon the individual circumstances.

Objective

Is to evaluate effectiveness of the commonly practiced laparoscopic surgical modalities in relieving patients's symptoms due to endometriosis within the peritoneal cavity. These include infertility, chronic pelvic pain, dysmenorrhoea, dyspareunia and recurrence the disease after apparent cure.

Key words

Endometriosis, severity of endometriosis, laparoscopic management of endometriosis, endometriosis surgery, treatment of endometriosis.

Introduction

Endometriosis is the presence of endometrial tissues (both stroma & glands) at sites outside the endometrial cavity. It has long been known that the symptoms experienced by a patient may seem disproportionate to the extent of the disease observed within that patient's pelvis. For the patient it is not the endometriosis that is important but rather the illness that they experience [1].

It can affect up to 10% of women in the reproductive age group and 35% of infertile women (Vigano et al., 2004) [2]. The symptoms and signs of endometriosis are nonspecific. The main clinical manifestations are dysmenorrhoea, dyspareunia and chronic pelvic pain with or without infertility. An acceptably accurate noninvasive diagnostic test has yet to be reported [3]. The preferred method for diagnosis of endometriosis is surgical visual inspection of pelvic organs with histologic confirmation. Such diagnosis requires an experienced surgeon because the varied appearance of the disease allows less-obvious or larger endometriomas with cul-de-sac obliteration inappropriately managed. Laparoscopic visualization of peritoneal lesions has a low positive predictive value (PPV) for histological confirmation of endometriosis in women with chronic pelvic pain. The PPV of visual findings consistent with endometriosis compared with histological confirmation of endometriosis ranges from 14% to 65% depending on the anatomic site (i.e. ovarian fossae, anterior cul-de-sac, etc.) and 0% to 76% depending on lesion type (red vesicles, pigmented lesions, or peritoneal windows). The overall PPV for laparoscopic visualization is 43% to 45% [4]. Diagnostic laparoscopy provides a relatively safe and simple method of diagnosing endometriosis. When appropriate, operative laparoscopy enables treatment to be initiated and possibly completed at the same time. Medical and surgical treatment modalities sometimes produce similar results, but surgical treatment completed at the time of diagnosis has a distinct advantage over medical therapy because of decreased time, cost, and side effects. The patient can also be spared a second operation (laparotomy) if operative laparoscopy can be performed at the time of diagnosis. Operative laparoscopy offers several advantages to laparotomy, primarily because of better visualization, less tissue trauma, and much shorter recovery time. The guiding surgical principle is complete removal of all endometriosis lesions, fibrosis, and adhesions, including those requiring deep dissection [4].

The American Society for Reproductive Medicine revised classification system for endometriosis (ASRM 1996) is the most widely accepted staging system [5]

Endometriosis is a heterogeneous disease with typical and atypical morphology and spans a spectrum from a single 1-mm peritoneal implant to 10-cm. Deep endometriosis is, together with cystic ovarian endometriosis, a most severe form of endometriosis. It has been defined as endometriosis infiltrating deeper than 5-6 mm under the peritoneum (Koninckx and Martin, 1994); it is strongly associated with pelvic pain (Cornillie *et al*, 1990; Koninckx *et al*, 1991; Koninckx and Martin, 1994), especially the deeper lesions, and probably also with infertility (Koninckx *et al*, 1993) [6].

Traditionally, therapeutic options include medical treatment, surgery via (laparoscopy or laparotomy), or a combination of both. In spite of significant development in surgical and medical approaches, the optimal therapy for endometriosis-associated pelvic pain has yet to be established (Valle and Sciarra, 2003), [2].

Laparoscopic treatment of endometriosis involves destroying the endometriotic lesions using electrosurgical desiccation or fulgration or by laser evaporation for minimal to mild disease while lysis of adhesions and excision of deep fibrotic lesions may have to be performed for more severe forms of the disease. Laser & electrosurgery have the advantage of haemostasis but there is a risk of collateral damage. The newly invented technique of Cavitation Ultrasonic Surgical Aspirator (CUSA) using a probe with ultrasonic tip vibrating at 23 kHz causing emulsification of the cell membrane of the endometriotic implants and adhesions which then irrigated to remove debris. It is claimed better

visibility and helps to differentiate between target tissues. The relative efficacy has to be awaited [8] . LAVH or TLH may have to be performed in intractable or recurrent disease. More recently laparoscopic pelvic peritoneal excision has been introduced as a way of preventing recurrence.

Material & Method

A literature search was performed using Google, Yahoo, Springerlink & pubmed engines . The following search terms were used: "endometriosis", "management of endometriosis", "laparoscopic surgery for endometriosis", complications of laparoscopic surgery for endometriosis"

The 15 number of quality citations reviewed was selected for this review.

The criteria for selection were:

- At least 20 cases should be included in the study especially for complicated cases.
- Method of analysis (statistical or not). RTC preferable.
- Type of operative procedure (commonly practiced ones).
- The institution where the procedure was practiced (preference for those specialized for laparoscopic surgery) .

Laparoscopic procedures practiced:

- Electrosurgical ablation of superficial endometriotic deposits.
- Laser ablation.
- Excision of endometrioma.
- Excision of deep fibrotic deposits and adhesiolysis.
- Hysterectomy & bilateral salpingo-oophorectomy.

Review of citations

1- panel.p et al included 118 cases with deep endometriosis, (48 with bowel endometriosis). About 95.6% have their pain symptoms improved (93% for dyspareunia) . Among the 29 couples with infertility.

21(72%) got pregnant. There were 3 laparotomies ,two of which were due to haemorrhage, There were 4 major post-operative complications, (2 rectal fistulae & 2 ureteric necrosis) [9].

2 - Fuchs.F, Raval.p , et.al retrospectively analysed 64 patients with infertility and having stage I - IV on laparoscopy. All treated laparoscopically but 20 were then excluded from the study (reason unspecified).

65% (22 patients) got pregnant within 8.5 months. 89% with those with stage I-II & 56% with stage III-IV got pregnant within one post-surgery. They recommend complete laparoscopic surgical treatment for such patients to increase their chance of pregnancy either spontaneously or with assisted reproductive techniques [10].

3- [Littman E](#), Giudice L. et.al: A series of 29 patients with previously failed IVF treatment had laparoscopic evaluation & treatment by the same surgeon. 22 conceived including 15 non-IVF conception & 7 after IVF treatment. Their conclusion was that in the absence of tubal occlusion & male factor infertility, laparoscopic surgery may still to be considered for treatment of endometriosis even after multiple IVF treatment failure [11].

4 - In a prospective cohort study by K.D.Jones & C.J.Sutton on 39 women aged 20-43yrs who were trying to conceive for more than 12 months. They were treated laparoscopically for ovarian endometriomas of at least 2cm in diameter using KTP laser or bipolar diathermy to the cyst capsule after being mobilized & fenestrated. According to AFC staging 29 patients(74%) had stage IV disease. The cumulative pregnancy rate was 15/38 (39.5%) and for those with stage IV disease was 11/28 (39.3%). There were no major complications. The conclusion was that cyst fenestration and capsule ablation is a safe & effective treatment for improving fertility [12].

5- Charles Chapron et.al in France evaluated fertility outcome of 30 patients (Jan 93- Dec 96) with deep endometriosis infiltrating the uterosacral ligaments (USL) and no other cause for infertility. They were treated laparoscopically (e.g lysis, Lp cystectomy, bipolar coagulation of the superficial peritoneal deposits & resection of deep deposits infiltrating the USL) . The overall rate of intrauterine pregnancy (IUP) was 50.0%(15 patients). Only one of these 15 pregnancies was obtained using in-vitro fertilization techniques (IVF). The cumulative IUP rate for the 14 pregnancies which occurred spontaneously was 48.5% at 12 months . The rate of spontaneous pregnancies was not significantly correlated with the revised American Fertility Society (rAFS) classification. The rate of IUP was 47.0%(eight cases) for patients with stage I or II endometriosis and 46.1% (six cases) for the patients presenting stage III or IV endometriosis (not significant)

Their recommendation was to resect the USL deposits when the classic laparoscopic surgery for endometriosis is performed. This is not only to relieve their pain symptoms but also to improve their chance to conceive [13].

6 - Concerning post-operative premature ovarian failure (POF) following laparoscopic surgery for ovarian endometrioma, a retrospective analysis by Mauro Busacca and his team for 126 patients who had been operated on for bilateral ovarian endometrioma under age of 40 yrs between Jan.1995 and Dec.2003. They were able to determine a frequency of 2.6 percent of women (3 out of 126), who had experienced POF, with all cases occurring immediately after surgery. Surgery also brought advantages, however. Dysmenorrhea and dyspareunia each improved in more than 80 percent of patients, while nine (50 percent) of the 18 women who were infertile before surgery, later conceived [14].

7 - In a review by M. Busacca, L.Fedele, et.al of 81 patients with recurrence of endometriosis after previous surgery, 40 patients have to be re-operated by laparotomy and 41 by laparoscopy. They were followed up for one year for symptoms of dysmenorrhoeas, dyspareunia & pelvic pain and pregnancy

rate. Dysmenorrhoeas recurred in 34% & 43% respectively. The rate of recurrence of dyspareunia & pelvic pain was not significantly different though slightly higher in laparotomy group. There was no statistically significant difference in cumulative pregnancy rate at 24 months. The conclusion was operative laparoscopy seems as efficacious as conservative surgery at laparotomy in the treatment of recurrent endometriosis [15].

8 - James E. Carte: has performed laparoscopic treatment on 100 patients with chronic pelvic pain. Pain level was rated on scale 1-10. patients recorded their pain level at 1,3 & 6 months as well as at 1,2 & 3 after of surgery. The average pain rate pre-op was 8.2. The pain score dropped to 3.6 at one month, 1.9 at 6 months & 2.2 at 3 years. 20% of patients had pain score of 5 at 6 months . Of these 6 had hysterectomy (4 had adenomyosis) . 11 patients with score 5 had no further treatment and 2 had repeated laparoscopy. His Conclusion was Extensive laparoscopic surgery to restore normal pelvic anatomy and remove all diseased tissue, including treatment of all endometriosis, resection of ovarian cysts, resection of adhesions, removal of the appendix, and treatment of hernias when indicated, together with laparoscopic uterosacral nerve vaporization or presacral neurectomy, results in significant improvement in reported pain levels [16].

9- In a prospective observational cohort study by J.A. Abbot et al, 254 women was referred to laparoscopic surgery unit for chronic pelvic pain. Of these, 216 required laparoscopic assessment and 167 confirmed to have endometriosis. Disease staging according to the American Fertility Society was documented and laparoscopic surgical treatment was performed as appropriate. The outcome of 5 years follow up was analysed. The pain scores for dysmenorrhoea, dyspareunia, dyschesia and non-menstrual pelvic pain were all significantly improved at 2 - 5 years follow up. The chance of requiring further surgery was 36% and in 68% endometriosis was confirmed histologically .

The conclusion was, laparoscopic excision of endometriosis significantly reduces pain and improves quality of life for up to 5 years with 36 % chance of an other surgery. Return of pain following laparoscopic excision is not always associated with clinical evidence of recurrence [17].

10 - In a series of 212 patients with endometriosis studied by Philip.R.K, et al. They presented with severe pelvic pain. They were staged as stage I (67%), stage II (78%) & stage III-IV (76%) respectively according to AFC staging with the largest lesions in stage II-IV. They were laparoscopically treated with CO₂-Laser. The operative time increased when deep lesions & endometrioma are present but decreased with expertise. Excision was clinically judged complete in 94, 96 and in 84 percent in stage I, II, III respectively. There were complications with ureteric lesions & 7 late bowel perforations with peritonitis. The conclusion was that complete laparoscopic excision could be performed in over 90% of women with deep endometriosis and advocated pre-op medical treatment with GnRh analogues to decrease the operative difficulties with severe disease [18].

11 - A systematic review of 4 randomized controlled trials involved 439 women with mild to severe endometriosis. A comparison was made between laparoscopic ablation with laparoscopic uterine nerve ablation (LUNA) versus laparoscopic ablation alone. There was no difference in dysmenorrhoea pain relief at 6 months (62.8% VS 62.5%). At 12 months (57% VS 62%) or 36 months follow up (64% VS 68%). Patient's satisfaction with treatment was high in both groups (68% Vs 73%). There was also no significant difference in relief of pelvic pain , dyspareunia & dyschesia between the two groups.

However, in an other similar RTC study involving 63 women with mild to moderate endometriosis, they found significantly reduced pain at 6 months with laparoscopic ablation plus LUNA in comparison with laparoscopic ablation alone [19].

12 - Frenna.V, Santos .L , et.al reviewed 54 women with sever endoetriosis . Urinary tract was involved in 10cases with recurrent UTI, loin pain & hydronephrosis with ureteric stenosis in addition to the other major symptoms of endometriosis . In 9 patients ureteric involvement was associated with bladder endometriosis (16.7% of the sample in the study group). Ureterolysis was performed in all but in one the ureter was injured during the operation, one with vesico-vaginal fistula & 2 with transient urinary retension. They recommended conservative laparoscopic surgery to relieve ureteral obstruction and remove pathologic tissue is the management of choice. Resection of part of the ureter should be performed only in exceptional cases. Ureterolysis should be performed in all patients before endometriotic nodule resection to recognize and prevent any ureteral damage [20].

13- Duepre H.J , Senagore . AJ ,et al, 51 patients between feb 1998 - dec 2001 were retrospectively analysed. They were having a wide range of symptoms due to recto -sigmoid endometriosis. The laparoscopic procedures taken ranged from bowel superficial serosal implants excision to bowel resection and abdominal hysterectomy & BSO. Four cases converted to laparotomy. Post-operatively 87% of their patients reported clinically significant improvement in their symptoms. Their conclusion was, although technically demanding, with expertise , complete radical laparoscopic excision of endometriotic implants can be accomplished with preservation of reproductive organs & bowel resection, is appropriate in the majority of cases [21].

14 - Exacoustis .C, Zupi. C, et.al retrospectively studied 62 patients with recurrence of endometriosis within 36 months after laparoscopic surgery based on the typical appearance on transvaginal ultrasound scan. 24(15%) remained asymptomatic. Recurrence was associated with pain & infertility in 47(76%) patients of which 15 required second surgery because of large endomerioma (> 3cm) and failed medical treatment. While 34 patients did not require surgery because the lesions were small. Their conclusion was that decision for second surgery depends largely on the patient'symptoms not on the size of endometrioma. However, those with large lesions are more likely to have surgery later on for deep nodules or bowel involvement. [22].

15- The predictive value of the current classification of endometriosis in terms of response to surgical treatment had been assessed by vercillini.P et.al

In a total of 729 women with endometriosis undergoing first-line conservative laparoscopic surgery. Age at surgery , AFC staging , site of lesions, fertility status and types & severity of pain symptoms were all collected.

Minimal endometriosis was present in 222 patients, mild in 106, moderate in 197 and severe in 204. The cumulative probability of pregnancy at 3 years from surgery in 537 infertile women was 47% (51% at stage I, 45% at stage II, 46% at stage III and 44% at stage IV . The cumulative probability of moderate or severe dysmenorrhoea recurrence in 425 symptomatic subjects was 24% (32% at stage I, 24% at stage II, 21% at stage III and 19% at stage IV. The cumulative probability of disease relapse was 12% (3% at stage I, 11% at stage II, 11% at stage III and 23% at stage IV.

No association was observed between endometriosis stage or lesion type and lesion site and any of the considered study outcomes.

Their conclusion was that the current classification of endometriosis has an inadequate predictive value with regard to the major clinical outcomes [23].

Discussion:

Endometriosis is a common disease with an estimated prevalence of 10-15% in the general population being more common in whites. The disease is found in (20-50%) of infertile women [24] and in (71-87%) of women with chronic pelvic pain [25]. Patients seek medical advice for various combinations of symptoms predominantly chronic pelvic pain, dysmenorrhoea, dyspareunia & infertility. Since development of laparoscopic surgery in early 80's, there has been a considerable interest to manage this disease laparoscopically. Those listed early in this article are the most commonly performed ones although recently laparoscopic total pelvic peritoneal excision in 100 patients with different stages of the disease, has been shown in experienced hands to be safe and effective especially in preventing disease recurrence (A.K.Trehan) [26].

The impact of laparoscopic surgery on fertility prospect has been positive in most of the reviewed articles. The overall conception rate within the first year of surgery was (39.5% - 72%) [9,10,12,13]. The chance is higher for those with stage I-II (47%-89%) [10,13] than for stage III-IV (39.3 - 56%) [10,12,13]. In the absence of tubal or male factor infertility laparoscopic endometrial surgery has been shown to increase significantly the pregnancy rate (22/29 patients = 75%) after previous repeated failure at IVF treatment [13].

Despite these encouraging results for infertility there is, on the other hand, risk of inducing premature ovarian failure with laparoscopic treatment of endometrioma (2.6%) [14]. This risk is more likely when electrocoagulation or laser are used leading to destruction of the nearby oocytes. Fenestration & stripping technique with removal of haemosiderine loaded cells is preferable pelvic pain due to endometriosis is a very common symptom to all. With adequate laparoscopic treatment which may include presacral neurectomy, 95.6% of patients with pelvic pain and 93% with dyspareunia symptoms improved. Pain score dropped by 75% at 6 months of surgery but tends to reoccur after 2-5 yrs.

There is 36% chance of requiring another surgery for recurrence of pain but this does not necessarily mean recurrence of the disease as only in 68% of these cases endometriosis was histologically confirmed [9,16,17,18].

There seems to be no statistically significant difference in pain relief with laparoscopic ablation alone versus laparoscopic ablation plus LUNA. Though in one RTC the evidence was in favor of the last treatment [19].

The urinary tract may be involved in advanced endometriosis. In most severe form there may be hydronephrosis due to ureteric stenosis. Often there will be also urinary bladder deposits (16.7%). In most of these cases conservative laparoscopic ureterolysis with resection of the fibrotic lesions is the management of choice to relieve the obstruction. Resection of the ureter is rarely required. The ureter

should always be mobilized before fibrotic tissue excision to avoid ureter damage and fistula formation [20].

Rectosigmoid & rectovaginal endometriosis are not uncommonly seen in stage III-IV disease with symptoms of pelvic pain, dyspareunia & dyschesia. The problem can be dealt with conservatively but bowel resection with hysterectomy & BSO may have to be resorted to [21].

Recurrence of the disease occurs in a number of cases even in those who appear to be adequately treated. However recurrence of symptoms does not always correlate with the disease as in one study recurrence was confirmed histologically only in 68% of suspected cases [17, 22].

One study showed no statistically significant difference in symptom relief among those who had been operated upon laparoscopically or via laparotomy for recurrence of the disease though pain recurrence was slightly higher following laparotomy [15].

Interestingly, the results of study by Vercillini.P,et.al on 729 patients to assess the validity of AFC staging system in predicting the treatment outcome were unexpected. This means that the management should largely be based on the patient's symptoms individual needs [23].

Laparoscopic surgery is not without complications. The risk depends upon several factors including severity of the disease, previous surgery, skill of the surgeon and the adopted procedure. Haemorrhage is by far the commonest complication. Electrosurgical damage is not uncommon especially . Bowel and renal tract injuries are more likely when are involved by the disease. Experience and ability to detect and tackle these injuries is the main factor to minimize the associated complications [9,14,18,20].

Conclusion:

Endometriosis is a difficult gynaecological disease to treat and sometimes to diagnose. Laparoscopy & histological biopsy is the best way to confirm it. Every effort should be made to treat it actively at first laparoscopy with aim of complete removal of all visible lesions. On reviewing these articles, there is a good evidence that in experienced hands laparoscopic surgery has a lot to offer in terms of symptom relief, fecundity rate and recurrence of the disease with largely avoidable complications. Though surgical treatment is technically demanding but patient rewarding.

References:

- [1] A. Prentice, regular review, Endometriosis BMJ 2001; 323; 93-95
- [2] N.C.Hill, et.al; Safety of the helical thermal coagulator in the treatment of early stage endometriosis Journal of obstetric and gynaecology, January 2005; 25(1); 52-54
- [3] A.L.Mouns, A. Wilgus; et.al ; Diagnosis and management of endometriosis American Family Physician Vol; 74; No .4; August 15.2006
- [4] Craig.A.Winkel, Surgical management of women with endometriosis Women's health care 2004

- [5] B. Barker, A. Mahdavi, et.al. Role of laparoscopic surgery in infertility Middle East Fertility Society Journal Vol.10, No.2, 2005
- [6] Philippe.R.Koninckx, Brigitte.Timmermans , Christel Meuleman & F. Penninckx Complications of CO2-laser endoscopic excision of deep endometriosis Human reproduction Vol 11; No.10; pp 2263-2268; 1996
- [7] Donnez J, Pirard C, Smet M, Jadoul P, Squifflet J Surgical management of endometriosis Clinical Obstetric Gynaecol 2004 Apr; 18(2); 329-48
- [8] Jaime Vasquez , Endometriosis , The Fertility Network
- [9] Panel P, Chis C, Caudin S, et.al Laparoscopic Surgery of Deep endometriosis J Gynecol Obstet Biol Reprod (paris) 2007 Jun; 36(4); 354-359
- [10] Fuchs F, Ravnal P Salama S ,et.al Reproductive outcome after laparoscopic treatment in an infertile population J Gynaecol Obstet Biol Reprod (Paris) 2007 Apr; 36(2); 162-72
- [11] Littman E., Gludice L, Lathi R, et.al; Role of Laparoscopic treatment of endometriosis in patients with failed In vitro Fertilization population Fertility and Sterility; Vol. 84 No. 6 , Dec 2006
- [12] K.D.Jones & C.J.G.Sutton Pregnancy rate following ablative laparoscopy for endometriosis Human Reproduction. Vol.17, No.3 pp. 782-785, 2005
- [13] Charles Chapron, Xavier Fritel, et.al. Fertility after laparoscopic management of deep endometriosis infiltrating uterosacral ligaments Human Reproduction , Vol.14, No.2, pp329-332, 1999.
- [14] Busacca M, Riparini J , et. al. postsurgical ovarian failure after laparoscopicm excision of bilateral endometrioma Am J Obstet Gynecol 2006; 195(2); 421-5.
- [15] M. Busacca, L. Fedele , et.al Surgicaql treatment of recurrent endometriosis Laparotomy versus laparoscopy
- [16] James. E.Carter Laparoscopic treatment of chronic pelvic pain in 100 adult women OBGYN. Net Editorial Advisor.
- [17] J.A.Abbott, J.Hawe . et.al The effects and effectiveness of laparoscopic excision of endometriosis, A prospective study with 2-5 yrs follow up Human Reprod Vol.18, No.9,pp 1922-1927.
- [18] Philippe.R. Koninckx , Brgitte T ,et.al Complications of CO2-laser endoscopic Excision of deep endometriosis Human Reprod. Vol 11 . No.10 pp2263-2268, 1996
- [19] Laparoscopic removal plus LUNA versus laparoscopic remaoval alon J Gynacol Obstet Biol Reprod (paris). 2007 Apr; 36(2); 151-61
- [20] J. Minim Invasive Gynaecol 2007 March-Apr; 14(2); 169-71

- [21] Duepre, H.J, Senagore A.J, et.al. Laparoscopic resection of deep pelvic Endometriosis with recto-sigmoid involvement. The minimally invasive surgery centre Cleveland.
- [22] Exacoustos .C, Zupi.F ,et.al. Recurrence of endometriosis after laparoscopic removal; sonographic and clinical follow up and indication for second surgery.
- [23] Vercellini P, Fedele L et.al reproductive performance, pain recurrence and disease relapse after conservative surgical treatment for endometriosis, the positive predictive value of the current classification system. Human Reprod, 2006. Oct; 21(10); 2679-85
- [24] Strathy JH, Molgaard CA et.al Endometriosis and infertility, a laparoscopic study of endometriosis among fertile and Infertile women. Fertility Sterility ; 1982; 38; 667-672
- [25] Carter JE Combined hysteroscopic and laparoscopic findings in Patients with chronic pelvic pain J Am Assoc Gynecol Laparosc 1994; 2; 43-47.
- [26] A.K.Trehan Personal series, Minimal Access surgery unit, Dewsbury District Hosp, UK 2007.

For more information please log on to <http://www.laparoscopyhospital.com>