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ORIGINAL ARTICLE

Minilaparotomy in spinal anaesthesia: a surgical choice in treatment of benign gynaecologic disease

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Abstract
Purpose Minilaparotomic access in spinal anaesthesia represents an example of mininvasive surgery and could be a valid cost–benefit alternative in the surgical treatment of benign gynaecologic diseases.
Methods The study is a randomized study. We analyzed a consecutive series of 80 patients treated for benign gynaecological diseases with spinal (group A) or with general anaesthesia (group B).
Results The median length of incision was 5 cm. The average operating time was 40.5 ± 9.39 min, without differences between groups. The average hospital stay was 0.71 days shorter ($p \leq 0.0001$) and the postoperative pain was lower at 2 and 6 h from the surgery and at 10 p.m. in the group A ($p \leq 0.0001$).
Conclusions Minilaparotomy in spinal anaesthesia carries advantages from economic point of view with reduction of length of stay in hospital which is an important parameter for the evaluation of the quality of surgical treatments.

Keywords Minilaparotomy · Postoperative pain · Spinal anaesthesia · Mininvasive surgery

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Introduction

During the last century, laparotomic surgery techniques have been improved in order to reduce the postoperative course. In this perspective, "the length of stay in hospital" becomes an important parameter to evaluate the quality of surgical treatments, thanks to the recent attention to cost reductions in the public health system. The minilaparotomic access in spinal anaesthesia represents an example of mininvasive surgery and could be a valid cost–benefit alternative in the surgical treatment of benign gynaecologic diseases [1–13]. The minilaparotomic technique may be performed by a transverse suprapubic incision (4–8 cm skin incision) for gynaecological disease. This minimally invasive surgery could represent a valid alternative to laparotomic and laparoscopic gynaecologic surgery in the management of benign disease [1–13]. In this study, we describe the advantages of this approach.

Materials and methods

From January 2007 to December 2007, a consecutive series of 80 patients, who underwent minilaparotomy for benign gynaecological diseases in our Hospital, were randomized into two groups.

We randomized the patients in, patients with spinal (group A) or general anaesthesia (group B) (Canadian Task Force classification I).

In this study, we included patients affected by benign gynaecologic diseases like simple ovarian cysts or uterine leiomyomatosis.

The exclusion criteria was (1) body mass index (BMI) greater than 25 Kg/m^2, (2) previous longitudinal laparotomy or pelvic surgery, (3) indication for a concomitant

vaginal surgery, (4) large uterus ≥12 weeks of gestational size, (5) fixed uterus with preoperative suspected of severe endometriosis, (6) serious renal or cardiopulmonary pathologies, (7) coagulopathies, (8) corticosteroid therapy and (9) spinal malformations hindering spinal anaesthesia.

Informed consent was obtained from each patient.

A preoperative evaluation included physical and gynaecological examination, chest X-ray, CA125 serum levels (when indicated) and ultrasonographic scan with colour Doppler. Clinical evaluation and surgical procedure were performed by one senior surgeon. All patients received bowel preparation with macrogol the evening before surgery and antibiotic prophylaxis in short term, with piperacillin + tazobactam 2.2 g i.v. (intravenously), 30 min before the surgery. The antithrombotic prophylaxis was performed in all patients according to thrombosis risk factor.

Spinal anaesthesia was performed at L2–L3 level with hyperbaric marcain 0.5%, 16 mg with 25 G sprotte. General anaesthesia consisted in premedication with midazolam 0.15, propofol 2.5 mg/Kg to induce narcosis, cisatracurium 0.2 and remifentanil 0.25 mcg/Kg. Narcosis after intubation and assisted ventilation with 50% air–oxygen blend was maintained with sevoflurane to MAC. In both groups, postoperative analgesia was carried out with ketorolac trometamine and tramadol.

In group A, we administrated analgesic therapy 6 h after surgery (one giving); in group B ongoing therapy was administrated during the first 24 h from the end of surgery. The post operatory pain was calculated with visual analogical scale (VAS) immediately after surgery, at 2 and 6 h from the surgery, at 10 p.m., 8 a.m. and 10 p.m. on the following days of stay in hospital [14–17].

For every case, we considered the following parameters: age, parity, BMI, past and present pathologies and therapies, weight of uterus, time of surgery, haematic loss, intraoperative complications (bowel, bladder, urethral and vascular injuries) and scar measurement at the end of surgery. During follow-up, we analyzed length of stay in hospital, postoperative morbidity, blood transfusions (for haemoglobin level ≤7 g/dl in asymptomatic patients), day of bladder catheter removal and free diet onset. Postoperative temperature was obtained by two measurements at 8 a.m. and at 8 p.m. All women were reviewed 4 weeks after surgery.

Statistical analysis

We compared the data from the two groups of patients. Analysis was carried out with Mann–Whitney *U* test for the continuous variables and Fisher exact test for the frequency data. Significance was set at a probability value of <0.05.

Surgical technique

The patient is placed in supine position with a Foley catheter into bladder. The skin incision is made according to Mini-Pfannenstiel technique (photos 1–2) [1–13]. The following subcutaneous cut is performed by electrocution, down to superficial fascia of recti abdominis at the insertion of pyramidal muscles. The opening of the muscular fascia, longer than the laparotomic cut 2 cm/side, allows the visualization of the muscular plan and the median rafe of the abdominal wall muscles, that is dissected exposing the parietal peritoneum. The opening of parietal peritoneum is performed with manual traction for preventing internal or vesical lesions. To widen the operating field, Deaver retractors can be placed (Farabeuf retractor).

Myomectomy, cystectomy, salpingo-oophorectomies and total hysterectomy were performed according to our School technique [18]. At the end of the surgery, the peritoneal cavity is washed with physiological solution at 37–40°C and accurate haemostasis is obtained. The synthesis of the abdominal wall is performed in layers. The scar measurement is made at the end of surgery, in order to check a lengthening due to the traction on the skin.

Photo 1 Abdominal cut (4–7 cm transverse incision, 1–2 cm below pubic hair line, 2–4 cm above pubic sinfisis)

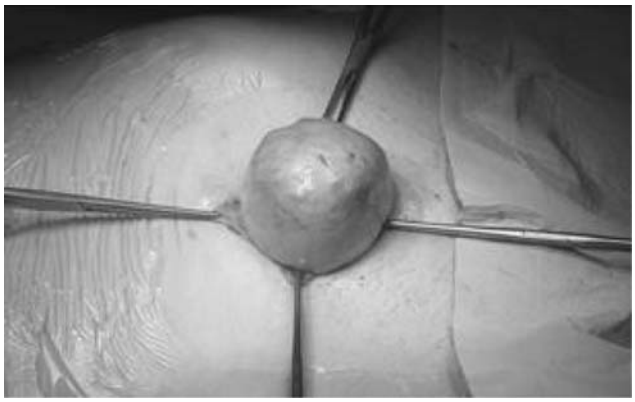

Photo 2 Uterus in myomectomy

Table 1 Clinical characteristics of patients with spinal anaesthesia (Group A, $n = 40$) or general anaesthesia (Group B, $n = 40$)

Characteristics	Group A Median (range)	Group B Median (range)	*p* value
Age (years)	37.5 (29–55)	35.8 (32–68)	N.S.
Parity	0.4 (0–2)	0.5 (0–3)	N.S
BMI (kg/m^2)	21.9 (18–25)	22 (19–25)	N.S

N.S. not significant

Results

A consecutive series of 80 patients (average age 36.65 ± 8.59 years, range 20–68) were included into this study.

Two groups are homogenous in age, parity and BMI (Table 1). Preoperative diagnosis was myoma in 44 patients (51%), ovarian cyst in 32 (37%) and uterine leiomyomatosis in 10 (12%). Intraoperative diagnoses confirmed preoperative diagnoses (Table 2). All surgical acts were performed by the same senior surgeon, as reported in Table 3.

The median length of incision was 5 cm, ranging from 4 to 7 cm. The average operating time was 40.5 ± 9.39 min without any significant differences between the two groups (Table 4). The weight of the removed uterus, following hysterectomy, was between 70 and 700 g. The average number of removed myoma was 2.48 (range 1–7), with an average diameter of 5.36 cm (range 2–9) with no significant differences between groups. No intraoperative complications were observed and no conversion to Pfannenstiel incision was necessary. The average blood loss was 60 ml (range 20–80). Postoperative analgesia was carried out 6 h after surgery in group A (ketorolac trometamine 60 mg and tramadolo 300 mg i.v.) and during the first 24 h from the end of surgery (ketorolac trometamine 90 mg and tramadolo 400 mg i.v.) in group B. We did not observe post-operative morbidity (temperature > 38°C) and any blood transfusion was necessary. In all patients, Foley catheter was removed within 10 h from surgery; deambulation was resumed the same evening and hot liquid diet was introduced at the evening of the surgery's day. The median duration of paralytic ileus was 1.09 days in group A and 1.33 days in group B ($p < 0.0001$) (Table 4). The average hospital stay was 1.84 ± 0.51 days for group A and 2.55 ± 0.5 days for group B (Table 4).

The popularity rating for spinal anaesthesia was 8 out of 10, while the rating for narcosis was 6 out of 10. Postoperative pain (VAS) was statistically different between the two groups immediately after surgery, at 2 and 6 h from the surgery and at 10 p.m. ($p < 0.0001$), while no statistically significant differences were recorded between the first and the

Table 2 Intraoperative diagnoses in patients with spinal anaesthesia (Group A) or general anaesthesia (Group B)

Diagnosis[a]	Group A *n* (%)	Group B *n* (%)
Myoma	22 (50)	22 (53)
Ovarian cysts	18 (41)	14 (33)
Uterine leiomyomatosis	4 (9)	6 (14)

N.S. not significant

[a] Some patients >1 diagnosis

Table 3 Surgical treatment of patients with spinal anaesthesia (Group A) or general anaesthesia (Group B)

Surgical treatment[a]	Group A *n* (%)	Group B *n* (%)
Myomectomy	22 (45.8)	22 (50)
Cystectomy	14 (29.2)	8 (18.2)
Salpingo-oophorectomies	8 (16.6)[b]	6 (13.6)[c]
Total hysterectomy	4 (8.3)	6 (13.6)
Oophorectomy	0	2 (4.5)

N.S. not significant

[a] Some patients >1 treatment

[b] 4 cases associated to total hysterectomy

[c] 2 cases associated to total hysterectomy

Table 4 Post surgical characteristics of patients with spinal anaesthesia (Group A) or general anaesthesia (Group B)

Characteristics	Group A Median ± D.S.	Group B Median ± D.S.	*p* value
Surgery time (minutes)	40.25 ± 10.31	40.75 ± 8.51	N.S.
Paralytic ileus (days)	1.09 ± 0.06	1.33 ± 0.13	<0.0001
Hospitalisation (days)	1.84 ± 0.51	2.55 ± 0.5	<0.0001

N.S. not significant

Table 5 Post-operative pain (VAS scale) of patients with spinal anaesthesia (Group A) or general anaesthesia (Group B)

Timing	Group A Median (range)	Group B Median (range)	*p* value
Post-operative	1.02 (0–4)	4.62 (3–7)	<0.0001
2 h from surgery	1.27 (0–4)	5.95 (4–8)	<0.0001
6 h from surgery	3.55 (1–5)	5.85 (4–8)	<0.0001
10 p.m.	5.22 (3–7)	6.07 (5–8)	<0.0001
8 a.m. first day	5.25 (3–7)	5.61 (3–8)	N.S.
10 p.m. first day	5.45 (3–6)	5.52 (4–7)	N.S.
8 a.m. second day	4.42 (2–6)	4.15 (1–6)	N.S.
10 p.m. second day	3.62 (1–5)	3.67 (1–5)	N.S.

N.S. not significant

second postoperative days (Table 5). All women were reviewed 4 weeks after surgery. No adverse event occurred after surgery.

Discussion

Minilaparotomy in spinal anaesthesia is an example of mininvasive surgery and it could be a valid cost–benefit alternative in the surgical treatment of gynaecologic diseases with advantages from surgical, anaesthesiology and economic point of view. We analyzed advantages of minilaparotomic access in a prospective group of patients treated for benign gynaecological diseases in spinal anaesthesia.

The reduction of length of stay hospital is an important parameter for the evaluation of the quality of surgical treatments, thanks to the recent attention to cost reductions in public health. As shown by our results, the average hospital stay is 0.71 days shorter in the group in spinal anaesthesia.

The shorter hospitalization may be the consequence of some specific attentions begin given beginning during the surgery with the choice of a small abdominal incision, which implies mild trauma on soft tissue. The careful haemostasis, the avoidance of bowel manipulation without the use of self-retaining retractor, peritoneal washing at the end of the procedure may reduce in time the postoperative adynamic ileus. During the postoperative course, the reduction of analgesic therapy excluding opioid drugs with early mobilization and hot liquid diet plays a crucial rule in the early discharge of our patients.

The spinal anaesthesia generally produces a motor block of shorter duration, which has advantages for earlier mobilization and discharge from hospital and may be particularly useful in gynaecological surgery. The regional anaesthesia and postoperative analgesia with ketorolac and tramadol appears to be the best choice for the control of post surgical pelvic pain. The patient popularity rating about the type of anaesthesia, in fact, was better for the group A.

From economic point of view (length of stay in hospital), we estimated the advantages of this technique. The cost of the postoperative stay in hospital is estimated to be in median of about 400 euro per each patient in the group in spinal anaesthesia. Naturally, there are no significant differences in the materials and surgery costs between the groups. With the described technique, we have a faster turnover of patients, which is an important parameter for the reduction of costs within the public health system. Moreover, most of surgeons can perform minilaparotomy which, unlike laparoscopy, dose not require a long training and expensive equipment which is not available in all Countries. Minilaparotomy can also replace laparoscopy in patients with critical physical status in which pneumoperitoneum is not recommended or in cases with contraindications to general anaesthesia.

In our opinion, the success of these results starts with the patients' selection. The preoperative counselling should be as complete as possible and should actively involve the surgeon, anaesthetist, nurse and patient, in order to obtain an optimal compliance before, during and after the surgery. The preoperative visit must be performed by the senior surgeon with a great experience in physical and ultrasonographic examinations. This is the first expedient for avoiding extensions to Pfannenstiel incision.

In conclusion, we are convinced that minilaparotomy can represent a valid alternative in gynaecological surgical approach even if different surgical accesses cannot be in antagonism but must be adequate to the pathology and the patient. The surgeon must be able to carry out with ease all kinds of access and to eliminate every bias for the choice of the corrected approach in the surgical treatment of benign gynaecological disease.

Conflict of interest statement None.

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