Laparoscopic treatment of deep endometriosis located on the uterosacral ligaments

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The goal of this study was to assess the efficiency of laparoscopic surgical treatment of pain for patients presenting deep endometriosis located on the uterosacral ligaments. To this end we analysed a continuous series of 21 patients treated by laparoscopic surgery between January 1993 and June 1994. In all these cases treatment consisted of resection of all the uterosacral ligament(s) presenting deep endometriotic lesions together with exeresis of all other endometriotic lesions. No complications were observed per- or post-operatively. The results were assessed for all the patients with a minimum follow-up of one year. The efficiency of the treatment varied according to the symptoms. Patients who presented dysmenorrhoea (19 cases) improved in 84.2% of cases (16 patients). Out of the 17 patients who presented deep dyspareunia, improvement was evident for 94.1% of cases (16 patients). The chronic pelvic pain suffered improved in seven out of nine cases (77.7%). Patients who benefited from an improvement rated it excellent or satisfactory in over 80% of cases. These results demonstrate that, provided the surgeon is highly skilled in laparoscopy, laparoscopic surgery is efficient for the treatment of patients presenting painful symptoms related to deep endometriotic implants located on the uterosacral ligaments.

Key words: deep endometriosis-operative laparoscopy/uterosacral ligaments

Introduction

Endometriosis is defined histologically by the presence outside the uterus of ectopic endometriotic glands together with stroma (Jansen and Russel, 1986; Martin et al., 1989). On the basis of the initial publications (Sampson, 1927), for a great many years the only lesions considered to be endometriotic lesions were the endometriomas, typical blackish or blueish lesions and pelvic adhesions. The progress made over more recent years has helped us understand certain aspects of endometriosis. To begin with, it is now definitely acknowledged that peritoneal endometriosis can appear in atypical forms: small white vesicles, red vesicles, brown lesions, flame-like lesions, polypoid lesions etc. (Vasquez et al., 1984; Jansen and Russel, 1986; Redwine, 1987; Stripling et al., 1988; Martin et al., 1989; Moen and Halvorsen, 1992).

Secondly, it has been demonstrated that microscopic endometriotic lesions can be observed when the peritoneum appears normal to laparoscopy (Murphy et al., 1986; Nisolle et al., 1990; Redwine and Yocum, 1990; Nezhat et al., 1991). Thirdly and finally, it has been shown that certain endometriotic lesions can penetrate the retroperitoneal space (Martin et al., 1987; Martin and Vander Zwaag, 1987; Moore et al., 1988; Cornillie et al., 1990; Koninckx et al., 1991).

Deep endometriosis is defined as existing when the lesions penetrate 5 mm or more (Cornillie et al., 1990; Koninckx et al., 1991). Deep endometriosis is a specific entity (Koninckx et al., 1992) which is extremely active, in phase with the eutopic endometrium (Cornillie et al., 1991) evolving progressively with age (Koninckx et al., 1991), and most often located in the Pouch of Douglas, the rectovaginal septum, the uterosacral ligaments and occasionally in the uterovesical fold (Cornillie et al., 1990). Deep endometriosis is responsible for pelvic pain, the intensity of which is correlated not with the spread of the lesions found at laparoscopy, but solely with the depth to which the lesions penetrate (Koninckx et al., 1991).

Although medical treatment can be efficient for the painful symptoms, the benefit is most often transitory and it is very likely that the pain will return when the treatment stops (Evers, 1987; Fedele et al., 1989; Waller and Shaw, 1993). Furthermore medical treatment does not enable the diagnosis of deep endometriosis to be made, for this is defined on a histological basis. These are the reasons for stating that surgery is the treatment of choice for deep endometriosis (Koninckx and Martin, 1995). The progress made in recent years in operative laparoscopy means that treatment for deep endometriosis can be envisaged using laparoscopic surgery. Several teams have reported their experience in laparoscopic surgical treatment for deep endometriosis located on the rectovaginal septum (Nezhat et al., 1992; Canis et al., 1993; Donnez et al., 1995), the Pouch of Douglas (Martin, 1988; Reich et al., 1991; Redwine, 1992) or the uterovesical fold (Nezhat and Nezhat, 1993; Dubuisson et al., 1994).

This study had a dual aim: firstly, to describe our technique for laparoscopic surgical treatment of deep endometriosis located on the uterosacral ligaments, and secondly, to assess the procedure in terms of its efficiency in reducing painful symptoms in the pelvis (dysmenorrhoea, dyspareunia, chronic pelvic pain).

Materials and methods

Operative procedure

Pre-operative workup
Clinical suspicion of deep endometriosis on the uterosacral ligaments requires a specific diagnostic procedure. From the clinical
point of view, it is necessary to complete the gynaecological assessment by a rectal examination in order to determine how widespread the lesions are. This examination must be repeated in the operating theatre under general anaesthesia at the beginning of the operation. From the paraclinical point of view there must be an investigation of the neighbouring organs (mainly the recto-sigmoid and ureter) which are liable to be involved and/or whose anatomical position may be modified by deep endometriosis. To do this, a complete rectocolonoscopy and i.v. pyelography is carried out.

**Instrumentation**

Standard, non-disposable instruments (grasping forceps, bipolar coagulation, scissors, etc.) (Storz-France, Paris) are used. An electrical generator (Erbe, Tübingen, Germany) gives constant control over coagulation. A 'Séroconditionneur' (Storz-France) is used to provide irrigation-aspiration at high pressure with hot normal saline solution kept at constant temperature.

**Patient set-up**

The patient is installed under general anaesthesia with endo-tracheal intubation with her thighs apart and buttocks just over the edge of the table. A urinary catheter is installed systematically. Exposure is a special aspect of this operation. In order to mobilize the uterus, the same set-up is used as that recommended for laparoscopic hysterectomy (Chapron et al., 1994). The rectum and vagina are mobilized using large calibre probes. The laparoscopy is performed trans-umbilically after conducting the safety tests. Three 5 mm suprapubic trocars are used; the two lateral trocars are introduced under visual control outside the epigastric pedicles located by the endoscope.

**Phases in the operation**

After pushing the loops of bowel back above the promontory, the first phase in the operation, before dissecting, is to identify the ureter whose trajectory can be modified by the deep endometriotic lesions.

The lateral pelvic peritoneum is then incised in a healthy area, below the route taken by the ureter, parallel and above the uterosacral ligament. The peritoneal incision is carried out with laparoscopic scissors after prior bipolar coagulation, and runs towards the point of insertion of the uterosacral ligament in the uterus. With a grasping forceps the peritoneum and uterosacral ligament are pulled firmly towards the centre of the pelvis. This enables all the deep endometriotic lesions to be dissected and resected.

How far retroperitoneal dissection and uterolysis go depends on the depth to which the endometriotic lesions have penetrated and their spread. If retroperitoneal infiltration is extensive it is sometimes necessary to carry out uterolysis up to the point where it crosses the uterine vessels. Once the outer lateral surface of the uterosacral ligament has been totally freed, the ligament is then pulled outwards using a grasping forceps. Exposure of the lateral rectal fossa is achieved by introducing a large probe into the rectum. After preventive bipolar coagulation the lateral rectal fossa is opened using the laparoscopic scissors. The extent to which further dissection must go towards the centre of the pelvis depends on the degree of retroperitoneal fibrosis and the extent of the endometriotic lesions.

In order to excise all the endometriotic lesions, it is necessary in some cases to continue dissection right up to the rectal serosa. The uterosacral ligament must then be removed from its point of insertion on the posterior surface of the cervix and vagina. The uterosacral ligament is coagulated level with its insertion in the uterus before sectioning with the laparoscopic scissors. Using the same procedure, the ligament is then freed from the pelvic floor. The tissues are then sent for pathological examination. At the end of the operation, the peritoneal cavity is systematically irrigated with hot saline and the haemostasis and the trajectory of the ureters are checked. Intactness of the rectum is checked by injecting a Methylene Blue solution through the anus. Reperitonization is not carried out and drains are not installed. In order to make it possible to analyse specifically the action of laparoscopic surgery alone with respect to pain, medical treatment [gonadotrophin-releasing hormone (GnRH) analogues or progestatives] was not prescribed postoperatively.

**Patients**

From January 1, 1993–June 30, 1994 we made a retrospective study of a continuous series of 21 patients presenting deep endometriosis, confirmed histologically, on one or both uterosacral ligaments. Endometriosis was diagnosed only when ectopic glands together with stroma were found. In every case the depth to which the lesions penetrated was 5 mm or more, proving the deep character of endometriosis (Cornillie et al., 1990; Koninckx et al., 1991).

All these patients presented painful functional symptoms associated with a strong clinical suspicion of endometriosis on the uterosacral ligaments. The reasons for consultation, sometimes more than one for the same patient, are given in Table I. Ten patients (47.6%) had been given medical treatment for 3–6 months before the operation. In six cases this was progressive treatment, and in four cases treatment was by GnRH analogues.

In 13 cases (61.9%), vaginal examination revealed a painful nodule level with the uterosacral ligament(s). In nine of these cases (69.2%) firm palpation over the nodule produced pain identical to that causing the patient to complain. The nodules were bilateral in two cases. For the eight other patients, vaginal examination revealed no nodule but all the uterosacral ligament(s) were sclerotic and hard. In six of these cases (75%) firm palpation over the uterosacral ligament produced pain identical to that causing the patient to complain. The lesions were bilateral in two cases. For all 21 patients the paraclinical workup (i.e. pyelography, cystoscopy, rectocolonoscopy) showed no signs of bowel or urinary tract involvement.

During laparoscopy, endometriosis was scored according to the revised American Fertility Society Classification (AFS, 1985). Patients were distributed according to the classification as: stage 1, two patients (9.5%); stage 2, seven patients (33.3%); stage 3, seven patients (33.3%); stage 4, five patients (23.9%). In all cases the
samples sent for histology enabled the diagnosis of deep endometriosis to be confirmed on the uterosacral ligament(s). In addition to uni- or bilateral resection of the uterosacral ligaments, all other endometriotic lesions (cystectomy, lysis, bipolar coagulation of superficial implants, etc.) were treated for all patients. No patient was given presacral neurectomy (Cotte, 1937, 1949).

The mean age of the patients was 30.8 ± 5.4 years (range 22-42). Thirteen patients (61.9%) had never been pregnant. Nine patients (42.8%) had a previous history of surgery for endometriosis. These nine patients had all been operated on previously in other establishments. During each of these operative procedures, although the operative reports mentioned the existence of deep bilateral lesions on the uterosacral ligaments, only the diffuse superficial peritoneal endometriotic lesions had been destroyed (bipolar coagulation and/or carbon dioxide laser).

All patients were followed-up for at least 1 year. The patients were seen in consultation every 4 months for the first year after operation and then every 6 months. The patients were given a clinical examination at each consultation and the efficiency of laparoscopic treatment for the various types of pain (dysmenorrhoea, deep dyspareunia, chronic pelvic pain) was determined. As the use of multidimensional pain scoring systems to assess the efficacy of a treatment for pain is complicated in practice (MacLaverty and Shaw, 1995), a simpler method of pain assessment involving a verbal rating scale (MacLaverty and Shaw, 1995) was used. This consists of giving the patient a questionnaire and asking her to indicate which description seems most appropriate for the change in her pain symptoms after laparoscopic treatment. The four descriptions proposed to the patients were

**Table II. Laparoscopic surgical procedures associated with resection of the uterosacral ligaments (n = 16)**

<table>
<thead>
<tr>
<th>Associated laparoscopic surgical procedures</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesiolysis</td>
<td>10*</td>
<td>47.6</td>
</tr>
<tr>
<td>Right tubo-ovarian lysis</td>
<td>6</td>
<td>28.6</td>
</tr>
<tr>
<td>Left tubo-ovarian lysis</td>
<td>5</td>
<td>23.8</td>
</tr>
<tr>
<td>Bowel lysis</td>
<td>4</td>
<td>19.0</td>
</tr>
<tr>
<td>Coagulation of superficial endometriotic lesions</td>
<td>13*</td>
<td>61.9</td>
</tr>
<tr>
<td>Left ovarian cystectomy</td>
<td>3</td>
<td>14.3</td>
</tr>
<tr>
<td>Right ovarian cystectomy</td>
<td>1</td>
<td>4.8</td>
</tr>
<tr>
<td>Left cystectomy</td>
<td>2</td>
<td>9.5</td>
</tr>
</tbody>
</table>

* Several laparoscopic procedures may apply for the same patient. I.p. = intra peritoneal.

Our results for laparoscopic surgical treatment of deep endometriosis located on the uterosacral ligaments are satisfactory. We have observed a disappearance or significant reduction in pain for over three quarters of the patients, with a follow-up of at least 1 year in every case. Overall, the
laparoscopic surgical treatment is efficient, but the degree of improvement varies according to the type of pain. In cases of deep dyspareunia with effects on the patient’s sex life, the results are excellent. The treatment was efficient in 94.6% of cases (16 patients) and when there was an improvement, it was considered to be excellent or satisfactory in 81.2% of cases (13 out of 16). As for dysmenorrhoea, the symptoms regressed in 84.2% of cases (16 patients). For patients suffering from dysmenorrhoea who noted an improvement, this was judged to be excellent or satisfactory in 81.2% of cases (13 out of 16). The treatment was a little less efficient for chronic pelvic pain, with the pain being reduced 77.7% of the time. When there was an improvement, it was judged to be excellent or satisfactory for 85.7% of the patients (six out of seven).

These good results match those reported recently (Martin and Vander Zwaag, 1987; Redwine, 1991; Koninckx and Martin, 1995). They justify the statement that laparoscopic surgery offers results comparable to those observed for laparotomy. For example, Damario et al. (1994) with a series of 15 patients who underwent bilateral resection of the uterosacral ligaments via laparotomy reported an improvement in dysmenorrhoea and dyspareunia respectively in 80 and 58% of cases.

No rectal, ureter nor vascular complications were observed in this series. However, these encouraging results must not mask the fact that this is a difficult procedure to be reserved for surgeons highly experienced in laparoscopic surgery. The modification in the anatomical relationships consequent upon the retroperitoneal infiltration of the lesions causes resection of deep endometriosis to constitute a risk factor for complications during laparoscopic surgery (Chapron and Querleu, 1994). At the end of the operation the ureter and rectum must be checked systematically. Overlooked peroperative complications are characteristic of laparoscopic surgery accidents (Chapron et al., 1992). At the slightest doubt, safety tests must be carried out to enable any injury to the ureter or rectum to be diagnosed during the operation (for the ureter, i.v. injection of 5 ml of Carmine Indigo; for the rectum, transanal injection of Methylene Blue via a bladder catheter).

In cases of pelvic pain occurring in a context of deep endometriosis, in order for treatment to be efficient it must consist of surgical exeresis of all endometriotic lesions (Koninckx and Martin, 1995). In cases of deep endometriosis located on the uterosacral ligaments, treatment must consist of complete resection of one or both uterosacral ligaments to ensure complete excision of invasive endometriosis. The laparoscopic uterine nerve ablation (LUNA) recommended by some (Davies, 1985; Festi, 1985; Lichten and Bombard, 1987; Sutton and Hill, 1990) is in our opinion insufficient and inappropriate in this context as it leaves the endometriotic lesions in place. Given that laparoscopic surgery is recognized as being efficient for obtaining total removal of all the deep endometriotic lesions, the problem arises of how to recognize these lesions on the uterosacral ligaments. In patients presenting painful symptoms (dyspareunia, dysmenorrhoea, chronic pelvic pain), this type of lesion should be suspected during clinical examination when a nodule or infiltration of the uterosacral ligament(s) is found palpation of which gives rise to pain comparable to that of which the patient complains. The discovery of this type of lesion means that the patient must be meticulously re-examined under general anaesthesia, not only at the beginning but also at the end of the operation in order to be sure that all the lesions palpated have indeed been removed. During the operation retroperitoneal dissection must be as broad as required by the spread of these deep lesions. If necessary, dissection must extend laterally, with the ureter (66% in our series) and sometimes (one case in our series) the uterine vessels being totally dissected in order to achieve complete exeresis of all the deep endometriotic lesions. Similarly to the inside of the uterosacral ligament it is sometimes necessary (38.1% of cases in our series) to dissect the rectum and the lateral rectal fossa. The limits of the endometriotic tissue are usually identifiable because ectopic endometriosis infiltrates through loose connective tissue and stops at the junction with adipose tissue.

No other surgical procedure was associated with the treatment of all endometriotic lesions. In particular we did not carry out any presacral neurectomy. This operation, described for the first time by Jaboulay (1899) and Ruggi (1899) was then adopted by Cotte (1937, 1949). Recently several authors have recommended carrying out this operation by laparoscopic surgery (Nezhat and Nezhat, 1992; Perry and Perez, 1993). As no studies have formally demonstrated the advantages of this operation for the treatment of pain associated with endometriosis (Vercellini et al., 1991; Candiani et al., 1992), we have never associated it with resection of the uterosacral ligaments, particularly because this operation is not without risk (Lee et al., 1986; Pastner and Ozz, 1990).

**Conclusion**

The uterosacral ligaments are a frequent site for deep endometriosis. In this context the painful symptoms are correlated with the depth to which the lesions penetrate. Medical treatments are most often simply palliatives with a considerable risk of painful recurrence when the treatment ceases. Surgical

| Table III. Efficiency of laparoscopic surgical resection of uterosacral ligaments with respect to reduction of painful symptoms |
|---------------------------------|-----------------|-----------------|
| Dysmenorrhoea (n = 19) | Deep dyspareunia (n = 17) | Chronic pelvic pain (n = 9) |
| **No.** | **Percentage** | **No.** | **Percentage** | **No.** | **Percentage** |
| Improvement | 16 | 84.2 | 16 | 94.1 | 7 | 77.7 |
| Excellent | 6 | 31.6 | 11 | 64.7 | 2 | 22.2 |
| Satisfactory | 7 | 36.8 | 2 | 11.8 | 4 | 44.4 |
| Slight | 3 | 15.8 | 3 | 17.6 | 1 | 11.1 |
| No Improvement | 3 | 15.8 | 1 | 5.9 | 2 | 22.3 |
exeresis of all the deep endometriotic lesions is the most efficient treatment. The results of this series confirm the efficiency of laparoscopic surgical treatment for this indication. It is however a difficult operation which requires a certain degree of experience in laparoscopic surgery, because extensive dissections are required close to the ureter, the uterine vessels and the rectum.

References


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