COCHRANE REVIEW

Surgical pelvic neuroablation for chronic pelvic pain: a systematic review

Neil Johnson, Michelle Wilson and Cindy Farquhar
University Department of Obstetrics and Gynaecology, National Women’s Hospital, Epsom, Auckland, New Zealand

ABSTRACT

Objective To determine, from the best available evidence, the effectiveness of surgical pelvic neuroablative techniques as treatment for primary and secondary dysmenorrhoea.

Design Systematic review of randomized controlled trials (RCTs).

Subjects Women with primary or secondary dysmenorrhoea.

Interventions Surgical neuroablative techniques including uterine nerve ablation and presacral neurectomy.

Main outcome measures Pain relief (both short- and long-term) and adverse effects.

Results Laparoscopic uterine nerve ablation (LUNA) has been shown by one small study to be effective for primary dysmenorrhoea up to 12 months. A larger study showed no significant difference between LUNA and laparoscopic presacral neurectomy (LPSN) in pain relief for primary dysmenorrhoea up to 6 months, but LPSN was significantly more effective beyond 6 months. For dysmenorrhoea secondary to endometriosis, two trials found no significant difference in pain relief afforded by LUNA plus conservative laparoscopic surgery for endometriosis vs. conservative laparoscopic surgery alone. Presacral neurectomy (PSN) plus conservative surgery for endometriosis at laparotomy vs. conservative surgery for endometriosis at laparotomy showed no significant difference in overall pain relief, although there was a significant difference in relief of midline abdominal pain. Adverse events overall were significantly more common following PSN; these included constipation, urinary urgency, painless labour and one case necessitating a laparotomy for presacral haematoma 2 days after PSN.

Conclusions There is insufficient evidence to recommend the use of surgical pelvic neuroablation in the management of dysmenorrhoea, regardless of cause. Further scientifically rigorous RCTs should be undertaken.

Keywords endometriosis, LUNA, neuroablation, pelvic pain, presacral neurectomy.

INTRODUCTION

Dysmenorrhoea is the occurrence of painful menstrual cramps of uterine origin. It affects up to 50% of women, with an impact not only on personal health but also an economic impact through loss of working hours along with reduced productivity, diminished work quality and more work-related accidents in those who continue to work. When menstrual pelvic pain is associated with an identifiable pathological condition, such as endometriosis, adenomyosis or pelvic adhesions reflecting previous inflammation, it is considered to be secondary dysmenorrhoea. In contrast, menstrual pain without organic pathology is considered to be primary dysmenorrhoea. The initial onset of primary dysmenorrhoea is usually at or shortly (6–12 months) after menarche, when ovulatory cycles are established. The pain
duration is typically 48–72 h and is associated with menstrual flow. In contrast secondary dysmenorrhoea is more likely to occur years after the onset of menarche and occur premenstrually as well as during menstruation.

Overproduction of uterine prostaglandins is probably involved in the aetiology of the typical pain of primary dysmenorrhoea. Prostaglandins are also implicated in secondary dysmenorrhoea; however, anatomical mechanisms can also be identified, depending on the type of accompanying pelvic pathology. Medical therapy includes oral contraceptive pills (OCPs) and nonsteroidal anti-inflammatory drugs (NSAIDs) which both act by suppressing prostaglandin levels. Although the use of both OCPs and NSAIDs has been very successful, there is still a 20–25% failure rate.

The ideal neuroablative surgical procedure for pelvic pain would transect all afferent sensory nerves from all the pelvic organs and leave all other nerves unaffected. Whilst pelvic neuroanatomy is complicated and still not completely understood, what is known makes it clear that no such 'ideal neuroablative surgical procedure' exists (see Fig. 1). The body of the uterus is widely considered to be innervated only by sympathetic nerves. The cervix has predominantly parasympathetic (but also sympathetic) innervation. The afferent sensory nerves from both the uterus and cervix traverse the cervical division of the Lee–Frankenhauer plexus which lies within and around the site of attachment of the uterosacral ligaments to the posterior aspect of the cervix. From the uterosacral ligament, the parasympathetic afferent nerves reach the dorsal root ganglia of the first to fourth sacral spinal nerves (S1–4) via the pelvic splanchnic nerves (nervi erigentes) and inferior hypogastric nerve plexus (also known as the pelvic plexus) then the superior hypogastric nerve plexus (also known as the 'presacral nerve' or hypogastric plexus). The sympathetic afferent nerves emerging from the Lee–Frankenhauer plexus accompany the uterine, iliac and inferior mesenteric arteries to the sacral sympathetic trunk via the sacral splanchnic nerves, some of which bypass the superior hypogastric nerve plexus. Afferent nerves accompany both parasympathetic and sympathetic nerves from the ovary: pain fibres bypass the uterosacral ligament and course through corresponding plexuses to their cells of origin in the dorsal root ganglia of the tenth and eleventh thoracic spinal nerves (T10–11); some of the upper ovarian plexus afferent nerves course directly via renal and aortic plexuses and bypass the superior hypogastric nerve plexus.

Uterine nerve ablation (UNA) involves the transection of the uterosacral ligaments at their insertion into the cervix. Presacral neurectomy (PSN) involves resection of the presacral nerves lying within the boundaries of the interiliac triangle (essentially the superior hypogastric nerve plexus). These procedures both interrupt pelvic afferent sensory nerve fibres and would be expected to diminish uterine pain, although PSN involves the interruption of a greater number of nerve pathways than UNA. Doyle (1955) described a technique of vaginal transection of the uterosacral nerves apparently effective for dysmenorrhoea. Uncontrolled studies have supported the use of laparoscopic uterine nerve ablation (LUNA) for both primary and secondary dysmenorrhoea with either complete relief or substantial reduction in menstrual pain in the majority of subjects. Larger early retrospective studies provide data which have underlined the safety of LUNA. The use of PSN is also supported by uncontrolled studies showing similar results to that of LUNA for both primary and secondary dysmenorrhoea, although PSN probably entails greater operative risk than UNA.

However there are limitations to the usefulness of UNA and PSN. A long-term study showed that success rates declined rapidly over time from 72% in the first year to 39% in the fourth for LUNA. Others have suggested a possible risk of anatomical distortion such as uterine prolapse and bladder dysfunction following LUNA. There is also the concern regarding the effects of interruption of the pelvic nerves to the uterine muscles in subsequent pregnancies, such as painless labour. Since both operations interrupt only some of the afferent sensory nerve fibres from the pelvis, neuroablative techniques may be less effective for dysmenorrhoea associated with additional pelvic pathology. For this reason these techniques are often combined with additional treatments such as vaporization of endometrial implants.

The objective of this review was to determine the effectiveness of surgical pelvic neuroablative techniques (both laparoscopic and at laparotomy) for the treatment of primary and secondary dysmenorrhoea.

MATERIALS AND METHODS

Search strategy

This review has employed the search strategy developed by the Menstrual Disorders and Subfertility Group. Relevant trials were identified from the Trial
Register of the Review Group. The electronic databases Medline (from 1966 to 1998) and Embase (1980–98) were also searched using the following keywords:
dysmenorrh$.tw
dysmenorrhea/
painful menstruat$.tw
pelvic pain/
surgery/
laparoscop$.tw
surgical procedures, laparoscopic
denervation
uterine nerve ablation.tw
presacral neurectomy.tw
The search was performed on titles, abstracts, and keywords of the listed articles.
In addition citation lists of relevant publications, review articles, and included studies were searched, as were relevant conference abstracts.

Identification of included trials
Inclusion criteria were as follows:

1. randomized controlled trials
2. interventions involving surgical interruption of pelvic nerve pathways (both open and laparoscopic) where it is possible to draw conclusions regarding the effect of the intervention vs. no treatment or vs. another intervention
3. primary outcome of pain relief specified.

The other primary outcome was adverse effects. The selection of trials for inclusion in the review was performed independently by two reviewers (M.W. and C.F.) after employing the search strategy described previously. Uncertainties or differences of opinion were resolved by consensus after discussion with the third reviewer (N.J.). The search strategy yielded seven RCTs requiring closer scrutiny. From these, one was excluded which compared laser laparoscopy (involving LUNA and surgical treatment of endometrial implants) with no treatment (diagnostic laparoscopy only) in women with minimal-to-moderate endometriosis. Inclusion criterion 2 above was not fulfilled since there was no control group receiving only laser vaporization so that the effect of the intervention
LUNA could not be ascertained. The six included trials were assessed independently by two reviewers for predefined quality criteria and methodological details (displayed in Tables 1, 2 and 3).

**Description and methodological quality of studies**

Six trials met the criteria for inclusion in the review. Four trials had been fully published in peer-reviewed journals. Authors from five trials have been contacted to request additional information and/or data. One trial has published only preliminary results and the trial is currently being prepared for full publication with the possibility of further results being available at a later date; further information was supplied in correspondence regarding methodology. One trial is currently in progress and unpublished data with an interim analysis from this trial were supplied in correspondence. Details of methodology and allocation were supplied for one further trial. Further information has to date not been forthcoming for two trials.

A detailed description of the trials assessing women with primary dysmenorrhoea is given in Table 1, of those assessing LUNA in women with endometriosis in Table 2 and those assessing PSN in women with endometriosis in Table 3. There were no trials assessing pathology causing secondary dysmenorrhoea other than endometriosis.

The surgery involved was performed using standard techniques. LUNA was performed by operative laparoscopy in all four trials describing its use. Lichten & Bombard (1987) described bilateral uterosacral ligation electrocautery at the ligamentous insertion into the cervix until the tissues were blanched (generator power 5.8 watts). The ligaments were then incised using laparoscopic scissors and electrocautery reapplied to the base of the incision. Chen et al. (1996) described a similar 'coagulation and dissection' technique at the insertion of the uterosacral ligaments into the cervix, using monopolar or bipolar electrocautery. Dover et al. (1999) did not describe the technique in detail, but previously this group have described their technique of laser laparoscopy involving uterine nerve transection with the carbon dioxide laser. Vercellini et al. (1997) described the use of electrosurgery and mechanical instruments; excision of a segment of at least 1 cm in depth and length from the uterosacral ligaments at their uterine junction was performed.

Chen et al. (1996) described the technique of LPSN in detail. Laparoscopic identification was made of the aortic bifurcation, bilateral common iliac arteries, the right ureter and inferior mesenteric artery, and the superior haemorrhoidal vessels on the left. The peritoneum overlying the sacral promontory and 1 cm caudal to the aortic bifurcation was elevated and incised. The underlying adipose tissue was blunt dissected. By successive cauterization and cutting, the nerve plexus was identified and freed from the underlying tissue, left common iliac vein and middle sacral vein. The neural tissue was excised with the aid of unipolar and/or bipolar electrocautery, removed and sent for histological examination. Candiani et al. (1992) and Tjaden et al. (1990) referred to the literature to describe their techniques of presacral neurectomy at laparotomy.

Double blinding was used in two studies; one was single-blind. Vercellini et al. used no blinding in follow up, and for the other trial blinding was unclear. It is surprising that few of these trials employed double blinding since this is important when assessing a subjective outcome such as pain relief. However the area which can most seriously jeopardize the reliability of a trial is the randomization process; for only one trial was it clarified that true randomization at the time of surgery, allowing adequate allocation concealment, had taken place. One trial employed the use of case numbers in a process of quasi-randomization, but this trial was otherwise scientifically rigorous and therefore included.

A power calculation was performed and adhered to in one study. Tjaden et al. (1990) also included a power calculation but the trial was stopped before the number of patients needed was reached. The monitoring committee surprisingly stopped the trial after evaluation of data from the first 26 patients (only eight of whom had been randomized), as it was considered unethical to deprive patients with midline dysmenorrhoea of the relief afforded by presacral neurectomy.

**Data extraction**

Linear analogue scales have been validated as the most suitable method of evaluating pain. Some authors using this evaluation method have chosen to dichotomize the data obtained; there is evidence to suggest that dichotomous outcomes can be derived from continuous data when interpreting pain relief data. The outcome 'pain relief' may be reported as dichotomous (pain relief or not) or continuous data. Meta-analysis with RevMan software requires data to be
either dichotomous or to be presented as absolute values of means with their standard deviations (allowing the calculation of a weighted mean difference). Three authors\textsuperscript{5,28,31} dichotomized their pain relief data from the continuous outcome data reported by their trial participants; these reported figures were used in this analysis. For the other three trials\textsuperscript{29,30,32} data were presented correctly but in a form considered unsuitable for inclusion in this meta-analysis; these data are described in the results section but not included in the meta-analysis. Tjaden \textit{et al.} (1990)\textsuperscript{32} reported dichotomous pain relief data from three subgroups: midline, lateral and back pain. Dover \textit{et al.} (1999)\textsuperscript{29} correctly presented their outcome data for pain relief as medians with a range; these data were found to have a positive skew (hence use of the median as a ‘mean’ and the standard deviation estimated using the formula \((\text{range} \times 0.95)/4\) was inappropriate). Vercellini \textit{et al.} (1997)\textsuperscript{30} also reported continuous data; however, the reported figures were medians and interquartile ranges, making conversion to a mean and standard deviation also inappropriate.

All data were extracted independently by two reviewers (M.W. and N.J.), entered into the Review Manager (RevMan 4.0.3) computer software (Update Software, Oxford, UK) where appropriate, and double-checked for accuracy. Statistical analysis was performed in accordance with the guidelines for statistical analysis developed by the Menstrual Disorders and Subfertility Group. For dichotomous data, odds ratios with 95% confidence intervals were calculated; there was no pooling of results from different trials since each of the three trials suitable for inclusion in a meta-analysis examined different interventions (see Table 4).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Trials assessing women with primary dysmenorrhea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lichter &amp; Bombard (1987)\textsuperscript{5}</strong></td>
<td><strong>Chen \textit{et al.} 1996\textsuperscript{28}</strong></td>
</tr>
<tr>
<td><strong>Trial characteristics</strong></td>
<td><strong>Trial characteristics</strong></td>
</tr>
<tr>
<td>Method of randomization</td>
<td>By last digit of medical case number on day of surgery</td>
</tr>
<tr>
<td>Allocation concealment</td>
<td>Inadequate (owing to use of case numbers in randomization process)</td>
</tr>
<tr>
<td>Timing of randomization</td>
<td>On the day of surgery</td>
</tr>
<tr>
<td>Utilization of blinding</td>
<td>Double-blind</td>
</tr>
<tr>
<td>Number of participants providing data for analysis</td>
<td>21</td>
</tr>
<tr>
<td>Withdrawals/losses to follow up</td>
<td>None</td>
</tr>
<tr>
<td>Intention-to-treat analysis</td>
<td>Apparently done by author since no women withdrawn after randomization</td>
</tr>
<tr>
<td>Power calculation</td>
<td>Not done</td>
</tr>
<tr>
<td>Location of the trial</td>
<td>USA</td>
</tr>
<tr>
<td>Duration of follow-up</td>
<td>12 months</td>
</tr>
<tr>
<td><strong>Baseline characteristics of the studied groups</strong></td>
<td><strong>Baseline characteristics of the studied groups</strong></td>
</tr>
<tr>
<td>Age of women in the trial</td>
<td>Range 18–34 years</td>
</tr>
<tr>
<td>Inclusion criteria</td>
<td>Women with severe dysmenorrhea, no improvement with at least 2 NSAIDs and an oral contraceptive concurrently</td>
</tr>
<tr>
<td>Exclusion criteria</td>
<td>History of psychotherapy, major abdominal procedures, drug abuse, or demonstrable pelvic pathology at laparoscopy</td>
</tr>
<tr>
<td><strong>Interventions</strong></td>
<td><strong>Interventions</strong></td>
</tr>
<tr>
<td>Nature of intervention</td>
<td>LUNA vs. diagnostic laparoscopy only</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td>Method of expressing pain ratings</td>
<td>5-point pain scale converted by authors into pain relief or not</td>
</tr>
<tr>
<td>Timing of assessments</td>
<td>Preoperatively; postoperatively at 3 months and 12 months</td>
</tr>
<tr>
<td>Other outcomes</td>
<td>Adverse effects</td>
</tr>
<tr>
<td><strong>LUNA, laparoscopic uterine nerve ablation; LPSN, laparoscopic presacral neurectomy</strong></td>
<td><strong>LUNA, laparoscopic uterine nerve ablation; LPSN, laparoscopic presacral neurectomy</strong></td>
</tr>
</tbody>
</table>
RESULTS

Primary dysmenorrhoea

The intervention LUNA (see Table 4) effected a significant difference in pain relief for up to 6 months of follow-up (odds ratio, OR = 15.5); both LUNA and control groups were comparable prior to the intervention. Pain relief assessed at 12 months also showed a significant difference between the groups (OR = 10.9).

For LUNA vs. LPSN (see Table 4) there was no significant difference in pain relief between the two treatments up to 6 months of follow-up (OR = 0.7). However at more than 6 months’ follow up, the LPSN group had significantly better pain relief scores (OR = 0.1). There was a highly significant difference in the number of adverse effects reported by the participants: 94% of the PSN group reported constipation with no complications being reported in the LUNA group (OR = 0.02).

Secondary dysmenorrhoea

For UNA with surgical treatment of endometriosis vs. surgical treatment of endometriosis alone, both trials found no significant difference in pain relief.

Dover et al. (1999) reported comparable baseline pain scores, and at 6 months postoperatively found no significant difference between the experimental and
control groups for dysmenorrhoea pain scores for both the visual analogue scale (VAS) and the 10-point scale (Mann–Whitney test, $P = 0.12$ and $P = 0.21$, respectively). On the 10-cm VAS the experimental group pain scores at 6 months had a median of 4.8 (range 1–9.0), while the control pain scores had a median of 3.0 (range 0–9.8).

Vercellini et al. (1997)$^{30}$ reported median and interquartile ranges for the participants’ pain scores (100 mm VAS), preoperatively and at an average of 9 months after surgery. The experimental group pain scores changed from a median of 75 (interquartile range 67–85) to 38 (interquartile range 5–61), and the control group scores changed from a median of 80 (interquartile range 63–87) to 22 (interquartile range 0–39). The authors interpreted these results as no real difference between the two groups. A 12-month Kaplan–Meyer cumulative probability of recurrence of moderate to severe dysmenorrhoea was 33.7% for the experimental group and 27.55% for the control group.
group. An intention-to-treat analysis on subject satisfaction showed that 68% of the experimental group and 73% of the control group were very satisfied or satisfied with treatment, while 32% of the experimental group and 27% of the control group were uncertain, dissatisfied, or very dissatisfied with treatment. No adverse effects were reported for either group.

For PSN with surgical treatment of endometriosis vs. surgical treatment of endometriosis alone, Candiani et al. (1992)\textsuperscript{31} found no significant difference between the experimental and control groups overall (OR = 1.6) (see Table 4). However the authors originally collected information on the incidence, site and severity of pain and in analysis split their results into separate areas of pain. They interpreted their findings as showing a marked reduction in the recurrence of midline abdominal dysmenorrhoeic pain; however, this was at the borderline of statistical significance ($P = 0.06$). There was a highly significant difference in the proportion of patients with adverse effects from the treatment: the control group reported none but in the PSN group 13 women reported constipation, three urinary urgency, and two experienced a painless first stage of labour (OR = 14.6).

Tjaden et al. (1990)\textsuperscript{32} also originally collected information on incidence and location of pain and classified pain relief into areas. They found that the experimental and control groups were significantly different in pain relief for midline abdominal pain (Fisher exact test, $P = 0.03$). However for back pain or lateral pain associated with dysmenorrhoea there were no significant differences between the groups. These results are based on only the eight randomized participants. One woman experienced transient urinary urge incontinence for 2 weeks following PSN; no complications occurred in the group who did not undergo PSN.

### DISCUSSION

This systematic review has drawn on the results of six RCTs examining surgical pelvic neuroablation for chronic pelvic pain. Data were analysed from a total of 295 women who were randomly allocated treatment in these trials. Of these, 115 women underwent LUNA (46 with primary dysmenorrhoea, 69 with endometriosis), 33 underwent LPSN (all of whom had primary dysmenorrhoea) and 39 underwent PSN at laparotomy (all of whom had endometriosis). Laparoscopic and open techniques could be combined for these interventions, as there is evidence to suggest they have similar ranges of pain relief for dysmenorrhoea.\textsuperscript{18,20} LUNA is effective for pain relief in primary dysmenorrhoea in the short term but its effectiveness may decline over time.\textsuperscript{5} Chen et al. (1996)\textsuperscript{28} confirm this suggestion and demonstrate that LPSN may retain its effectiveness for longer. The importance of long-term follow up for future trials must be emphasised.

### Table 4 Summary of data from trials considered suitable for meta-analysis

<table>
<thead>
<tr>
<th>Trial</th>
<th>Experimental group</th>
<th>Control group</th>
<th>Odds ratio</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/n (%)</td>
<td>n/n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary dysmenorrhoea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNA vs. no UNA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain relief at less than 6 months’ follow-up A</td>
<td>9/11 (82)</td>
<td>1/10 (10)</td>
<td>15.5*</td>
<td>2.9–82.7</td>
</tr>
<tr>
<td>Pain relief at more than 6 months’ follow-up A</td>
<td>5/11 (45)</td>
<td>0/10 (0)</td>
<td>10.9*</td>
<td>1.5–77.4</td>
</tr>
<tr>
<td>UNA vs. PSN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain relief at less than 6 months’ follow-up B</td>
<td>29/35 (83)</td>
<td>29/33 (88)</td>
<td>0.67</td>
<td>0.18–2.6</td>
</tr>
<tr>
<td>Pain relief at more than 6 months’ follow-up B</td>
<td>11/35 (31)</td>
<td>27/33 (82)</td>
<td>0.13*</td>
<td>0.05–0.35</td>
</tr>
<tr>
<td>Adverse effects B</td>
<td>0/35 (0)</td>
<td>31/33 (94)</td>
<td>0.02*</td>
<td>0.01–0.06</td>
</tr>
<tr>
<td>Secondary dysmenorrhoea (endometriosis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSN and endometriosis treatment vs. endometriosis treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain relief at more than 6 months’ follow-up C</td>
<td>29/35 (83)</td>
<td>27/36 (75)</td>
<td>1.59</td>
<td>0.15–4.9</td>
</tr>
<tr>
<td>Adverse effects C</td>
<td>18/35 (51)</td>
<td>0/36 (0)</td>
<td>14.6*</td>
<td>5.0–42.2</td>
</tr>
</tbody>
</table>

Experimental group refers to the first intervention and control group refers to the second intervention listed in the left-hand column. Trials: A, Lichten B, Chen et al.\textsuperscript{28} (1992); C, Candiani et al.\textsuperscript{31} (1992). UNA, uterine nerve ablation; PSN, presacral neurectomy. *Significant difference between experimental and control groups.
Neuroablative procedures appear less effective when used as an adjunct to standard conservative surgery for endometriosis. However, PSN may be effective for midline pain associated with endometriosis, but not for other types of pain such as non-menstrual pain, lateral pain, and deep dyspareunia, and so is unlikely to modify substantially the subjective and social impact of the condition. Careful study of Fig. 1 clarifies why PSN might be more effective than LUNA, since transection of the superior hypogastric nerve plexus would ablate a higher proportion of relevant afferent nerves than transection of the Lee—Frankenhauser nerve plexus. It also explains why UNA could be particularly ineffective for pain arising from the ovary or adjacent tissues, as could be the case in ovarian or parovarian endometriosis, since all ovarian afferent nerves bypass the Lee—Frankenhauser plexus and many of the pain fibres bypass both of these nerve plexuses. Unless a periarterial sympathectomy of the iliac, inferior mesenteric, and ovarian vessels is performed, a number of afferent fibres will always be left intact.

More convincing is the high incidence of adverse effects following PSN. Complications were reported in women who underwent PSN in all trials. Out of 33 women who underwent LPSN, 31 experienced constipation, which was very severe in some cases. Amongst 35 women who underwent PSN, Candiani et al. (1992) subsequently reported 13 with constipation, three with urinary urgency, two with an asymptomatic first stage of labour and one woman who required a laparotomy 48 h following PSN, for a presacral haematoma. Tjaden et al. (1990) reported transient urinary urge incontinence in one out of four women randomly allocated to PSN. No complications were reported in women randomly allocated to LUNA!

LPSN is a surgical procedure which requires a high degree of skill from an experienced pelvic laparoscopic surgeon trained specifically in this retroperitoneal operation. The presacral region may be highly vascular and the procedure carries major potential hazards for the unwary or inadequately trained surgeon. The Royal College of Obstetricians and Gynaecologists classifies LPSN as a level 4 procedure, requiring advanced skills. Conversely, although LUNA must be performed precisely to avoid complications, it should be within the scope of all competent pelvic laparoscopic surgeons.

There is definitely a place for further well-designed RCTs examining the intervention of LUNA, which could be realistically available to all women. The high degree of specialized skill required to perform LPSN and the high likelihood of complications from PSN (whether performed laparoscopically or at laparotomy) bring into question whether further work is required. The view of the authors is that clinicians should consider the situation very carefully before performing this operation, even in the context of a RCT. This review suggests that women with endometriosis are a different population from women with primary dysmenorrhoea when pain relief from LUNA is considered. Ideally these populations should be studied separately. For primary dysmenorrhoea, in order to have 80% power at 95% confidence level to detect benefit in 50% of women, assuming ‘benefit’ in 10% controls, at least 48 participants would be required for analysis following randomization. For endometriosis, in order to have 80% power at 95% confidence level to detect benefit in 90%, assuming benefit in 60% controls undergoing conventional endometriosis surgery, at least 76 participants would be required for analysis following randomization.

The authors are aware of two further ongoing trials:
1. A multicentre RCT to assess the efficacy of laparoscopic uterosacral nerve ablation (LUNA) in the treatment of chronic pelvic pain (University of Birmingham Clinical Trials Unit, UK). The trialists aim to randomly allocate 120 women with minimal endometriosis, minor adhesions or no visible pelvic pathology on laparoscopy.
2. LUNA for chronic pelvic pain: an RCT at the University Department of Obstetrics and Gynaecology, National Women’s Hospital, Auckland, New Zealand. The trialists aim to randomly allocate 50 women with primary dysmenorrhoea and 80 women with endometriosis.

CONCLUSION

There is insufficient evidence to recommend the use of surgical pelvic neuroablation in the management of dysmenorrhoea, regardless of cause. Further scientifically rigorous RCTs should be undertaken and the results of the above trials are eagerly anticipated.

ACKNOWLEDGEMENTS

The authors acknowledge the helpful comments of those who proofread previous versions of this review, and the authors of included trials who supplied extra information and/or data. Special thanks are also due to Owen Sinclair for help with data extraction, Anne Lethaby for advice on statistics, Sarah Hetrick for help...
REFERENCES


34. Rosenshein NB, Rock J, eds. Presacral neurectomy. In:

