

Laparoscopic management of “pudendal pain” different endopelvic etiologies in 134 consecutive patients

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Abstract

10 **Objective:** To demonstrate the feasibility of the laparoscopic transperitoneal approach to the pelvic somatic nerves for the diagnosis and treatment of ano-genital pain caused by pudendal and/or sacral nerve roots lesions.

Method: In a retrospective review, 134 consecutive patients underwent laparoscopy for refractory ano-genital pain. All neurosurgical procedures such as neurolysis/decompression of the pudendal nerve and of the sacral nerve roots or implantation of neuroelectrode to the sacral plexus for postoperative neuromodulation were done
15 by laparoscopic transperitoneal approach of the pelvic nerves.

Results: Eighteen patients had Alcock’s canal syndrome and decompression was successful in 15. The three patients because of failure of the decompression underwent secondarily a sacral LION procedure with reduction at least 50% in pain VAS in all three. Sacral plexus lesions – radiculopathies -, most commonly post-surgical lesions and retroperitoneal endometriosis were found in 109 patients. All of these underwent a laparoscopic
20 neurolysis of the sacral plexus; the final outcome depended on the etiology: For patients with post-surgical nerve damage, 62% had a reduction of the mean preoperative VAS from 8,9 ($\pm 2,9$, 7-10) to 2,4 ($\pm 2,3$, 0-4) at time of submission this manuscript with a mean follow-up of 17 months (3- 39 months). Eight of them underwent secondarily because of failure of decompression, a sacral LION procedure: A pain VAS reduction was obtained in five of them. For endometriosis lesion of the sacral plexus, 78% had a reduction of the mean preoperative VAS
25 score of 8,7 ($\pm 1,9$; 8-10) to 1,1 ($\pm 0,7$, 0-2) at time of submission the manuscript (mean follow-up 21 months, 2-42 months). For vascular entrapment of pelvic nerves (n=6), all patients had complete relief. The last seven patients underwent primarily a sacral LION procedure with a pain VAS reduction at least 50% in four of them.

Conclusion: Our findings endorse that in patients with seemingly inexplicable ano-genital pain, especially after failure of treatment of Alcock's canal syndrome, laparoscopic exploration of the pelvic nerves have to be proposed for further diagnostic and therapy before labelling the patients as "refractory" prematurely.

Key words: pudendal neuralgia - Alcock's canal syndrome - LION procedure - perianal pain - perineal pain

Introduction

Ano-genital pain is a frequent complaint usually as a result of common and easily recognizable organic disorders such as anal fistula, thrombosed haemorrhoids or anorectal cancer, but can also occur under circumstances in which no organic cause can be found: The three most common functional disorders causing anorectal and perineal pain are levator ani syndrome, coccygodynia and proctalgia fugax (1) but the Alcock's canal syndrome is also responsible for pain in these areas; The Alcock's canal syndrome is also responsible for pain in these areas and is well known by physicians and patients as it is accessible not only by symptomatic treatments but also by etiologic surgical treatment (2). However the pudendal neuropathy (Alcock's canal syndrome) is only one etiology for perineal and perianal pain since stimuli to the endopelvic portion of the pudendal nerve or to the sacral nerve roots (radiculopathy S2/3/4) can also induce such perineal or perianal pain. Such endopelvic lesions are less well known as their diagnosis is difficult and surgical approach to these nerves remained difficult and invasive and are then managed by symptomatic treatments. This now has to change as laparoscopy offers a minimal invasive, safe and reproducible access to all pelvic nerves for both the diagnosis and the treatment of pelveo-abdominal neuralgia (3): In this paper we shall describe our experience with the laparoscopic management of "refractory" ano-genital pain.

Material and methods

134 patients were referred to us between 2004 and 2007 for laparoscopic management of "refractory" unilateral ano-genital pain by suspicion of pudendal neuralgia. In each patient, examination of the perineum, anal canal and rectum revealed eventually neurologic troubles such as hypoesthesia, hyperalgia or allodynia in the dermatomes S3 and/or S4 but no lesion such as herpes, abscess, fistula or any other organic pathology cause for the pain could be found; ~~The coccyx and the levator ani muscles were not tender to digital examination per rectum and no patient was incontinent.~~ Presentation of the patients to orthopedists and neurologists enabled exclusion of spinal lesions and lesions of the central nervous system. The motivation of the patients or of the

colleagues for laparoscopic exploration of the pelvic nerves were influenced by factors such as the combination of the pudendal pain with pelveo-abdominal pain, dysmenorrhea or dyspareunia in women in a reproductive age, the apparition of the pain after pelveo-perineal surgery or a delivery, but also the desperation because of failure of all the tested treatments (gabapentin, lyrica, morphine) and/or the unacceptable side effects of medical treatments with dramatic consequences in private and professional life (table 1). Preoperative anamnesis and neurological examination as well as laparoscopic surgery in all patients was performed by the author MP. A graduated scale from 0 „no pain“ to 10 „worst pain imaginable“ was used for standardisation (Visual Analog Scale – VAS) to quantify the pain. Patients were requested to describe their pain with the use of the Mainz Pain Centre Questionnaire (4) and to keep a record of their consumption of analgesics.

Laparoscopic management of pudendal pain consists of two operative possibilities: The first procedure focused on the endopelvic etiologies with the elective exploration of the entire sacral plexus extending from the dissection of the endopelvic portion of the sciatic and of the pudendal nerves to the full dissection of the endopelvic sacral nerve roots. The second procedure focused more on the extrapelvic etiologies and is limited to the elective dissection of the pudendal nerve from its emergence out of the sacral plexus up to the Alcock’s canal. Decision to perform one or the other procedure or both is strongly depended on the preoperative anamnesis: Apparition of the pain after a pelveo-abdominal surgical procedure, combination of the perianal/perineal pain with pelveo-abdominal pain or other pelvic neuralgia such as sciatica, neuralgia of the inferior gluteal nerve or of the obturatoric nerve, the characteristic “cyclical” of the pain in women (= apparition or significant increasing of the pain during the mens bleeding) especially in combination with further symptoms typical for endometriosis such as cyclical dyschesia, dysmenorrhoe or dyspareunia are all situations leading to begin the procedure with the primary dissection of the sacral plexus and to reserve the dissection of the pudendal nerve only when no any endopelvic etiologies is found. On the contrary, the dissection focused on the elective exposure of the pudendal nerve when the pain appeared after a vaginal delivery or after an infrapelvic surgical procedure such as a sacrospinous fixation by Amreich Richter. Our technique of laparoscopic dissection of the pelvic somatic nerve, has been previously reported (5); Full exposure of the pudendal nerve begins with the exposure of its endopelvic segment followed by the transection of the sacrospinous ligament which permits the further dissection of the nerve downwards until the Alcock’s canal. The functional integrity of all exposed motoric nerves is assessed before and after dissection/decompression of the nerves using intraoperative laparoscopic electrostimulation according to the LANN technique (6).

Neuromodulation is indicated after failure of medical treatment and surgical decompression or when during the laparoscopic exploration no any lesions to the nerves could be found (as in patients with multiple sclerosis) . We then used the “sacral LIONprocedure” which consists of the laparoscopic implantation of one multiple channel electrode to the sacral nerve roots S2, S3 and S4/5 (7). Before the decision of implantation of the permanent generator, the patient undergoes a test phase of external neuromodulation over several days with alternative periods of switsching “off” and “on” to proved objective efficacy or not: To be called effective, a procedure had to produce at least a 50% reduction in pain on the Visual Analog Scale.

All patients were clinically evaluated at the time of discharge and on a two-months basis for the first 6 months following surgery. Thereafter they were followed up every 6 months. Patients living abroad were followed up by telephone or by mail.

Results

In 18 patients with a true pudendal neuralgie subsequent to a sacrospinal fixation for vaginal prolapse, laparoscopic decompression with transposition of the nerve, the procedure resulted in significant improvement in pain with a reduction of the preoperative VAS scores from 9,1 ($\pm 0,73$, 8-10) to 1,6 ($\pm 1,26$, 0-4) in 15 patients to date of submission of the manuscript [mean follow-up 21 months ($\pm 7,04$, 6 -34 months)] (figure 1). Of the 3 patients who had no improvement one had a subsequent unilateral LION procedure to the sacral plexus which produced significant improvement.

The other 109 patients had endopelvic lesions which also affected the root of the sacral nerve (table 1). Fifty three of these had postsurgical nerve damage secondary to pelvic surgeries not only radical procedures to the parametria such a radical hysterectomy, radical prostatectomy of resection of deep infiltrating endometriosis but also “non-radical procedures” such as simple hysterectomy or prolaps surgery; laparoscopic neurolysis of the sacral nerve root was performed in addition to the surgical excision of the diseased tissues (figure 2). The by far more difficult procedure was then laparoscopic decompression of the nerves in patients after pexy-procedures with mesh-material and clip/agraffes to the sacral bone. A reduction of the VAS score from 8,9 ($\pm 2,9$, 7-10) preoperative to 2,4 ($\pm 2,3$, 0-4) at time of submission this manuscript could be obtained in 62% of the patients (follow-up mean 17 months, 3- 39 months). From the patients in who this procedure did not improve the pain, eight patients underwent then a unilateral sacral LION procedure (figure 3); Five of them had at reduction of the VAS under 2 points.

Fifty further patients had endometriosis: complete removal of endometriosis could only be obtained with a combination of the decompression of the nerves with further surgical procedures to endopelvic organs (table 1): A reduction of the mean VAS score of 8,7 preoperatively ($\pm 1,9$; 8-10) to 1,1 ($\pm 0,7$, 0-2) at time of submission the manuscript could be obtained in 78% of these patients (mean follow-up 21 months, 2- 42 months). 6 patients with vascular entrapment of the sacral nerve roots were completely cured (postoperative VAS score 0).

The remaining 7 of this series had a LION procedure for pain resulting from various etiologies (table 2). A reduction of pain of at least a 50% was obtained (VAS score) in 4 of them.

Discussion

The field of gynecology & obstetrics is one of the major producers of pudendal neuralgia with etiologies such as the compression of the nerves through a postpartal haematoma/fibrosis of the ischioanal fossa, the stretching of the nerve during delivery or its lesion during colpo-sacrospinal fixation by Amreich-Richter. However in our series, the most frequent etiologies for ano-genital pain were endopelvic endometriotic lesions or surgical damages to the sacral plexus. Therefore, the symptoms of perineal and perianal pain were mostly just a part of the complaints: A sciatica, a neuralgia of the inferior gluteal nerve or the radiation of the pain into metameral partitions, together with the slight sensory disturbance in the sacral dermatomes suggests that the disorders represent a form of radiculopathy due to sacral nerve root lesions (8).

To treat pudendal neuralgia, Robert has described the transgluteal approach for neurolysis of the pudendal nerve at the infrapiriform canal and transection of the sacrospinal ligament to free the nerve from the tension of the ligament (9). His experience has lead him to consider the fascia in the posterior half of the Alcock's canal and the fascia around the inferior rectal nerve as important but secondary sources for pain. Shafik on the other hand has attempted to decompress the pudendal nerve by following a perineal para-anal pathway. His dissection follows the inferior rectal nerve to the Alcock's canal (10) and focused on the Alcock's canal itself. The laparoscopic transperitoneal approach to the pudendal nerve focuses mainly on its proximal and medial portions and obviously required a more invasive dissection for the same dissection results. Thus for surgical treatment of a Alcock's canal syndrom, the perineal and transgluteal approaches appears to be more appropriate than the laparoscopic transperitoneal approach but both perineal and transgluteal approaches can not offer a appropriate approach to the entire sacral plexus: As no any classical surgical approach to the pelvic nerves could permit diagnosis, all our patients were primarily send for medical treatment while an „organic“ etiology existed. All patients were referred from one specialist to another and a variety of different but ineffective

treatments were attempted. As the development in videoendoscopy and microsurgical instruments, laparoscopy offers a unique and reproducible surgical approach to all pelvic nerves that could never be reached by classical open, perineal or transgluteal approach and permit:

150 (i) The diagnosis of endopelvic situations or pathologies responsible for the pelvic neuralgia. In our series, all patients had undergone extensive diagnostic including electrophysiologic exploration of the pudendal nerve and imagery (CT-scan,MRI...) of the pelvis, but in no patient with an endopelvic lesions, an exact and correct diagnosis could be made before laparoscopic exploration.. Thus in our series, laparoscopic exploration of the pelvic nerves permitted confirmation of suspected diagnosis such as extensive endometriosis or a postsurgical fibrosis of the retroperitoneal space, but also permitted discovery of
155 anatomical situations never suspected before such as the compression of the sciatic nerve by an atypical superior gluteal vein, the entrapment of the sacral nerve root S2 between the inferior gluteal vessels or an isolated endometriosis inside the sciatic nerve (11).

(ii) A possible etiologic treatment of lumbosacral radiculopathies: Endometriosis of the retroperitoneal space was the second most frequent etiology for lesion of the sacral plexus, but such types of deep infiltrating
160 endometriosis of the pelvic nerves is usually just a part of the disease (12); Simple removal of the endometriosis affecting the nerves without any further surgical treatment of the rest of the pelveo-genital endometriosis would then expose the patient to a higher if not a sure risk of recurrence and therefore the necessity of further surgical procedures. As demonstrate in our series, the laparoscopic approach to the pelvis offers the concomitant treatment of possible associated painful pathologies such as a pelveo-
165 abdominal adhesions.

Another therapeutic option to control perianal/perineal pain that needs to be discussed is the sacral neuromodulation. Until now neuromodulation has not been considered to be a real therapeutic option for pudendal neuralgia or for treatment of perianal/perineal pain in international medical literature (13, 14, 15). The essential difference between all these different techniques of implantation and the LION procedure is that the
170 laparoscopic technique of implantation is the only which permit the elective neuromodulation of all pudendal afferents fibers together with just one electrode; Our preliminary results are encouraging but since our series involves only a small number of patients, we will report on it separately in a future paper.

The main value of our manuscript is to demonstrate that some patients with seemingly inexplicable refractory “pudendal-like” pain have correctable findings that can be identified and treated by laparoscopy. In

175 situation of failure of medical and of classical neurosurgical treatments of decompression, the LION procedure
 for neuromodulation of the sacral plexus is then a good option for treatment, mostly the last.

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	Extended parametric endometriotic infiltration (with involvement of the sacral plexus)	n= 46
	<i>Associated procedures:</i>	
190	Resection of obturator/ilio-rectal/pyriform muscles	n=23
	Laparoscopic parasympathetic nerve sparing rectum resection/anastomose	n=7
	Laparoscopic ureter resection /ureterocystoneostomy	n=6
	Neurolyse/decompression of the obturatoric nerve	n= 11
195	Isolated endometriosis of the sacral plexus	n=4
	Parametric vascular entrapment of the sacral nerve roots S2 or S3	n=4
	Entrapment of the pudendal nerve in the infrapyriform space by the pudendal vessels	n=2
	Post surgical lesions (fibrosis, clip, suture, coagulation lesions...)	n=53

200 **Table 1:** Etiologies for sacral radiculopathies responsible for perianal/perineal pain in 109 patients

	Failure of the laparoscopic decompression of the pudendal nerve	n=3/18	Success 3/3
	Failure of the laparoscopic decompression of the sacral nerve roots	n=8/53	Success 5/8
205	Secondary to abdominal hysterectomy/pelvic lymphadenectomy/pelvic radiotherapy	n=1	No success
	Secondary to radical prostatectomy/pelvic lymphadenectomy	n=2	Success 1/2
	Multiple sclerosis (pudendal pain + BO + sciatica)	n=2	Success 2/2

No any etiology found by laparoscopic exploration of the sacral plexus and the PN	n=2	Success 1/2
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210 **Table 2:** Etiologies for the 16 patients who underwent a unilateral sacral LION procedure

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Figure 1: Laparoscopic transperitoneal neurolysis of the right pudendal nerve – end situs

250 **Figure 2:** Intraoperative finding – A suture to the sacral nerve root is exposed and removed

Figure 3: Sacral LION procedure – The electrode in place to the sacral nerve roots S2, S3 and S4