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Painless vaginal hysterectomy with thermal hemostasis (results of a series of 152 cases)

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Abstract In a preceding paper the authors described a completely new approach for vaginal hysterectomy. The classical technique has been simplified, including thermal hemostasis with BiClamp, multimodal anesthesia, and ongoing research aimed at ensuring minimal trauma. The authors describe the first group of 152 patients who were treated with this new approach. The results show that it is possible to expand the range of vaginal indications while shortening the patient's hospital stay to 1 day. Furthermore, this innovative surgery is becoming more generally accepted, resulting in better quality of life for the patients.

Keywords Hysterectomy · Electrosurgery · Local anesthesia · Outpatient · Fibroma

Introduction

Starting in March 2002, we developed an innovative technique for performing vaginal hysterectomy with the aim of fighting pain to obtain a fast postoperative recovery. The anesthetic and surgical procedures were published in March 2003 in a preliminary paper [1] and were then developed on a base of 152 cases in a review. In this article we present the results of this series, with comments.

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Materials and methods

The operative technique

As detailed earlier, this technique is based on three pillars of modern surgery:

1. Technological innovation through thermal hemostasis of the vessels with BiClamp (ERBE, Tübingen, Germany). BiClamp is a type of “electrical Jean-Louis Faure” clamp that allows safe hemostasis of large vessels; the two branches of the forceps act like the electrodes of a bipolar clamp. It is made to be used more than 50 times. Electric current is provided by the VIO electrosurgical generator (ERBE, Tübingen, Germany).
2. Multimodal anesthesia consisting of the combination of a general anesthetic with a locoregional anesthetic with a long-term effect; this multimodal approach has been proposed in order to control the pathophysiological problems caused by operative and postoperative nociceptive effects; it allows a better convalescence with reduced dosages and fewer side effects.
3. Ongoing research aimed at achieving minimal trauma (good information concerning the procedure, no shaving, no bladder catheterization, short hospital stay, etc.)

The participants

This series consists of the first 152 patients who were operated on between March 2002 and July 2004 by the same surgeon and with an identical anesthetic technique. The group was divided into three subgroups. Using a test series of 20 patients between March 2002 and September 2002, subgroup A, the feasibility of this technique was assessed, and together with the ERBE company the generator settings were subsequently optimized.

Between September 2002 and December 2002, a subgroup Bb with 25 patients was randomly compared with patients receiving classical vaginal hysterectomy with general anesthetic (subgroup Ba); this randomization particularly focused on the assessment of postoperative pain and the need for analgesics. Subgroup C consisted of the last 50 operated patients (excluding those with prolapse), who received the benefit of the technical, operative, and organizational improvements implemented by the operating team.

Participant selection for the study was carried out in accordance with specifications in the literature [3–5]. The age distribution showed no specific characteristics. Indications for inclusion were benign syndromes: fibromas, adenomyosis, uterine prolapse, and dysplasias (Fig. 1). The average weight of fibromatous uteri was 355 g (range 40–900 g).

Results

Complications

The interest in this first publication on 152 vaginal hysterectomies with thermal hemostasis is due to the complete absence of any substantial complications. Indeed, no serious immediate or secondary bleeding occurred, no thermal trauma to ureter or intestine was noted, and no fistulas developed. The complications that did occur are described below.

- Three cases of burns to the vulva or vagina occurred at the beginning of our tests, which required subsequent local treatment over a period of 5 days.
- Three cases of secondary bleeding of the vaginal incision required these patients to be readmitted to the hospital. This type of bleeding occurred during the period in which we used “Vicryl Rapide” 00 for

closure of the vagina, which was a mistake: Two of these cases required a repeat of the vaginal suture under general anesthetic on the 18th and 21st days, respectively, whereas the third case required only a vaginal tampon.

- On day 15 a surgical vaginal examination was carried out in one patient for pain assessment; the patient had had a hemorrhagic rupture of a follicular cyst.
- A febrile and painful hematoma on day 5 was due to bleeding of the ovarian wall after a simultaneous vaginal cystectomy (cyst diameter 5 cm); this was treated medically at home.
- One patient was readmitted on day 7 for 2 days because of febrile lateral pelvic pain; this rapidly normalized after antibiotic therapy.
- One patient with pyelonephritis (prior illness) required longer hospitalization.

Pain

On the basis of a visual analog scale (VAS) and the amount of analgesics used, the analysis of the randomized subgroup B demonstrated a substantial reduction of pain with this technique [1] (Fig. 2).

In addition, the side effects associated with the usual administration of postoperative analgesics did not occur (Table 1), which meant that these patients’ postoperative experiences were completely different. In fact, the majority of patients were able to get out of bed only a few hours after the operation to go to the toilet and save themselves unpleasant and sometimes futile efforts with bedpans.

If no motor block and no block of the upper sympathetic (in contrast to a spinal block) is carried out and if the patient does not receive any morphine, then the sensation of uriesthesis will be unaffected, and bladder evacuation will continue to function [6, 7].

Duration of the procedure

Duration of the procedure was investigated in subgroup C with the last 50 patients. The medium length of time between the incision and closure of the vagina was 30 min (range 12–80 min); this is equal to or slightly less than that for the classical technique.

The time required for thermal hemostasis may appear to be rather long. It requires positioning the BiClamp, removing the BiClamp after the generator has switched off automatically, and making a cut with scissors—that is, a total of three steps. However, achieving a classical hemostasis with sutures requires positioning the hemostasis clamp, cutting the pedicle with scissors, positioning the suture with a needle holder, knotting the sutures, removing the clamp, and cutting the suture with scissors—that is, a total of six steps with several changes of instruments.

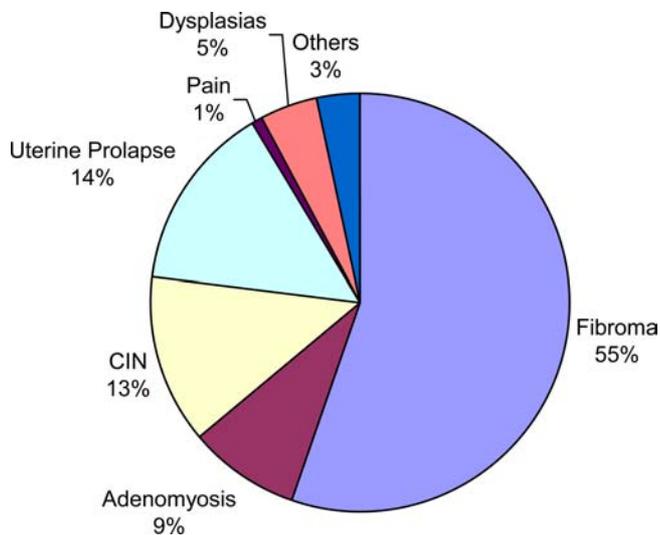


Fig. 1 Operative indications

Fig. 2 Assessment of postoperative pain in subgroup B

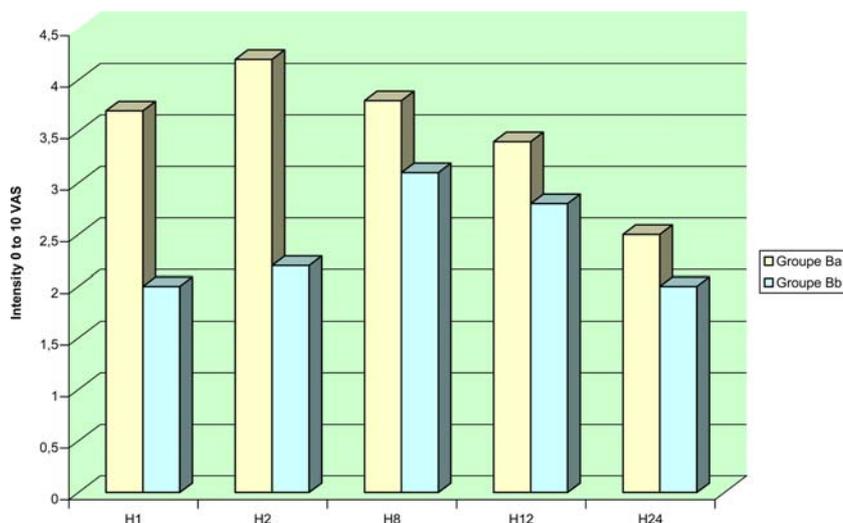


Table 1 Reduction of morphine in comparative study (*LRA* loco-regional anesthetic, *VAS* visual analog scale)

	B _a (control group, n = 25)	B _b (BiClamp + LRA, n = 25)
VAS/D1	38 ± 9	25 ± 10; <i>p</i> < 0.05
Consumption of morphine (D1) (mg/24 h)	21.6 ± 6.8	0; <i>p</i> < 0.0001
Side effects:		1; <i>p</i> < 0.05
Nausea	4	1
Vomiting	3	
Urinary retention	4	
Drowsiness	1	

In addition, thermal hemostasis also has a hemostatic effect on the two edges of the pedicle, preventing a backflow of blood and obviating the necessity of aspirating the blood or frequent swabbing with compresses. The visibility of the operative site is also improved, which in turn affects the length of the operation.

Vaginal scarring

In 142 of the cases, the vaginal scar was assessed as perfect—soft and not grainy. Three patients had secondary bleeding of the vaginal scar, and in seven patients, examination at the 4th postoperative week led to the prescription of local trophic treatment and the postponement of sexual intercourse.

This excellent vaginal healing was achieved due to the absence of necrotic inflammatory magma from foreign matter (dissolution of sutures) and the absence of tissue necrosis in the stumps, and by the creation of a simple, well-placed, and not too taut suture made of resorbable monofilament thread No. 1. This healing makes it possible for patients to have satisfactory sexual intercourse; we have no randomization concerning this point, but a retrospective analysis that is still being carried out points in this direction.

Blood loss

The loss of blood was minimal; we examined the blood loss in group C based on the number of compresses and gauze pads used. Each procedure required 1.3 gauze strips and six damp compresses on average. The insignificant blood loss was much appreciated by the patients, who often suffered from anemia or iron deficiency, and is yet another benefit of the operation, as uterine morcellation or adnexal exeresis are possible without the need for haste and under good conditions of safety.

Hospitalization

At the beginning of the study (subgroup A)

The hospital stay of this group was long due to our uncertainty about the procedure; the average stay was 6 days (OP day + 4 days).

In subgroup B

The average stay was shortened to 4.1 days (OP day + 2.1 days).

In subgroup C

We hoped to be able to carry out this intervention on a purely outpatient basis. We were able to achieve this goal in six out of 50 vaginal hysterectomies. We discovered in this connection that in France the obstacles that had to be overcome were more of an organizational and sociological nature than purely medical.

We adjusted to this situation and were able to offer the patients in subgroup C a standard hospital stay of 1 day (with the exception of prolapse cases), which was possible for 43 out of 50 patients. The patients were satisfied with being admitted only a short time before the

intervention and were reassured by the knowledge that they could spend the first postoperative night in a monitored environment (Table 2).

Comments

This technique, which, to the best of our knowledge, has not been described previously in the literature, is the result of the experience of a team of surgeons and anesthesiologists and offers many benefits to the patients, the nursing team, and society.

From the anesthesiologist's point of view

This technique is based on the publications of Kehlet; in the Kehlet concept, postoperative pain is controlled using a prophylactic multimodal approach. This approach has already been described for intestinal [8], orthopedic [9], ENT [10], and proctologic surgical procedures, and it appears to be suitable for use in gynecological surgery.

The use of a locoregional anesthetic with a long-term effect makes the administration of morphine preparations unnecessary, and the effect of this absence of morphine on the lungs and the urinary and digestive systems contributes to the patients' postoperative well-being.

The goal of "zero tolerance" of pain is possible only in an operative environment that places the highest priority on avoiding unnecessary trauma. This will help promote rapid healing [11].

From the surgeon's point of view

The important advantage of this series is the confirmation that no accidents occurred during or after the operation and that pain, which up to now was the greatest drawback of this operative procedure, could be clearly reduced.

The surgeon's contribution to the multimodal approach for the prophylaxis of postoperative pain is the use of thermal hemostasis. Although, because of its design, this series cannot offer final proof, we can point to the absence of tissue necrosis (stemming from the

Table 2 Subgroup C: a homogenous series of the last 50 patients

Average weight of fibromatous uterus (g)	355	(40–900)
Duration of the operative procedure (last 50 patients)	30 min	(12–80)
Hospitalization		
Outpatient, less than 12 h	6	12%
Less than 24 h	37	74%
Discharged on day 2	4	8%
Discharged on day 3	3	6%

crushing of the pedicles at the ligatures) and less resorption and phagocytosis of necrotic tissue and of foreign matter (thread), which in turn leads to decreased inflammatory and painful symptoms. These facts have already been emphasized by the endoscopic surgical team [12], who have been using bipolar current in hysterectomy procedures for many years. For the assessment of pain [13], a comparison of vaginal hemostasis with sutures and endoscopic methods with thermal hemostasis has demonstrated—despite the implications of a peritoneal and parietal intervention—the advantage of the endoscopic method.

We believe these studies have essentially demonstrated that thermal hemostasis is less painful than traditional hemostasis with sutures. Purohit confirmed this and noted a decrease in the use of analgesics in 88% of cases if vaginal hysterectomies were carried out with laparoscopic bipolar forceps [14]. In a recent paper Zubke et al. [15] decreased the dose of pain medication in 65% of cases with the use of BiClamp instead of classical ligatures.

This procedure offers a simpler and less traumatic approach. The simultaneous use of only two instruments at any single time during the different operative phases makes vaginal access feasible and thereby avoids a painful expansion with the holders. This intervention also avoids unnecessary and painful traction.

This procedure offers a less aggressive operative environment. A list was made of all avoidable aggressive and anxiety-causing elements surrounding the operation, and such elements were subsequently avoided: preoperative shaving; pre-, peri-, or postoperative bladder catheterization; and need to empty the bladder using a bedpan.

In addition, we offered the following:

- complete and detailed oral, written, and multimedia preoperative information
- hospital admission on the day of the intervention
- hospital discharge on the same day or on the following day
- resumption of normal feeding as soon as the patient desired

With this series we were also able to confirm that this technique can be applied in most adnexectomy procedures; in prolapse cases, because the ligament stumps are discernable; and in cases of a narrow vagina or an immobile uterus, as fewer instruments are employed than with the classical technique, and these can be kept near the middle of the vaginal shaft. This means that the number of vaginal hysterectomies will increase.

Economic aspects

The following factors will result in a substantial reduction of costs in the healthcare sector:

- BiClamp forceps can be reused up to 50 times and are suitable for use with the optional module of the new

multifunctional VIO generator series. This instrument is suitable for many different interventions (gastrointestinal, urology, etc.).

- The number of instruments for standard procedures is much reduced (reduced costs for purchasing, handling, sterilization, etc.).
- Only one suture is needed.
- Nursing care is less time-consuming.
- The hospital stay is shorter than with a standard vaginal hysterectomy [16], but the convalescence period is almost unchanged (3 weeks).

Conclusion

Painless hysterectomy with thermal hemostasis and multimodal analgesia offers several important advantages for the patients, the nursing staff, the public healthcare system, and the team of surgeons and anesthesiologists:

- The patients not only benefit from the reduced risk of hospital-acquired infection or/and thromboembolism but also from the “transparent” technique and the minimal psychological stress.
- The staff can apply the policy of quality assurance in a global and quantifiable project.
- This medical innovation is an important contribution in the battle against the lack of beds and staff and represents an improvement in healthcare efficiency.
- The operating team is interested in applying it to other pathologic situations, thereby extending this new paradigm.

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