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COMPARATIVE ANALYSIS OF SURGICAL OUTCOMES IN TOTAL LAPAROSCOPIC HYSTERECTOMY: UTERINE ARTERY LIGATION TECHNIQUES

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ABSTRACT

A comparative study was conducted to assess the surgical outcomes of total laparoscopic hysterectomy (TLH) with different techniques of uterine artery ligation. Group A comprised TLH patients with uterine arteries ligated following the cornual pedicles, while group B included TLH patients with uterine arteries ligated before the cornual pedicles. The study, conducted on 104 women in each group, revealed shorter surgical durations (63 minutes vs. 73 minutes, $p < 0.001$) and reduced blood loss (43 mL vs. 70 mL, $p < 0.001$) in group B compared to group A. No complications were reported in either group. Ligating uterine arteries at their origins before TLH resulted in faster surgeries, decreased blood loss, and fewer complications, emphasizing its potential benefits in gynecological laparoscopic procedures.

Key words: Total laparoscopic hysterectomy (TLH), Uterine artery ligation, Surgical outcomes, Blood loss, Complications.

INTRODUCTION

Gynecological patients worldwide undergo hysterectomy as a treatment for benign uterine disease. [1] Traditionally, abdominal or vaginal routes have been used for this procedure. Minimally invasive techniques are used to perform hysterectomies today. The total laparoscopic hysterectomy (TLH) involves closing the vaginal vault completely laparoscopically, then removing the uterus by vaginal or morcellating method [2]. The lap hysterectomy has a number of benefits, including minimal postoperative discomfort, short hospital stays, rapid recuperation, and quick return to normal activities [3]. A significant amount of technical progress has been made on this procedure over the last few years. Since most blood enters the uterus through these vessels, especially through the ascending branch, we modified our procedure to ligate both branches of the uterine artery [4]. Hypoxia occurs after occlusion of the myometrium causing blood clots to develop. In the present study, the TLH with uterine artery ligation was compared with the TLH with the ligation at the origin of the uterine artery.

METHODOLOGY

Study participants underwent 104 total laparoscopic hysterectomy procedures, of which 52 were conventional, and another 52 required uterine artery ligation prior to total laparoscopic hysterectomy. The study was carried out with informed consent and ethical clearance. All patients underwent preoperative evaluations. During the twelve hours preceding surgery, patients were prohibited from consuming anything and there was no bowel preparation. Preoperatively, the urinary bladder was catheterized. Participants in the study received antibiotic prophylaxis.

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As a prophylactic measure against possible thromboembolic episodes, compression devices were administered to all patients. Patients with obesity were administered low molecular weight heparin subcutaneously postoperatively.

Surgical Technique

A modified lithotomy position was used on the patient under general anesthesia. The umbilicus or supraumbilical site is inserted with a Veress needle and carbon dioxide is instilled into the abdomen at a pressure of 20 mm Hg at initial insertion and 15 mm Hg during maintenance. Through this port, a 10mm trocar is inserted blindly and a 10mm telescope is inserted. We were able to see the uterus and the adnexa. The third port is placed about 2 cm below and to the right of the umbilicus. The first port is located along the left spinoumbilical line at the junction of the medial 2/3rd and lateral 1/3rd. Before the procedure begins, the entire abdomen is examined. The uterus, adnexa and ureters are evaluated, as well as the presence of myomas. A 5 mm myoma spiral was used in laparoscopic manipulation of the uterus. There was no use of vaginal manipulators. A lateral approach was used to dissect the uterine artery. The broad ligament was sliced directly across the uterine vessels to create a window. It is close to the isthmus that we find the ascending branch of the uterine artery. The uterine vessels at this level are ligated with delayed absorbable sutures or bipolar diathermy. At that level, the ureters cross beneath the uterine artery, which does not need to be sutured. Moving the ureters laterally minimizes the risk of ureters getting caught in the suture after ureteric dissection and bladder pushing down**.** This results in a change in color in the fundus, which turns pale due to the securing of the vasculature of the uterus. A bipolar diathermy or harmonic ultracision is then used to dry and cut the cornual pedicles on one side. A ligated uterine pedicle is cut. A desiccator and a cutter are used to cut the uterosacral and cardinal ligaments. Afterwards, the myoma spiral position is adjusted to accommodate the opposite side pedicles.

A desiccated and cut infundibulopelvic ligament must be present if both ovaries are to be removed. To identify the vault and anterior lip of the cervix, a vaginal cuff is introduced through the vagina. A monopolar hook is used to cut the vault laparoscopically and completely detach the specimen from the vault. Generally, small uteruses with cervixes are delivered vaginally. An abdominal port can be used to retrieve specimens from large uteri by morcellation. Suturing is usually done through the contralateral ports. Especially ergonomically suited to suturing are the ports in the right midquadrant and left lower quadrant. A number 1 delayed absorbable suture (vicryl) is used to suture the vaginal vault. Staples are used to close the ports. Suction apparatuses are used to measure total blood loss. To determine the accurate value, blood is also measured in the suction tube. A total blood loss calculation is performed before irrigation is used throughout the procedure. In addition, 500 mL of normal saline is left in the peritoneum following peritoneal lavage with normal saline solution. A liquid diet is started after peristalsis has been established after 6 hours with the catheter removed. A follow-up call is made after seven days for the patient, who was discharged the following day.

There were 104 cases included in the study, 52 of which were treated with conventional TLH (Group A) and 52 with TLH following uterine artery ligation (Group B). Both groups had similar sociodemographic characteristics. The most common symptom of patients in both groups was menorrhagia (76.11% of patients in group A and 76.3% of patients in group B). Table 1 shows that the indications for surgery were also similar between the two groups. In group A, 74.11% of women had previously delivered naturally, 29.3% had previously delivered by cesarean section, and in group B 70% had previously delivered normally, 24% had previously delivered by cesarean section. Due to dense bladder adhesions, dissection was difficult in some patients after cesarean section. In both groups, the uterus measured between 10 and 22 weeks. A hemoglobin level of 9 g/dL was present in all patients of both groups. Preoperative blood transfusions were not required in any of them. Group A samples were retrieved vaginally 66.8% of the time and morcellated and retrieved 37.6% of the time. Group B consisted of 70.6% vaginally removed specimens and 33.8% morcellated samples.

This table compares the amount of time spent in surgery and the amount of blood lost in both groups (Table 2). In group A, the average surgery duration was 73 minutes. 62 minutes was the average surgery time in group B. There was a statistically significant difference between the two groups in terms of surgical duration ($P< 0.001$). Prior to surgery, vulvar arteries were ligated in patients with shorter surgery times.

A total of 70 mL of blood was lost in group A. A total of 43 mL of blood was lost in group B. There was a statistically significant difference between the two groups (P value< 0.001). Compared to group A that divided the cornual structures without ligating the uterine arteries, group B showed significant reductions in blood loss and need for blood transfusions.

Both groups did not experience any major complications. A patient in Group B in whom there were multiple fibroids and previously had two lower segment cesarean sections has been detected postoperatively with bladder injury and, after 2 weeks of catheterization, has been treated conservatively.

Table 1: Both groups' surgical indications

DIAGNOSIS	GROUP A		GROUP B	
	No.	%	No.	%
Abnormal uterine bleeding (AUB)*	26	52.0	28	55.1
Endometriosis	6	13.7	6	13.7
Fibroid	20	40.6	20	40.6
Total	52	100.0	52	100.0

TABLE 2: The difference between groups A and B in terms of blood loss and surgery duration

Parameters	Group A	Group B	P Value
Duration of surgery (min)	73.37 ± 7.23	62.79 ± 7.06	<0.001
Blood loss (mL)	72.98 ± 20.35	45.10 ± 7.69	<0.001

Discussion

Hysterectomy performed completely laparoscopically is now considered an alternative to abdominal hysterectomy. The uterus receives its vascular supply primarily from the bladder and ovary. As most blood enters the uterus through these arteries after uterine artery ligation, transient uterine ischemia occurs [5]. The obliteration of the blood supply to the uterus can be accomplished effectively by bilateral uterine vessel ligation [6]. Generally, we believe that securing the uterine vascular pedicle is the most important step in hysterectomy [7]. A large uterus limits access to the uterine vascular pedicles, especially if myomas are located in difficult places, and may result in complications including hemorrhage and ureteric injury. By dissecting and ligating the uterine artery at its origin, the blood supply is reduced and the risk of ureteral injury is reduced [8]. The uterine arteries were ligated as the first step in this study in order to reduce the total blood loss and the duration of surgery. Dissecting the ureter properly can sometimes be difficult in cases of large uteri. If the ureters are not fully mobilized after coagulation of the uterine vessels, they could be damaged by thermal shock. It is therefore best to suture uterine vessels intracorporeally. As compared to study. our study showed that primarily handling the uterine vessels at their origin significantly reduced blood loss during the procedure. Inexperience with pelvic anatomy is a leading factor in fear of ureteric injury. [9] As the bladder is dissected down, the ureters follow along with the peritoneum as they fall laterally. As a result, the suture has a very low risk of involving the ureters. When sutures are used instead of bipolar desiccation or staples, the risk of ureteric injuries is lower.

In our study, no serious complications occurred. According to study (7) there were only two patients in Group B who were diagnosed with multiple fibroids and had undergone two LSCS prior to the current surgery. One of these patients had bladder injury, which was discovered postoperatively and was treated conservatively with catheterization for 2 weeks.

CONCLUSION

By ligating the uterine artery at its origin during TLH, blood loss and surgical duration are reduced while complications are reduced. A surgeon's proficiency in retroperitoneal dissection results in a significant reduction in the duration of the procedure.

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