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Efficacy of Laparoscopic Pelvic Denervation in Central-Type Chronic Pelvic Pain: A Multicenter Study

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ABSTRACT

Our aim was to evaluate the efficacy of laparoscopic pelvic denervation (uterosacral resection or presacral neurectomy) for the treatment of chronic pelvic pain with a predominant central-type localization in women with endometriosis or with no visible pathology. In a retrospective analysis performed in six centers, we evaluated the data relative to 58 patients with midline pelvic pain laparoscopically treated, with a follow-up of at least 6 months including a quantitative pain assessment. The distribution of types of pain (dysmenorrhea, deep dyspareunia, and pelvic pain not related to menses or coitus) was not different among stage I–II endometriosis, stage III–IV endometriosis, and no visible pathology, except that deep dyspareunia was significantly ($p < 0.05$) less frequent in the absence of visible pathology than in moderate to severe endometriosis. Both types of laparoscopic denervations significantly ($p < 0.001$) reduced after 6 months the intensity of midline dysmenorrhea, pelvic pain, and deep dyspareunia in both endometriosis patients who also had undergone conservative surgery and women without any laparoscopically visible pathology. Presacral neurectomy was significantly more effective than uterosacral resection in the relief of dysmenorrhea. No major adverse effects were reported; and minor side effects were comparable between the two techniques. In conclusion, both presacral neurectomy and laparoscopic uterosacral resection are highly effective in reducing midline pelvic pain performed either alone or in combination with the classic ablative surgery for endometriosis. (J GYNECOL SURG 12:35, 1996)

INTRODUCTION

CHRONIC PELVIC PAIN (CPP) IS A COMMON and perplexing gynecologic problem. Although its definition is still nebulous, it represents the reason for at least 10% of all office visits to a gynecologist¹ and for approximately 40% of all laparoscopies.² Laparoscopy, both diagnostic and therapeutic, is particularly useful for this indication, allowing pathogenetic treatment in the majority of the causes of CPP. Operative laparoscopy has induced a renewal of interest in pelvic denervation, particularly presacral neurectomy (PSN), as described by Cotte,³ and uterosacral resection (USR).⁴

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These techniques of pelvic denervation, whose anatomic rationale has been described elsewhere,^{3,4} could have a central role in the management of midline pelvic pain associated with endometriosis⁵⁻⁸ or in the absence of a specific pathology,^{9,10} in view of the frequent lack of success of conservative treatment of endometriosis and the transient effect of medical treatment, which has various side effects. The role and efficacy of PSN and USR have not been clearly defined. We, therefore, have evaluated data about PSN and USR performed in six operative laparoscopy units for midline chronic pelvic pain, particularly for those patients followed up for at least 6 months, using a quantitative pain assessment.

MATERIALS AND METHODS

All pelvic denervations (PSN and USR) performed laparoscopically for chronic pelvic pain in six operative laparoscopy units were reviewed. Data were analyzed for those cases with a complete description of the history, intensity of pain, responsiveness to medical treatment, and localization of the pain and with a postoperative follow-up of at least 6 months. Only those women with predominant midline pelvic pain, cyclic or acyclic, persisting for more than 6 months and unresponsive (or only temporarily responsive) to medical treatment, who had laparoscopically assessed endometriosis or no visible pathology at laparoscopy, were included in the study.

Fifty-eight patients included in the review underwent gastroenterologic, urologic, orthopedic, and psychiatric evaluation before laparoscopy to exclude other causes of pelvic pain. Age, weight, infertility, laparoscopic diagnosis, type of pain, and distribution of types of pain depending on the laparoscopic diagnosis were recorded. For each patient, the intensity of the pain was evaluated by a pain scale, a visual analog scale, or a pain diary with a pain relief scale filled in by the patient before surgery. All data were converted into a 1 to 10 numeric linear scale. The treatment was considered unsuccessful when there was a reduction of less than 2 points in the numeric linear scale score. The laparoscopic assessment included endometriosis stage, technical modalities of pelvic denervations, and the intraoperative and postoperative complications.

The conservative treatment of endometriosis was by means of adhesiolysis, endometriectomy, and ablation of all endometriotic implants. USR was performed in 29 cases using a bipolar dissection followed by scissor transection of the proximal 2 cm of the uterosacral ligaments. In 5 cases, a suture behind and in front of the transection was placed by a 2-0 PDS skyneedle (Ethicon, Pomezia, Italy).

Laparoscopic PSN was performed in 4 cases following the original Perez technique.⁵ In the remaining 20 cases, a slightly simplified technique was used, consisting of an umbilical scope and three 5-mm ancillary ports, left retraction of the sigmoid colon and retroperitoneal vasopressin infiltration of the sacral promontory area, a transverse incision from major vessels or the ureter on the right to the mesentery of the sigmoid on the left and hydrodissection, and bipolar coagulation and scissor transection of all the underlying tissue layers (including neurectomy) down to the periosteum.

We used the *t*-test for paired data to compare pain intensities before and after surgery, the *t*-test for unpaired data to compare the Δ (t_0-t_f) values means, and the Chi-square test to analyze the frequencies.

RESULTS

The average age of the patients was 30.4 ± 4.1 years, the average weight was $63.6 \text{ kg} \pm 10.5$, and the incidence of infertility was 36% (Table 1), with no difference between the groups treated by means of PSN or USR.

The laparoscopic diagnosis was stage I-II endometriosis in 16 patients, stage III-IV endometriosis in 24, and no visible pathology in 18. The distribution of laparoscopic diagnosis and types of pain (dysmenorrhea, deep dyspareunia, and pelvic pain unrelated to menses or coitus) was not different between the PSN and USR groups (Table 1). The distribution of pain symptoms in the different clinical conditions (Table 2) revealed no differences between stage I-II endometriosis and endometriosis moderate to severe, whereas deep dyspareunia was significantly ($p < 0.05$) less frequent in those patients with absence of visible pathology than in stage III-IV endometriosis.

Pain intensity, preoperatively evaluated, was not different between PSN and USR groups and between patients with endometriosis or with no visible pathology (Table 3). The evaluation of pain intensity before

TABLE 1. DEMOGRAPHIC AND CLINICAL DATA

	Total cases <i>n</i> = 58	PSN ^a <i>n</i> = 24	USR <i>n</i> = 34
Age (years)	30.4 ± 4.1 ^b	29.3 ± 3.9	31.2 ± 4.2
Weight (kg)	63.6 ± 10.5	61.8 ± 9.4	64.9 ± 11.2
Infertility	21 (36) ^c	9 (37)	12 (35)
Endometriosis stage I–II	16 (27.6)	5 (20.8)	11 (32.3)
Endometriosis stage III–IV	24 (41.1)	11 (45.8)	13 (38.2)
No visible pathology	18 (31.0)	8 (33.3)	10 (29.4)
Dysmenorrhea	56 (96.5)	23 (95.8)	33 (97.1)
Dyspareunia	28 (48.2)	14 (58.3)	14 (41.2)
Pelvic pain (unrelated to menses or coitus)	36 (62.1)	16 (66.6)	20 (58.8)

^aPSN, presacral neurectomy; USR, ureterosacral resection.

^bMeans ± SD.

^cPercent given in parentheses.

and after surgery (Table 4) showed a significant ($p < 0.001$) effectiveness for both types of surgery in decreased pain scores for all the symptoms for 6 months.

PSN was unsuccessful in the relief of dysmenorrhea in 8% (2 of 23) of cases and in 12% (2 of 16) of pelvic pain unrelated to menses or coitus. USR had a failure rate of 24% in case of dysmenorrhea, 21% for deep dyspareunia, and 15% for other pelvic pain. Evaluating the differential pain score before and after surgery (Δt_0-t_f), we determined a significantly ($p < 0.001$) higher efficacy for PSN than for USR in the relief of dysmenorrhea and comparable results between the two techniques for deep dyspareunia and pelvic pain (Table 4). The techniques were comparable in the relief of pain symptoms in patients either with endometriosis or with no visible pathology (Table 5).

We had one acute complication from PSN: major bleeding (>500 mL) from midsacral vessels, laparoscopically resolved but requiring a blood transfusion. The late complications were constipation in 5 cases in the PSN group (20%) and 4 patients in the USR group (16%) and urinary urgency in 2 women treated by PSN (8%).

DISCUSSION

CPP is one of the most frustrating problems for a gynecologist. These patients often suffer from alterations in daily functioning, work, and personal relationships.¹¹ The medical treatment offers only temporarily relief of the symptoms and, because of the side effects, should not be considered for long-term therapy. Endometriosis, one of the most frequent causes of CPP, can be treated conservatively, with improvement in pain symptoms.¹² Unfortunately, however, such surgery is not always completely successful, particularly in the presence of subperitoneal implants and microscopic lesions.¹³

TABLE 2. DISTRIBUTION OF PAIN SYMPTOMS IN DIFFERENT CLINICAL CONDITIONS PREOPERATIVELY (t_0)

	Endometriosis stage I–II <i>n</i> = 16	Endometriosis stage III–IV <i>n</i> = 24	No visible pathology <i>n</i> = 18
Dysmenorrhea	16 (100%)	24 (100%)	16 (88%)
Dyspareunia	7 (43%)	16 (66%)*	5 (27%)
Pelvic pain	7 (43%)	14 (58%)	11 (61%)

* $p < 0.05$; Chi-square 4.76; odds ratio 0.19; 95% confidence limits: 0.03–0.86.

TABLE 3. PAIN INTENSITY DEGREE^b at *t*₀

	<i>Dysmenorrhea</i> <i>n</i> = 56	<i>Deep dyspareunia</i> <i>n</i> = 28	<i>Pelvic pain</i> <i>n</i> = 36
Total cases	6.17 ± 1.56 ^b	6.60 ± 1.38	6.76 ± 0.78
PSN ^c	7.29 ± 1.23	5.87 ± 1.12	8.0 ± 0.85
USR	5.82 ± 1.56	6.38 ± 1.53	6.73 ± 0.70
Endometriosis	5.97 ± 1.42	6.36 ± 1.49	6.79 ± 0.83
No visible pathology	5.52 ± 2.69	5.75 ± 2.65	6.60 ± 0.51

^aDegree, 1 to 10 linear numeric scale.

^bMeans ± SD.

^cPSN, personal neurectomy; USR, ureterosacral resection.

The rapid, widespread use of high-tech operative laparoscopy has renewed interest in pelvic denervation, and many observational reports have confirmed its efficacy by both PSN^{5,14} and USR.¹⁵⁻¹⁸ Our multicenter retrospective, stringently defined analysis has shown a PSN efficacy rate of 92% in the relief of dysmenorrhea, 100% for deep dyspareunia, and 88% for pelvic pain unrelated to menses or coitus and a USR success rate of 76% for dysmenorrhea, 79% for dyspareunia, and 85% for other pelvic pain.

The inclusion in this study of data relative only to patients with a quantitative assessment of pain has allowed us to show a highly significant ($p < 0.001$) reduction in the pain score 6 months after surgery. Our results are consistent with the improvement rate in dysmenorrhea in patients with endometriosis reported by Perez⁵ (24 of 25), Nehzat and Nezhat¹⁴ (92% of 57 patients), Feste¹⁵ (72% of 32 women), Davis¹⁶ (92% of 146 patients with dysmenorrhea and 94% of 109 with dyspareunia), Daniell¹⁷ (75% of 80 cases), and Sutton and Hill¹⁸ (70% of 187 patients). However, in some of these reports, the inclusion criteria were not limited to midline pelvic pain, and in none of them was a pain scale used.

Regarding the efficacy of pelvic denervation in patients with no visible pathology at laparoscopy,¹⁰ our data have shown similar results to those obtained in endometriosis patients with both techniques (PSN and USR). This fact could be interpreted as indirect proof that the efficacy in pain relief of pelvic denervation is at least partly independent of the ablative treatment of endometriosis. Nevertheless, the only well-conducted (prospective randomized) laparotomic study¹² has questioned this issue, although the relatively small size of the series and the better results of the PSN group (79% vs 67% relief rate), although not significant, do not allow a definitive conclusion.¹⁹

A significantly ($p < 0.001$) higher effectiveness of PSN over USR in reducing the dysmenorrhea score has been shown, and this is the first report (to our best knowledge) of a comparison between the two techniques. Only the laparotomic study by Lee et al.⁹ showed an insignificant improvement of PSN results by

TABLE 4. PAIN INTENSITY DEGREE^a PREOPERATIVELY (*t*₀) and 6 Months After Surgery (*t*_f)

	PSN ^b		USR	
	<i>t</i> ₀	<i>t</i> _f	<i>t</i> ₀	<i>t</i> _f
Dysmenorrhea	7.29 ± 1.23 ^{c*}	2.87 ± 1.75	5.82 ± 1.56*	3.02 ± 1.78
Deep dyspareunia	5.87 ± 1.12*	1.12 ± 0.99	6.38 ± 1.53*	1.11 ± 2.21
Pelvic pain	8.0 ± 0.85*	2.58 ± 1.08	6.73 ± 0.70*	1.86 ± 1.64
Δ(<i>t</i> ₀ - <i>t</i> _f) dysmenorrhea		4.63 ± 1.57**		2.50 ± 1.83
Δ(<i>t</i> ₀ - <i>t</i> _f) dyspareunia		4.71 ± 1.38		5.38 ± 2.30
Δ(<i>t</i> ₀ - <i>t</i> _f) pelvic pain		4.58 ± 2.19		4.86 ± 1.45

^aDegree, 1 to 10 linear numeric scale.

^bPSN, presacral neurectomy; USR, ureterosocial resection.

^cMeans ± SD.

* $p < 0.001$ Student's *t*-test for paired data.

** $p < 0.001$ Student's *t*-test for unpaired data.

TABLE 5. COMPARISON OF EFFICACY OF PSN AND USR IN ENDOMETRIOSIS AND NO VISIBLE PATHOLOGY

Indication	PSN ^a		USR	
	Endometriosis	No pathology	Endometriosis	No pathology
$\Delta(t_0 - t_f)$ dysmenorrhea	4.50 \pm 1.50 ^b	5.0 \pm 1.58	2.40 \pm 1.59	3.54 \pm 2.11
$\Delta(t_0 - t_f)$ dyspareunia	4.0 \pm 1.0	5.25 \pm 1.50	5.11 \pm 2.23	8.0 \pm 0.0
$\Delta(t_0 - t_f)$ pelvic pain	4.81 \pm 1.88	4.80 \pm 2.28	4.70 \pm 1.33	5.50 \pm 1.76

^aPSN, presacral neurectomy; USR, ureterosacral resection.

^bMeans \pm SD.

adding USR, but no direct comparison was made. We cannot say if these results can be attributed to the more frequent incompleteness of nerve section during USR than PSN, particularly in those endometriosis patients in whom the cul-de-sac anatomy is altered, or to a higher efficacy of PSN rather than USR.

Finally, this study shows that laparoscopic PSN and USR are highly effective in reducing midline pelvic pain in patients with endometriosis or with no visible pathology. From these data, we can extrapolate, at least for CPP patients, a theoretical advantage of performing a pelvic denervation at the time of diagnostic laparoscopy when a correct exclusion of other causes of pain is made, with a clear uterine (central) localization of pain, and when the laparoscopist is sufficiently skilled. The higher efficacy of PSN over USR in the relief of dysmenorrhea suggests the former as the first choice technique, at least in those cases with distortion of the cul-de-sac anatomy in which a complete uterosacral resection can become dangerous for ureteral and vascular injuries.

The conclusions of this preliminary study, multicentric and retrospective, to be definitive, need future prospective randomized studies with a longer follow-up (12 months or more). In particular, a comparison between ablative laparoscopic surgery and ablative laparoscopic surgery plus denervation in CPP patients with endometriosis and a comparison between diagnostic laparoscopy plus denervation vs diagnostic laparoscopy plus medical treatment in CPP patients with no visible pathology could be extremely useful.

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