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Original Article

Laparoscopic Lateral Ovarian Transposition

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ABSTRACT

Introduction: Transposition of the ovaries outside of the pelvis to protect them from pelvic radiation was initially described in 1958. The procedure is indicated in patients diagnosed with malignancies that require pelvic radiation, but not removal of the ovaries, as part of their treatment. It can be performed by laparotomy or laparoscopy, depending on gynecologist's surgical skill. The aim of this article is to describe the technique of lateral ovarian transposition by laparoscopy. Surgical Technique: The patient is placed in Trendelenburg position, under general anesthesia. Pneumoperitoneum is insufflated using Veress needle and four abdominal trocars are placed: 10mm at the umbilicus, 10mm at the suprapubic region, and two 5mm at the anterior superior iliac spine bilaterally. The ovaries are completely separated from the uterus and fallopian tubes by dividing the utero-ovarian ligament and incising the mesovarium. The peritoneum along the infundibulo-pelvic ligament can be also incised and the ovaries are transposed laterally to the paracolic gutters and sutured. Two titanium clips are placed at the ovaries to mark the most cephalad and caudal extent. It allows postoperative localization of the ovaries to program pelvic radiation. Conclusion: Lateral ovarian transposition can be performed safely and effectively. Laparoscopic approach has some advantages compared to open surgery, including reduced length of hospital stay, less postoperative pain, smaller incisions and faster recovery. For these reasons, we advocate laparoscopy as the gold standard approach for ovarian transposition.

Key words: Laparoscopy, ovarian transposition, cancer, radiation.

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INTRODUCTION

Radiation therapy is one of the treatment modalities used in the management of patients with cancer, notably in cases of Hodgkin's disease, genitourinary and low intestinal tumors. Depending on the site and the extent of the disease, radiation can be administered locally or to a larger area[1,2]. It is a highly effective therapy in patients with early stage cancers, but it may result in the loss of ovarian function and in the necessity of long-term hormone replacement therapy for young women[3]. The role of the gynecologist becomes very important in these cases as an attempt to preserve the ovarian function, therefore assuring patient's quality of life and in some cases possible future fertility.

Transposition of the ovaries out of the field of irradiation to preserve ovarian function was initially described in 1958[4]. Since then a number of techniques have been reported, and they were performed during staging laparotomy or as a separate procedure[5-11]. Among them lateral ovarian transposition (rate of success until 83%)[7], ovarian transposition behind the uterus, ovaries protection with a lead shield[12], exteriorization of the ovaries under the skin through an opening in the flank[8], and heterotopic ovarian transplantation[9].

Recently surgical techniques progress and minimally invasive techniques development have allowed laparoscopic lateral ovarian transposition to be performed effectively by laparoscopy[2], with a shorten hospital stay, earlier mobilization, earlier return to normal activities and reduced costs[13].

The objective of this manuscript is to describe the laparoscopic ovarian transposition surgical technique.

SURGICAL TECHNIQUE

The operation was performed under general anesthesia. The patient was placed in lithotomy Trendelenburg position with both legs protected by elastic bandages. A Foley catheter was inserted into the urinary bladder for continuous monitoring of urine output during the operation.

Pneumoperitoneum was then insufflated with Veress needle and pressure maintained between 12

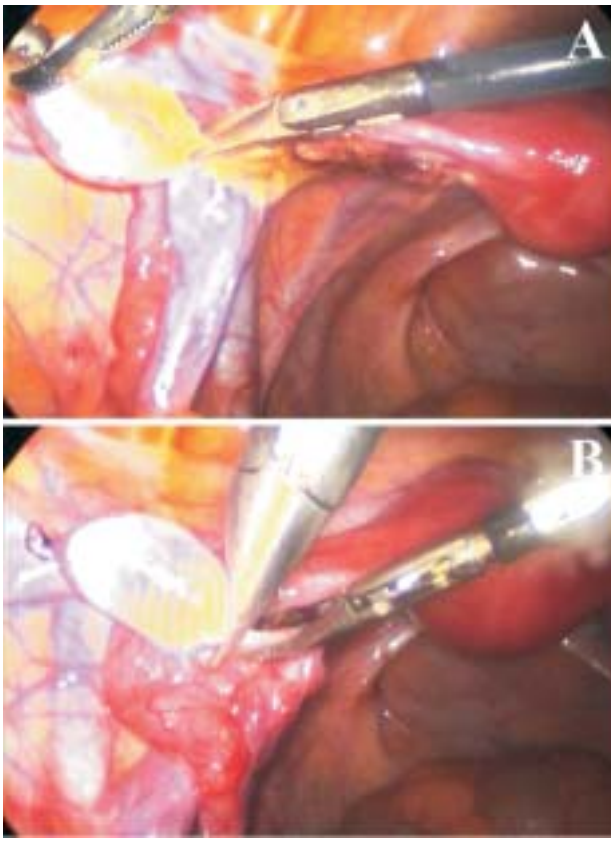

Figure 1 - *(A) Left utero-ovarian ligaments section. (B) The ovary is fixed to the left paracolic gutters and marked by a metal clip.*

to 14mmHg. A 10-mm trocar was placed at the umbilicus for the 0º optical, a 10-mm trocar was place at the suprapubic area and two 5-mm trocars were placed at the anterior superior iliac spine bilaterally.

The procedure began with a thorough examination of the abdominal cavity searching for eventual metastasis, including the liver and the diaphragm. The utero-ovarian ligaments were electrocauterized and divided (Figures 1A, 2A e 2B). The same procedure was performed on the mesovarium. The dissection was continued to the infundibulopelvic ligament with attention to leave the vascular pedicle inside the ligament intact. Ovaries were mobilized to the level of the anterior-superior iliac spines. In case of inadequate mobilization, a relaxing incision could be made on the peritoneum inferior to the ovary. It is not necessary to transect the fallopian tubes performing this technique which will increase the chances of a future pregnancy as patient's wish. The ovary was anchored.

To the peritoneum with two sutures of inabsorbable thread (Figures 1B e 2C). The inferior border of the ovary was marked with a vascular metal hemoclip bilaterally (Figures 1B e 2D) in order to be found during radiation.

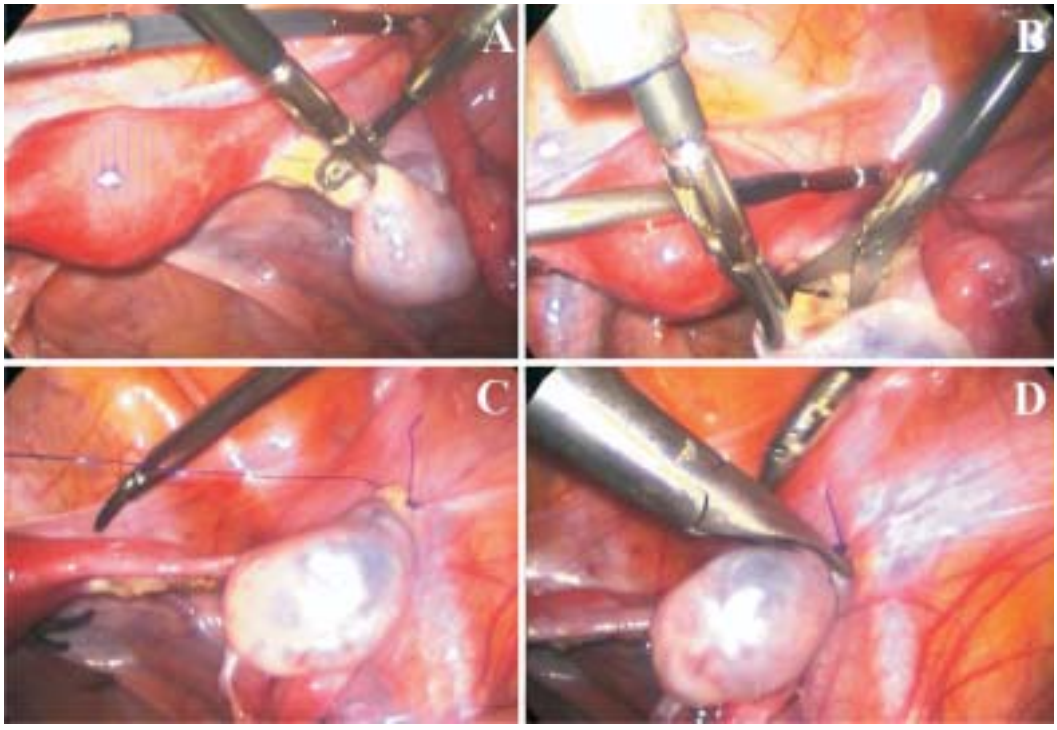

Figure 2 - *(A e B) Right utero-ovarian ligaments section and coagulation. (C) The right ovary is fixed to the right paracolic gutters. (D) Right ovary marked by a metal clip.*

FOLLOW-UP

Measurement of follicle-stimulating hormone (FSH) is obtained before the surgical procedure. The ovarian function is evaluated by monitoring patient's menstrual cycles and eventual symptoms of ovarian failure. Postoperatively it is important to perform a Doppler ultrasound of the pelvic region to assure the presence of blood flow in the transposed ovaries. Control of the ovarian function is checked by the measurement of FSH 30 days after the surgery and 30 days after completing radiotherapy.

DISCUSSION

The advent of laparoscopy was one of the most important innovations in modern-day surgery and many procedures that previously required a laparotomy now could be done by minimally invasive access[2,14]. Patients undergoing laparoscopic surgery have experienced shorter hospitalization, smaller incisions, less postoperative pain, faster recovery and more rapid return to radiotherapy without complicating subsequent therapeutic protocol than patients receiving the traditional abdominal approach[15]. This could be done to ovarian transposition.

Ovarian preservation seems mandatory for premenopausal young patient with non-hormone-dependent gynecologic cancers or nongynecologic cancers requiring pelvic irradiation[14,16]. The ovaries have been transposed to a variety of sites; however there has not been a consensus. Usually they are placed as high or lateral as possible [15,17], but the ovaries can also be transposed medially behind the uterus or to any distant site[1].

Other methods include ovaries protection with a lead shield[12] (it seems less effective than ovaries lateralization, besides it protects compromised lymph nodes), exteriorization of the ovaries under the skin through an opening in the flank(this technique has been associated to ovarian cyst formation) [8], and heterotopic ovarian transplantation (implantation of the ovary to the medial face of the arm using vascular anastomosis)[9].

According to Treissman e cols. [18], ovarian suspension with transection of the ovarian ligament allows an adequate mobilization of the ovaries. In some cases an additional relaxing incision on the peritoneum inferior to the ovary may be needed. This laparoscopic technique is simple, as dissection of the cecum is not necessary and the fallopian tubes can be stretched up to the level of the anterior-superior iliac spines.

Lateral ovarian transposition by laparotomy has been associated with preservation of ovarian function in 83% of patients after pelvic irradiation[7]. Successful preservation of the ovarian function depends on two factors: the dose of radiation received by the ovary and the age of the patient[14,19]. In the study of Huang and cols[3], eight out of the fourteen patients (57.1%) had ovarian failure after laparoscopic ovariopexy. Among the patients older the 40 years of age, 6 out of the 7 patients (85.7%) developed ovarian failure after the surgery, while among the patients in age below 39 only 1 out of the 7 patients (14,3%) had ovarian failure. Thus, ovarian failure happens not only just because the relevant vessels are disrupted during the procedure, but also because older ovaries are more sensitive to chemotherapy and radiotherapy[1,16,19].

Possible complications of ovarian transposition are torsion of the ovarian vascular pedicle[7], ureter injury, intraoperative bleeding, functional ovarian cyst formation and subsequent recurrence on transposed ovaries[20,21].

In this manuscript we described the laparoscopic lateral ovarian transposition surgical technique. Besides the benefits above mentioned of the minimally invasive procedure, laparoscopic surgery theoretically causes less pelvic adhesion compared with laparotomy[3]. As it is a simple and minimally invasive technique laparoscopy is a gold standard approach for ovarian transposition.

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