

ROLE OF LAPAROSCOPY IN MANAGEMENT OF UNEXPLAINED CHRONIC ABDOMINAL PAIN

By

Gamal I. Moussa, M.D. and Amal E. Mahfouz, M.D.#

Department of General Surgery and Obstetrics & Gynecology #Faculty of Medicine Tanta University

Objective: Patients with chronic abdominal pain (CAP) can undergo numerous diagnostic tests with failure to detect any structural or biochemical abnormality. This study was undertaken to assess the diagnostic and therapeutic role of laparoscopy in patients with unexplained chronic abdominal pain (UCAP).

Patients And Methods: Diagnostic laparoscopy was performed for 56 patients with UCAP not diagnosed by usual clinical examination and investigations. Their mean age was 27.8 years. In 36 patients (64.3%) the diagnostic procedures was extended to operative laparoscopy.

Results: UCAP represent 22.6% of the patients complaining of CAP and it is common in females (71.3%) than in males. The most frequent laparoscopic findings detected were abdominal adhesions (26.8%), endometriosis (14.2%), chronic appendicitis (12.5%), pelvic varicosities (8.9%), internal ring for clinically undiagnosed indirect inguinal hernia (5.4%), uterine myoma (3.6%) and abdomino-pelvic tuberculosis (1.8%). In 21.4% of patients with UCAP, laparoscopy did not reveal any pathologic findings in the abdomen. Laparoscopic operative interventions were in the form of adhesiolysis in 26.8%, ablation or drainage and cauterization of endometriotic tissue in 12.5%, laparoscopic appendectomy in 12.5%, laparoscopic trans-abdominal preperitoneal hernioplasty in 5.4% and salpingostomy for chronic tubal ectopic in 3.6%. Other lines of treatment were given for 9 patients (16.1%) with pathologic findings. Follow up for 6 months revealed, pain relief in 53.5%, pain reduction in 26.7% and persistent pain in 19.8%.

Conclusions: Diagnostic laparoscopy in UCAP is a significant procedure, which increase our understanding of many underlying abdominal disorders. However, it should be undertaken only after complete diagnostic evaluation has been carried out. It permits the effective surgical treatment of many conditions encountered at time of diagnostic laparoscopy.

Key words: Laparoscopy, unexplained, pain, abdominal, chronic.

INTRODUCTION

Chronic Abdominal pain (CAP) is a common complaint of patients seeking a primary care physician, it is a leading reason for referral to a gastroenterologist and the 4th frequent chronic pain syndrome in the general population, it represent about 13% of all surgical admissions⁽¹⁾. Chronic pelvic pain (CPP) is estimated to have a prevalence of 3.8% in women of reproductive age and it is the reason for 10% of all out patients visits to gynecologist as well as being responsible for approximately 40% of laparoscopy by gynecologists⁽²⁾.

Pain and its perception are effective by several factors including the presence of anatomic lesions, the local release of biochemical substances, the psychological state and the

pain threshold of the patients⁽³⁾. From an anatomico-clinical point of view, chronic abdominal pain can be divided into four categories, definite non-gynecological disease, definite gynecologic disease, non organic disease but evidence of an effective disorder or no evidence of organic or psychiatric disease⁽⁴⁾.

The etiology of chronic abdominal pain is often not clear as there are many disorders of the reproductive tract, gastrointestinal system, urological organs, musculoskeletal system and psychological system that may be associated with chronic abdominal pain. Patients with chronic abdominal pain are usually evaluated and treated by gynecologist, gastroenterologist, urologist and internists⁽⁵⁾.

In many patients with chronic abdominal pain

appropriate history, clinical examination and non-invasive diagnostic work-up remain non-conclusive. The diagnostic potential of laparoscopy in cases of acute or chronic abdominal pain is substantial. However, general surgeons, unlike gynecologists, are still somewhat reluctant to use laparoscopy for these disorders (6,7).

The purpose of this work is to elucidate the diagnostic and therapeutic roles of laparoscopy in management of patients with unexplained chronic abdominal pain.

PATIENTS AND METHODS

The present study was conducted on 56 patients selected from 248 patients presented with chronic abdominal pain (CAP) of more than 6 months duration, attended the General Surgery and Gynecology departments in Tanta University hospital during the period of time from May 1999 to March 2002. Their ages ranged from 17 to 46 years.

All patients (248) were subjected to: - Full history taking which includes a social background, family and professional responsibilities, medical, gynecological and obstetric history. Recording pain severity using Health Utility Index (HUI)⁽⁸⁾ scale that ranges from 0 (no pain) to 10 (unbearable pain) and consider the pain to be severe when it falls between 10 and 7, moderate between 6 and 4 and mild between 3 and 1 - Thorough physical examination, the clinical examination was systematic and include a general physical examination, an abdominal examination with the patients in different positions and search for trigger points using a cotton-tipped swab. Local anesthetic infiltration of these points can be both diagnostic and therapeutic. Gynecologic examination in women include inspection, speculum examination, one hand pelvic palpation to identify muscular pain, tenderness of urethra, base of the bladder and vaginal fornix and pain with cervical motion. Bimanual examination to assess shape, direction and mobility of the uterus and adnexia and the presence of any associated mass or tenderness. Rectovaginal examination to evaluate the presence of any induration or nodularity of the rectovaginal septum, cul de sac of Douglas or uterosacral ligament. Per-rectal examination to exclude anal or rectal pathology. - Laboratory investigations, radiological and ultrasonographic examination together with endoscopic assessment as cystoscopy or colonoscopy when required.

Fifty six patients (22.6%) had no obvious cause for their CAP (unexplained). Thirty-nine patients were females (71.3%). These 56 patients were subjected to laparoscopic examination. After at least 6-hour fasting and enema for all patients, laparoscopy was performed under general endotracheal anaesthesia. Careful and close inspection of the peritoneal surfaces, intra-abdominal and pelvic organs,

inner surfaces of the abdominal and pelvic walls and any intraperitoneal fluid was aspirated for bacteriologic and cytological examination. All patients received one gram cephalosporin and one liter of intravenous fluids. Laparoscopic findings, intra and postoperative findings were recorded and statistically analyzed. Surgical laparoscopic interventions were done for 36 patients (64.3%), additional laparoscopic canulae were placed according to the type and the site of intervention.

RESULTS

In the present study the ages of the patients were ranged between 17 and 48 years with a mean age 27.8 years. The incidence of UCAP was 22.6% (56 out of 248 patients). Thirty-nine patients (71.3%) were females (14 patients were virgin, 11 patients were infertile).

According to pain score, pain was severe in 7 patients (12.5%), moderate in 32 patients (57.1 %) and mild in 16 patients (30.4 %). As regard the site of pain, it was lower abdominal in 36 patients (64.3 %), generalized abdominal in 14 patients (25 %) and upper abdominal in 6 patients (10.7%).

Laparoscopic findings (Table 1): -The most common laparoscopic findings were intra-abdominal adhesions detected in 15 patients (26.8%), 9 of them had past history of intra-abdominal operation (postoperative adhesions). - Endometriosis in 8 patients (14.2%), 3 of them were infertile and 2 were virgins. The lesions were ovarian chocolate cyst in one patient (Fig.1), endometriotic implants in Douglas pouch and rectovaginal septum in 4 patients and pigmented spots on the uterus, tubes and pelvic peritoneum in 3 patients. The diagnosis of endometriosis was made macroscopically if the findings were characteristic, in lesions with atypical color and or adhesions the diagnosis was established histopathologically. -Chronic appendicitis with normal other pelvic organs was detected in 7 patients (12.5%). The appendix appeared short, kinked, subcaecal with periadnexial, ileal and caecal adhesions in 5 patients, retrocoecal appendix with minimal adhesions in one patient and preileal appendix with abdominal wall adhesions in one patient. -Pelvic veins varicosity, in absence of any pelvic pathology (pelvic congestion syndrome), was detected in 5 patients (8.9%), 2 virgin and 3 women -Internal hernial orifice for clinically undiagnosed indirect inguinal hernia (Fig.2) was detected in 3 obese patients (5.4%), 2 of them were males and one female. - Uterine myoma in 2 patients (3.6%), one had a small posterior wall myoma with uterine retroversion and the other was virgin with 2 myomas in the anterior wall, the uterus shifted to the right side with right ovarian prolapse in Douglas pouch. -Chronic tubal ectopic pregnancies in 2 patients (3.6%), confirmed by histopathologic examination

of laparoscopically removed product of conception in spite of negative B HCG test. - Abdomino-pelvic tuberculosis (Fig.3&4), diagnosed in one patient (1.8%), she had multiple small tubercles on the surface of all pelvic and abdominal organs as well as the parietal peritoneum together with significant amount of straw colored ascetic fluid, confirmed by histopathologic and bacteriologic examinations of multiple biopsies and fluid aspirated respectively. -Chronic tubo-ovarian abscess with periovarian adhesions in one patient (1.8%). -No intra-abdominal structural or pathologic findings were detected in 12 patients (21.4%).

Operative interventions (Table 2): Out of 56 patients underwent diagnostic laparoscopy, 36 patients (64.3%) performed surgical laparoscopic interventions at time of diagnostic laparoscopy. -Laparoscopic adhesiolysis were performed in all patients with adhesions, filmy adhesions lysed bluntly with second puncture probe and scissors, thick vascular adhesions coagulated with bipolar coagulation, dissected free with scissors and incised at their origin (Fig.5). - Operative laparoscopy was carried out for 7 out of 8 patients with endometriosis in form of excision or ablation of all endometriotic implants by electrocoagulation. The chocolate cyst was opened, evacuated, washed with cautery of the inner surfaces together with removal of adhesions as much as possible. Multiple biopsies were taken for histopathologic confirmation. The single inoperable patient with dense adhesions received GnRh analogue. - Laparoscopic appendectomy and adhesiolysis were done in all patients with chronic appendicitis. Two additional canulae are placed(5mm at middle quadrant of the right axillary line and 10mm at suprapubic area), third 5mm trocar was placed in the middle between the umbilical and suprapubic ports in 3 patients only. Using bipolar cautery for mesoappendix, transection of appendicular artery between clips and the appendix was amputated between endoloops with scissors (without cauterization)(Fig.6). -Laparoscopic transabdominal preperitoneal hernioplasty was performed in the three patients with clinically undiagnosed indirect inguinal hernia. Two additional 10mm canulae were placed lateral to the rectus sheath on either side at the level of the umbilicus .We used hernia stapler for mesh fixation and closure of the peritoneal flap (Fig.7). -Salpingostomy in the antimesenteric border of the fallopian tube with evacuation of the tubal content, lavage and bipolar cauterization of bleeding points in 2 cases with chronic ectopic pregnancies - Incision and aspiration of pus from a small chronic tubo-ovarian abscess in one patient - Endoscopic biopsies from the parietal peritoneal surface and omentum and fluid aspiration from the pelvic fluid of the tuberculous patient.

Operative time and hospital stay: As regards to diagnostic laparoscopy, the operative time ranged from 40 to 60 minutes with a mean of 49 minutes and hospital stay was 6 to 12 hours with a mean of 9 hours. In operative laparoscopy the operative time was from 60 to 150 minutes with a mean of 105 minutes and hospital stay was from 24 to 96 hours with a mean of 36 hours.

Early complications: We do not face any difficulties or intra-operative complications except a trocar site bleeding in one patient (1.8%), which was controlled by compression of the edge around the trocar by towel clips till the end of the operation then closed with deep mattress suture. Difficult insufflation in one obese patient(1.8%) in whom we used Hasson,s technique for insufflation. Postoperative fever in 6 patients(10.7%), 3 patients underwent adhesiolysis,2 underwent endometriotic ablation and one underwent appendectomy. Paralytic ileus for 2 days in one patient(1.8%).

Follow up results(Table 3): Follow up of the patients for 6 months after laparoscopic evaluation and treatment revealed the following: - Among patients performed adhesiolysis 9 showed pain relief, pain reduction in 4 patients and persistence of pain in 2 patients. - In patients with endometriosis, 3 had complete relief of pain, reduction of pain in 4 patients and persistence of pain in one patient who received GnRH analogue. - Patients performed laparoscopic appendectomy reported complete relief of pain in 5 patients and reduction of pain in 2 patients. - All patients performed laparoscopic hernioplasty were completely free from pain(3 patients). - The two patients underwent laparoscopic removal of tubal ectopic had complete cure of pain. - Patients with pelvic congestion received medical treatment in form of Progestins, oral contraceptive and non-steroidal anti-inflammatory,3 patients became pain free and 2 had marked improvement. - Patients with uterine myoma received one injection of GnRH followed by progestin treatment showed complete cure in one patient and no improvement in the other one. - The patient with miliary TB received anti-tuberculous drugs with marked reduction in pain and improvement in general condition after 6 months treatment in chest hospital . Out of the twelve patients with negative laparoscopic findings 3 patients became pain free, 2 had reduction of pain after they receiving treatment for irritable bowel syndrome and no improvement in the remaining 7 patients.

Table (1) : Laparoscopic findings in patients with unexplained chronic abdominal pain .

<i>Laparoscopic findings</i>	<i>Number of patients</i>	<i>%</i>
1- Abdominal adhesions	15	26.8
- Primary	6	10.7
- Secondary	9	16.1
2- Endometriosis	8	14.2
3- Chronic appendicitis	7	12.5
4- Pelvic varicosities	5	8.9
5- Hernia	3	5.4
6- Uterine myoma	2	3.6
7- Chronic tubal ectopic	2	3.6
8- Abdomen-pelvic TB	1	1.8
9- Chronic tuboovarian abscess	1	1.8
10- No pathological findings	12	21.4
Total	56	100

Table (2): Operative interventions during diagnostic laparoscopy.

<i>Pathological findings</i>	<i>Operative procedure</i>	<i>No</i>
1.Adhesions	- Adhesiolysis	15
2.Endometriosis	- Ablation	4
	- Coagulation	2
	- Drainage&cautery	1
3.Chronic appendicitis	-Laparoscopic appendectomy	7
4.Inguinal hernia	-Laparoscopic hernioplasty	3
5.Chronic ectopic	-Salpingostomy,evacuation & cautery	2
6.Tubo-ovarian abscess	-Incision & drainage	1
7.Abdomino-pelvic TB	-Biopsy	1
Total		36

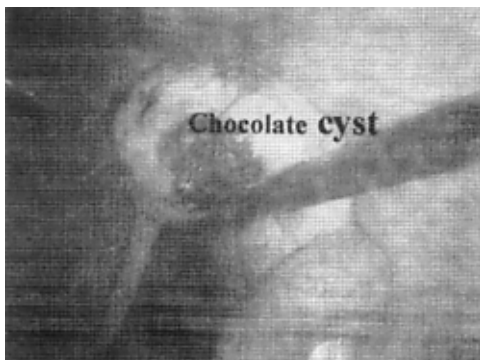


Fig (1): Endometriotic chocolate cyst

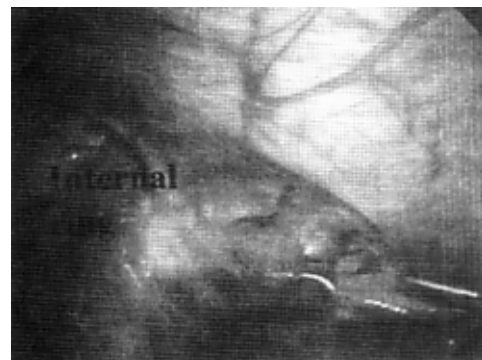


Fig (2): Internal ring of indirect inguinal hernia

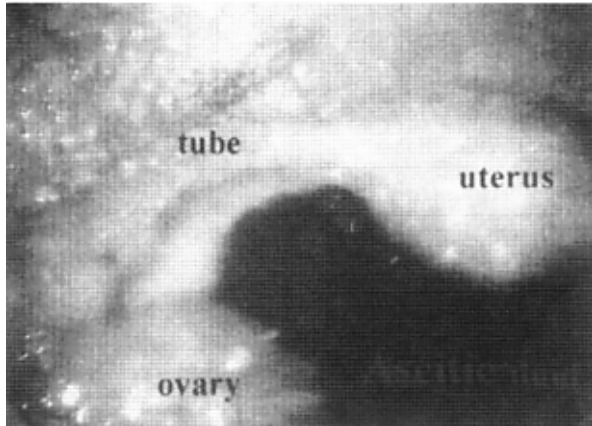


Fig (3): Pelvic tuberculosis.

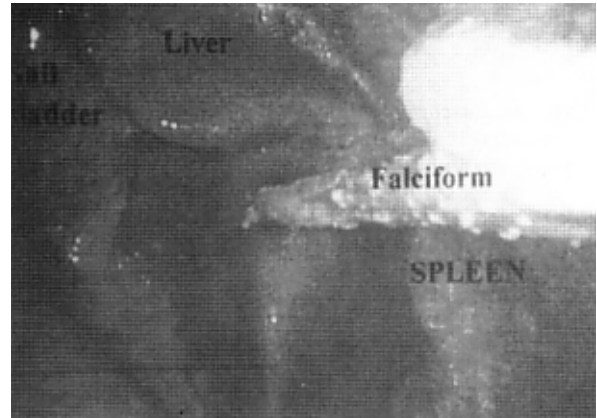


Fig (4): Abdominal tuberculosis.

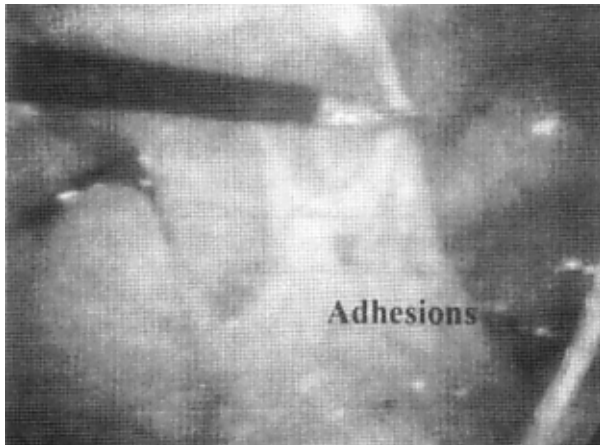


Fig (5): Adhesiolysis of intra-abdominal adhesions.

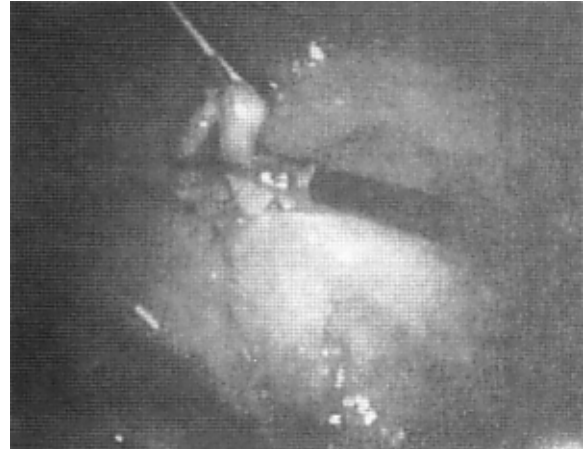


Fig (6): Excision of the appendicular base.



Fig (7): Laparoscopic mesh hernioplasty.

DISCUSSION

Chronic abdominal pain, defined as pain reported for a minimum period of 6 months and is affecting the daily life activities of the patients. Diagnosis and treatment plane in

patients with CAP is usually difficult and frustrating. It is one of the most common surgical symptoms, and among the most challenging problems facing the physician⁽⁹⁾.

We studied 248 patients suffering from chronic

abdominal pain. They were examined and investigated carefully to detect the cause of their pain. Among the examined patients, 56 with no obvious cause or uncertain diagnosis (unexplained) were evaluated laparoscopically, to determine the underlying cause of pain. Laparoscopic examination revealed normal abdominal anatomy with no pathologic lesion in 12 patients (21.4%) whereas in 44 patients (78.6%) some pelvic pathology was found. This figure coincides with the laparoscopic study of Marana and his coworkers⁽¹⁰⁾ and Gowri and Krolikowski⁽¹¹⁾, who detect pelvic pathology in 80% of their patients with CAP and failed to detect any abnormalities in 20% of them.

The most frequent abdominal pathology detected in our study were abdominal adhesions in 26.8%. Tiwari and Peters⁽¹²⁾ and Di Lorenzo and colleagues⁽¹³⁾ reported an incidence of 31.5% and 18.6% respectively. It has been found that pain is located in the area of adhesions in 90% of cases, although there is no correlation between the severity of pain and extent of adhesions⁽¹⁴⁾. Adhesions will cause CAP if it restrict the mobility or distensibility of abdominal organs especially the bowel⁽¹⁵⁾.

Laparoscopic adhesiolysis was carried out in our study for all cases of abdominal adhesions. Follow up of patients for 6 months after operation revealed complete relief of pain in 9 out of 15 patients (60%), reduction of pain in 4 patients (26.7%) and persistence of pain in 2 patients (13.3%). These results coincide with the results reported by Di Lorenzo and colleagues⁽¹³⁾ whom reported, complete relief of pain in 60.2%, pain reduction in 23.1% and persistent pain in 16.7%. Laparoscopic adhesiolysis carried out by Swank and coworkers⁽¹⁵⁾ lead to complete pain relief in 74% of patients, persistent pain in (22%) and increased pain in (4%). A retrospective study of 65 patients underwent laparoscopic adhesiolysis revealed that, pain completely disappeared in 84% of the patients and reduced in 4.7%⁽¹⁶⁾.

Endometriosis was present in 8 patients (14.2%) in our study. This result coincides with Bojahr and his colleagues⁽¹⁷⁾, who diagnose endometriosis in 15.8%. Kresh and coworkers⁽¹⁸⁾ reported an incidence of 32%, Redeché and his colleagues⁽¹⁹⁾, reported 25.6% and Marana and coworkers⁽¹⁰⁾, reported 29% incidence in their study. Endometriosis can produce pelvic pain by several mechanisms, including peritoneal inflammation, infiltration and tissue damage, release of chemical mediators of pain, adhesions and scar formation⁽²⁾. However, there is no relation between the stage of endometriosis and the severity of pain⁽²⁰⁾.

Laparoscopic excision or ablation of endometriosis, drainage and cautery of endometriotic cyst together with removal of associated adhesions were done for 7 patients (12.5%) and GnRh analogue was prescribed for one patient (1.8%) in whom there was a dense pelvic adhesions.

After 6 months follow up there was complete resolution of pain in 3 patients (37.5%), reduction of pain in 4 patients (50%) and persistence of pain in one patient (12.5%). Several studies evaluated laparoscopic surgery for endometriosis reported complete resolution of pain in 37 to 100% and reduction of pain in 18 to 80%^(21,22).

In our study chronic appendicitis was the cause of UCAP in 7 patients (12.5%) all were managed by laparoscopic appendectomy, complete relief of pain was observed in 5 patients and pain reduction in 2 patients. Raymond and his colleagues⁽²³⁾ reported 15.7% chronic appendicitis out of 70 patients underwent diagnostic laparoscopy only for the evaluation and treatment of chronic abdominal pain, with improvement of pain in 90% of the patients. While Majeski⁽²⁴⁾ reported that, the incidence of chronic appendicitis was 2.7% of the patients presented with CAP and complete resolution of pain observed in all patients after laparoscopic appendectomy. Fayez and his coworkers⁽²⁵⁾ recorded 95% improvement in chronic lower abdominal pain after laparoscopic appendectomy.

Pelvic varicosity was a less frequent laparoscopic finding in our study (8.9%). Pieri and his coworkers⁽²⁶⁾ detected pelvic varicosities in 5.3% of laparoscopically examined patients with CAP. However Papathanasiou and colleagues⁽²⁷⁾ reported that the pelvic congestion was a common finding in women with CPP especially in multigravida (14.5%). Porpora and Gomel, reported that the frequency of pelvic varicosities is 2.8% in females⁽²⁾.

Internal ring of clinically undiagnosed oblique inguinal hernias was detected laparoscopically in 3 obese patients (5.4%) of our study. While the incidence reported by Raymond and his colleague⁽²³⁾ was 18.6% in patients presented with CAP.

In our study the incidence of laparoscopically detected chronic tubal ectopic pregnancy was 3.6% (two patients). Fimbrial histopathologic examination, at a distant site from ectopic implantation showed chronic salpingitis. B-HCG in urine was negative in both patients. The two patients became pain free 6 months postoperatively. Kontoravidis and coworkers⁽²⁸⁾ reported complete relief of pain in all patients with tubal ectopic after laparoscopic salpingostomy and removal of ectopic remnants.

Laparoscopic findings of abdomeno-pelvic TB were rare events reported in one patient (1.8%). Porpora and Gomel⁽²⁾ detected pelvic TB in one patient with CPP. Histopathological confirmation in abdominal TB is difficult due to suboptimal non-invasive access to the involved area, so, laparoscopy provide semi-invasive access to the peritoneum. Laparoscopy was safe and helpful in the diagnosis of peritoneal TB in 87% of clinically undiagnosed patients⁽²⁹⁾.

In the present study 12 of laparoscopically examined patients with CAP (21.4%), had no pelvic pathology or organic lesion. In a study of 70 patients with CAP Raymond and coworkers⁽²³⁾ reported negative laparoscopic findings in 14.3% of the patients. Kontoravidis and coworkers⁽²⁸⁾ in 1999 examined 180 patients and found no pelvic abnormalities in 60% of cases. If no structural or biochemical abnormality can be identified upon utilising the necessary diagnostic measures including laparoscopy, a functional or psychosomatic disorder as the cause of pain is assumed and treatment is tapered towards relief of symptoms only⁽³⁰⁾. Psychiatric disorders among patients with CAP is present, especially those with prior psycho sexual trauma⁽³¹⁾

CONCLUSIONS

Diagnostic laparoscopy in UCAP is a significant examination which increase our understanding of many underlying abdominal disorders. However it should be undertaken only after a complete diagnostic evaluation has been carried out. It permits the effective surgical treatment of many conditions encountered at time of diagnostic laparoscopy..

REFERENCES

- John, R.D.; Gary, W.V. and Laurie, H. : What could be causing chronic abdominal pain?. *Postgraduate Medicine*.1999;106 (3) : 1 - 8.
- Propora, M.G. & Gomel, V.: The role of laparoscopy in the management of pelvic pain in women of reproductive age. *Fertility & sterility*.1997; 68(5): 765-779.
- Decat, B.; Sussman, L. and Lewis, M.P.N. : Randomized clinical trial of early laparoscopy in the management of non - specific abdominal pain. *Br J Surg*. 1999; 86: 1382 - 1386.
- Gelbaya,T.A. & El Halwagy, H.E. Focus in primary care: Chronic pelvic pain in women. *Obest. Gynecol*. 2001; Dec.56(12): 757-64.
- Wesselmann, U. & Czakanski, PP.: Pelvic pain : A chronic visceral pain syndrome. *Curr. Pain Headach*.2001; (1): 13-19.
- Promecene, P.A. : Laparoscopy in gynecologic emergencies. *Semin Laparoscopic Surg*.2002; Mar;9(1):64-75.
- Poulin,E.C.; Schlachta, C.M. and Mamazza, J. : Early laparoscopy to help diagnosis of non- specific abdominal pain. *Lancet* 2000;355: 861 - 863.
- The Euro Qol Group : Euro Qol : A new facility for the measurement of health related quality of life. *Health Policy*. 1990; 16 : 199- 208.
- Scmidbauer, S. and Hallfeldt, K. : Laparoscopic adhesiolysis in patients with chronic abdominal pain. *Surgery* 2001; 129(4) : 513- 4.
- Marana, R.; Paielli, FV.; Muzii, L .and Mancusol, J : The role of laparoscopy in evaluation of chronic abdominal pain. *Minerva Gynecol*. 1993 ; Jun 45(6):281-6.
- Gowri; V & Krolikowski, A.: Chronic pelvic pain. Laparoscopic and cystoscopic findengs. *Saudi. Medical.J*.2001; 22(9): 769-70.
- Iwari, A. and Peters, J.C. : Laparoscopic adhesiolysis in patients with chronic abdominal pain.*Lancet*.2003; 28(361): 2243-2247.
- Di lorenzo, N. ; Coscarella, G. ; Lirosi, F. ; Faraci, L. and Rossi, P. : Impact of laparoscopic surgery in the treatment of chronic abdominal pain syndrome.*Chir Ital* . 2002 ; 54(3) : 367- 78.
- Mahawar, K.K. : Laparoscopic adhesiolysis in patients with chronic abdominal pain. *Lancet(england)* . 2003; 361(9376) : 2243-4.
- Swank, D.J.; Van Erp, W.F.; Repelaer, O. J.; Hop,W. C. and Bonjer,H.J. :A prospective analysis of predictive factors on the results of laparoscopic adhesiolysis in patients with chronic abdominal pain. *Surg Laparosc Endosc*. 2003; 13(2): 88-94.
- Peters,A.W; Trimbos,D.; Kember, G.C.; Admiral, C and Trimbos, JB: A randomized clinical trial on the benefit of adhesiolysis in patients with intraperitoneal adhesions and chronic abdominal pain. *Br. J. Obestet. Gynecol*. 1998 ; 99:59-62.
- Bojahr, B.; Romer, T. and Lober, F.: The value of laparoscopy in diagnosis and therapy in patients with chronic pelvic pain. *Zentralbl Gynakol*. 1995 ; 117(6):304-9(English abstract).
- Kresh, A.J.; Seifer,D.B.; Sachs, L.B. and Barrese,I.: Laparoscopy in 100 women with chronic pelvic pain. *Obest. Gynecol*. 1984 ; 64:672-4.
- Redeche, M; Niznanska, Z; Korbal, M; Borovsky, M and Chabadova, J:Laparoscopic diagnosis in women with chronic pelvic pain. *Bartisl-LekListy*. 2000; 101(8): 460-64.
- Mahmood,T.A; Templeton,A.A; Thompson, L. and Fraser,C. : Menstrual symptoms in women with pelvic endometriosis- a consequence of infiltration or retraction or possibly adenomyosis externa? *Fertile. Sterile*. 1991 ;58:924-8.
- Daniell, JF. ; Kurtz, BR. and Gurley,O.: Laser laparoscopic management of large endometriosis. *Fertile. Sterile.*, 1991 ; 55:692-5.
- Canis, M.; Watliez, A.; Pouly, JL.; Manhest, et al. , : Laparoscopic treatment of endometriosis in patients with chronic pelvic pain: Time of review London : Parthenon publishing, 1994 ; 7: 83-92.
- Raymond, P. o.; Elizabeth, A. M. and Cleveland, O.H. : Role of laparoscopy in patients with chronic abdominal pain and assessment of late outcome.*Digestive disease week*.2001;23(4):241-46.

24. Majeski, J. : Diverticulum of the vermiform appendix is associated with chronic abdominal pain. *Am J Surg* , 2003;186(2) : 129- 31.
25. Fayez, J.A.; Toy, N.J. and Flanagan, T.M. : The appendix as the cause of chronic lower abdominal pain. *Am J Obstet Gynecol* .1995;172:122-26.
26. Pieri,S.; Agresti, P.; Morucci, M. and Medici, L. : Percutaneous treatment of pelvic congestion syndrome. *Radiol Med (Torino)*.2003;105:76-82.
27. Papatthanasiou, K.; Papageorgiou, C.; Panidis, D. and Mantelenakis, S.: Our experience in laparoscopic diagnosis and management in women with chronic pelvic pain. *Clin. Exp. Obstet. Gynecol.* 1999 ; 26(3-4):190-2.
28. Kontoravidis, A.; Hassan, E.; Hassiakos, D.; Botsisd, D.; Kontoravdis, N. and Creatsea, G. : Laparoscopic evaluation and management of chronic pelvic pain during adolescence.*Clin Exp Obstet Gynecol.* 1999 ; 26(2):76-7.
29. Gupta, A. and Kumar, S. : Abdominal TB : Diagnosis by laparoscopy and colonoscopy. *Trop Gastroentrol* , 2002; 23(3) : 150- 3.
30. Gschossmann, J.M.; Hauser, W. ; Wesselmann, U. and Holtman ,G. : Diagnostic criteria and therapeutic strategies of abdominal pain syndrome. *Schmerz.* 2002;16(6):467-80.
31. Merlijn, V.P. ; Hunfeld,J.A. ;Wouden, J.C.; Koes, B.W. and Passchier, J. :Psychosocial factors associated with chronic pain in adolescents. *Pain* . 2003;101(1-2):33-43.