typical abdominal wall crepitation) insufflation must be immediately stopped as the extension of the emphysema to the mediastinal structures may compromise cardiac and respiratory functions. Bowel injury by Veress needle puncture may not require treatment: the entity of the lesion must be accurately evaluated and any bowel laceration or bleeding need to be corrected by a double layer laparoscopic suture. Laparotomic treatment is rarely required. Rather frequently (2%) a pneumoomentum may appear, generally needing no treatment.

Main port insertion is performed similarly to Veress needle perforation and implies the same risks of bowel and vessels injuries, but in a more dangerous way, considering the larger diameters of the instrument. This problem may be avoided by paying attention to the penetration angle and to the force used during the procedure. Injury to a big vessel imposing an emergency laparotomy is seldom reported (20 cases in the literature) but may be lethal.

Ancillary port insertion, even if it seems uneventful, being performed under visual control has the highest number of complications. The usual injury is to the inferior epigastric vessels on the border of the rectum abdomini muscles. Epigastric vessel bleeding require hemostasis by suture, bipolar coagulation or pressure with a Foley catheter. Hemostasis may be achieved either at the end of the procedure as the ancillary trocar "per se" produces hemostasis, eliminating the need for a new port entry. Ancillary port extraction must be performed at the end of the procedure under direct view in order to diagnose possible epigastric lesions. Hemostasis difficulties using these techniques are very rarely described but usually a simple enlargement of the skin incision to permit better suturing of the artery is sufficient.

Intraoperatory injuries involve mostly the bowel and the ureter. Bowel injuries are frequent with adhesiolysis and are usually determined by excessive tissue traction, scissors or thermic, electric and laser energy. Electric or laser injuries might be neglected during surgery and the diagnosis delayed until peritonitis or bowel occlusion signs become present. Accurate knowledge of pelvic anatomy, a perfect view of the operatory field and experience with the use of electrical instrumentation are of paramount importance being basic prerequisites for any surgeon who approaches laparoscopic procedures, as well as for laparotomy. Bowel injuries limited to the superficial serosa permit an expectant management while complete punching or lacerations require sutures, sometimes even resection and end- to-end anasthomosis. Urinary bladder injuries may occur while dissecting the space between the uterus and the bladder during hysterectomy or adhesiolysis or during Retzius space preparation in Burch procedures. Vesical perforations are easily diagnosed by visualizing intraoperatory bleeding and mostly by observing blood or gas in the urine. Small injuries may be surgery requiring laparotomic management, therefore, during major laparoscopic procedures, ureteral isolation may be required in order to avoid injury. Vascular injuries may interest the large vessels (aorta, cava, illiac) and need immediate laparotomy, while bleeding from smaller vessels such as the uterine artery or the ovarian vessels may be managed laparoscopically by bipolar coagulation, clips or suture.

Postoperative laparoscopic complications include possible infections of abdominal wall sutures, pelvic abscess in cases of terminal bowel injuries, rectovaginal fistulas in surgery performed for rectovaginal septum endometriosic nodes, especially if the vaginal cuff was previously coagulated by monopolar current before suturing. When a more than 10 mm diameter ancillary ports are used, incisional herniation is possible but rare and may be avoided by suturing the aponeurotic defect.

The large experience with laparoscopic surgery had demonstrated its effectiveness and safety but still attention has to be paid to possible complications. Knowledge of potential laparoscopic complications and their treatment is the only way to avoid surgical risks.

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Endometriosis: laparoscopic treatment

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The incidence of endometriosis among female population ranges between 7-10%. Endometriosis should not always be considered a disease and requires adequate treatment only when correlated with pathological changes in the normal pelvic anatomy, causing pain and/or infertility.

Stage I (minimal)

The association of endometriosis – infertility in this stages is still debated. Randomized trials have shown no statistically significant differences in the reproductive potential among patients treated with medical therapy, surgery and expectancy management. Many Authors consider minimal endometriosis as a paraphysiological condition which does not necessarily require treatment.

Stage II (mild)

In this stage the modification of the pelvic anatomy is still a rare condition and the correlation with infertility is not clear. Nonetheless, this stage includes many cases of deep endometriosis or rectovaginal septum endometriosis, which may produce severe dysmenorrhea and dispareunia [1]. Medical therapy is often lacking in efficacy, does not completely remove the symptomatology and moreover, recurrences are frequent. Surgery seems to be the most appropriate treatment in this stage but may be difficult. Many literature data are available on this topic but the follow-up of the patients is still too short [2, 3, 4, 5].

Surgical treatment

Laparoscopic surgical treatment of deep infiltrating and rectovaginal septum endometriosis cannot be standardized as the clinical findings are multiple and of different severity. The common technique includes: clinical evaluation of the Douglas' pouch and uterosacral ligament infiltration under general anesthaesia, a rectal incannulation to define its anatomical limits, the use of a 10 mm laparoscopic optical system and of 2 or 3 ancillary suprapubic ports. The uterosacral ligaments need to be laterally isolated to avoid ureteral injury and is followed by the isolation of the endometriosic node beginning with the isthmic portion, then continuing laterally through the pararectal fossa and finally removing it from the rectum. The node is isolated from the vagina at the posterior fornix level; when the node involves the vaginal wall, the tissue may be resected by laparoscopy or vaginally. When the rectum is deeply involved sometimes an intestinal resection may be required. A rectal injury is possible during node isolation, therefore presurgical treatment with Metronidazole or antibiotics may be useful, in order to allow correction of the perforation in the same surgical procedure.

CASE-SERIES - our experience

Between June 1993 and June 1996, 59 patients underwent surgery for deeply infiltrating endometriosis (defined as a minimum of a 1 cm in diameter lesion) in our Department. Only 36 patients with a > 6 months follow-up were considered for our study. Deep endometriosis involved the rectovaginal septum in 9 cases (25%), vesicouterine peritoneum in 6 (13%), uterosacral ligaments and Douglas' pouch in 25 (69%). Thirty-four patients had dysmenorrhea, 18 (50%) deep dispareunia and 17 (47%) pelvic pain. Fourteen patients were infertile (38%). Twelve (33%) patients were stage IV, 12 (33%) stage III, 10 (27%) stage II and 2 (5%) stage I. Nineteen patients underwent medical therapy after surgery (7 with GnRH analogues, 1 with Danazol and 2 with estroprogestins). The mean follow-up was 20±4 months. Seven women (19%) presented clinical signs suggestive of recurrence or persistence of the disease after surgery. However, only 3 complained of pain while the others were asymptomatic or had only mild dysmenorrhea. Persistence or recurrence of deep endometriosis is quite frequent after surgery, but almost 50% of the patients remain asymptomatic.

Stage III and IV (moderate and severe)

Severe forms of endometriosis produce alterations of the pelvic anatomy and therefore are closely correlated with pelvic pain and infertility. For many years the conservative laparotomic approach was considered the gold standard in the treatment of moderate and severe endometriosis. More recently, laparoscopy has demonstrated its validity and efficacy in all stages of endometriosis [8, 9, 10]. Medical therapy prior or after surgery does not significantly influence the results [11].

The large variety of anatomical aspects does not permit the standardization of the surgical approach.

The technical steps in the enucleation of endometriotic cysts (in most cases advanced stages of the disease) are summarized as follows:

- Isolation of the endometrioma from its adhesions with the posterior leaf of the broad ligament and with the homolateral ulterosacral ligament (almost always adhesions are present).
- Aspiration of the cystic content if still unruptured (normally ruptures during ovariolysis).
- Traction in opposite directions using 2 graspers to remove the cystic wall from the adjacent ovarian tissue.
- As endometrioma may involve the ovary till its hilus and till the utero-ovarian ligament, an accurate hemostasis by bipolar coagulation is always mandatory.
- The cyst will always be removed by endobag.

We perform all laparoscopic procedures using only forceps, graspers, bipolar coagulation and hydrodissection without laser energy, therefore organ manipolation and pelvic trauma are minimized.

Case Series

From January 1993 through December 1996, 181 women with III, IV stage of endometriosis were laparoscopically treated in our Department. This study includes only 141 patients with a minimum 12 months follow-up.

Tab. 1 – *Clinical characteristics of patients*

No. of patients	181
No. of patients with follow up ≥ 6 months	141
Age (mean ± SD)	31.7±4
Main complaint	
Infertility	57 (40.4%)
Pelvic pain	66 (46.8%)
Only clinical evidence	18 (12.8%)
Previous surgery for endometriosis	31 (21.9%)

Clinical characteristics of the patients are summarized in table 1. In all cases, at least one endometriotic ovarian cyst was present. All laparoscopic procedures were performed without use of laser, with forceps, bipolar coagulation and hydrodissection. Generally we do

not use reabsorbable membranes to prevent adhensions but we perform an accurate hemostasis. After surgery, 12 patients received Danazol while 9 had postsurgical treatment with GnRh analogues for 3 months. Thirty-nine women received estroprogestinic pills. Infertile patients did not undergo any therapy for 6 months after surgery. Transvaginal ultrasound scan was programmed. The cumulative pregnancy rate and the percentage of recurrences were calculated using the Kaplan Meier method and the groups were compared with the median of the Log rank test. The Chi square test, Fishter exact test and T test were chosen for nonhomogenous data.

Fertility: by considering only infertile patients prior to the laparoscopic approach, 25 out of 57 patients became pregnant (49.9% pregnancy rate). The cumulative pregnancy rate at 24 months was 57.7%. Most of the patients became pregnant during the first 6 months after surgery. The patients characteristics in relation to pregnancy status are illustrated in table 2. Twenty-three patients with stage III endometriosis (23/45, 51%) while only two stage IV patients became pregnant (2 / 12, 16.7%) $p < 0.05$. We found a statistically significant difference between patients who did and did not conceive in relation to the adhesion score ($p < 0.005$).

Tab. 2 – *Clinical characteristics of infertile patients.*

	Pregnancy	No pregnancy	Total
No. of patients	25 (43.9%)	32 (56.1%)	57
Age (mean ± SD)	30.1±3.5	33±3.8	31.7±3.9
Duration of infertility	27.6±17.2	40.7±34.7	34.8±28.7
Stage			
III	23 (51%)	22 (49%)	45
IV	2 (16.7%)	10 (82.3%)*	12
Score adhesions	5.3±5.9	12.4±17.3†	9.8±14.4
Score implants	22±8.1	24.6±9.9	24.8±13.5

Recurrences. There were five (3.5%) recurrences at 6 month follow-up. The cumulative recurrence rate at 24 month follow-up was 27%. The cumulative curve of pain relapses in all the patients and in relation to endometriosis stage was statistically significant ($p < 0.05$). Therefore, recurrences do not seem to be related to the anatomic patterns and diameter of the cysts, nor to the medical therapy or surgical techniques.

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Laparoscopic surgical approach to ectopic pregnancy

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The incidence of ectopic pregnancy (EP) ranges between 1-2%. EP represents the most frequent cause of maternal gestational death under 20 weeks of pregnancy. Mortality for EP is 10-fold higher with respect to intrapartum mortality which justifies its fame of "being a disaster in human reproduction" [1]. Ectopic pregnancy is often associated with hypofertility or reproductive failures such as recurrent abortion. The rising incidence (about 10% every year) of EP reported in the literature is multifactorial due to an increase in