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Original Article

Ovarian Ablation as Adjuvant Therapy in Advanced Breast Cancer. Comparison Between Conventional and Single Port Laparoscopic Surgery at One Brazilian Oncology Center

Ablação Ovariana como Terapia Adjuvante no Câncer de Mama Avançado. Comparação entre Laparoscopia Convencional e por Portal Único em Centro de Residência Oncológica no Brasil

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ABSTRACT

INTRODUCTION: With the intra- and post-operative benefits of laparoscopic surgery compared to traditional open procedures well established, single port laparoscopic surgery has been increasingly employed because of its potential to reduce the morbidity of minimally invasive techniques. OBJECTIVES: compare variables such as surgical time, complications, and intraoperative bleeding in patients undergoing ovarian ablation performed by conventional and by single port laparoscopic surgery. MATERIALS AND METHODS: A prospective analysis of 44 women undergoing bilateral salphingo-oophorectomy, 25 of them by conventional laparoscopic and 19 by single-port access between March 2011 and Abril 2012 at the Barretos Cancer Hospital. RESULTS: Age, body mass index and intraoperative blood loss were comparable between the groups, mean blood loss in conventional laparoscopy: 28 ml versus 5 ml in single-port; median blood loss: 10 ml in traditional surgery vs. 2.5 ml in single port; p = 0. 112). The operative time was the only variable for which there was a statistically significant difference between groups: women who underwent traditional laparoscopy had longer surgical times (mean = 65 minutes in traditional laparoscopy vs. 40 minutes with single-port laparoscopy; median = 50 minutes in traditional laparoscopy vs. 30 minutes in single-port laparoscopy; p = 0.006). CONCLUSION: Once beyond the learning curve, the shorter surgical time for single-port laparoscopy is a benefit of this new surgical approach for bilateral salpingo-oophorectomy for hormonal castration when compared to traditional laparoscopy.

Key words: Laparoscopy. Single site surgery. Single-port. Oophorectomy.

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INTRODUCTION

Laparoscopic surgery has been gradually gaining support over open surgery due to advantages such as reduction of pain symptoms, quicker return to activities of daily living, better cosmetic results, and shorter hospital stays. It is believed that reducing the number of surgical trocars is possible and will increase the benefits of laparoscopic procedures.[1]

Although valued by patients and affirmed by several authors, the unquestionable esthetic benefit of single-port laparoscopic surgery is not the only and should not be seen as the principal rationale for this approach.[5,6,10,11] When intra-operative and immediate postoperative parameters of laparoscopic hysterectomy were compared with single-port laparoscopy (SPL) there were no significant differences, although less postoperative pain had

already been reported with the use of single trocar in cholecystectomy and in assisting in vaginal hysterectomy when compared with the use of more trocars.[1, 12.13]

The first single-port laparoscopic surgery reported was a tubal ligation performed in 1969[2] and in 1991 the first SPL hysterectomy was described, establishing the safety and effectiveness of this surgical approach.[3] Advances in laparoscopic instrumentation and techniques have permitted greater surgical versatility,[4,5] drawing attention to the potential advantages of single-port over traditional laparoscopic surgery.[5]

Whereas most complications of traditional laparoscopy occur with the placement of the first trocar, the need to insert the single-port device using Hasson's (open) technique constitutes an advantage over laparoscopy by puncture, which ensures greater safety for surgeons during procedure, especially in patients who have undergone previous abdominal surgeries.[4,14]

It is estimated that over 3,000 gynecological procedures have already been carried out using this new approach, which attests to its great suitability for such surgical procedures. Thus, the single-port approach is now considered suitable for hysterectomies, salpingo-oophorectomies and, more recently, in oncologic surgeries. [5,8,15,16]

The use of single-port laparoscopy in oophorectomies offers advantages such as facilitating the removal of adnexas through the same incision used to introduce the access device to the abdominal cavity. Furthermore, there is the proximity of the single umbilical trocar relatives to the adnexas, safety in the insertion of the trocar under direct view and psychological and esthetic benefits for women.[4,6,8-10]

Despite the advances, the disadvantages of this new route of access are still experienced routinely.[1] The restriction of surgical mobility of instruments that occurs due their proximity to one another prevents ideal triangulation causing inconvenience when using traditional (straight) laparoscopic forceps.[1,4,5,9,15] This difficulty makes the learning curve steeper.[5]

To evaluate the applicability of SPL as a new surgical approach in salpingo-oophorectomy in women with breast cancer requiring hormonal suppression, we analyzed the first 19 surgical castrations using this surgical approach and compared them with the same procedure performed by traditional laparoscopy, which was the surgical route used until that time in a surgical oncology teaching center in the Brazilian state of São Paulo.

MATERIALS AND METHODS

Data of patients undergoing bilateral salpingo-oophorectomy for advanced breast cancer between March 2011 and April 2012 at the Barretos Cancer Hospital were collected prospectively. The data collection instrument was a standardized form that was completed at the end of each surgery.

The criterion for use of SPL was temporal. Until August 2011 all salpingo-oophorectomies were performed by conventional laparoscopy. From then on SPL was introduced as the new surgical approach used by this service.

The surgeries were performed with a 30° optic, unarticulated (straight) forceps and bipolar type cautery.

All surgeries were performed by the gynecologic oncology team of the Barretos Cancer Hospital, composed of three or four surgeons, including one attending and two or three 3rd to 5th year surgical residents. In all surgeries, the residents performed the entire bilateral salpingo-oophorectomy procedure.

General anesthesia was used in all cases and all patients were placed in Trendelenburg on egg crate mattresses and Allen padded stirrups. Pneumoperitoneum was achieved with carbon dioxide inflating the abdominal cavity to a maximum pressure of 15 mmHg and a mean pressure of 12 mmHg.

The traditional laparoscopic salpingo-oophorectomy was performed with use of four trocars: one 10mm trocar in the umbilical scar and three 5mm trocars (right and left iliac fossa and supra-pubic). The surgical technique used followed the steps described below.

1. A 1.5 to 2 cm arciform incision is made in the umbilical scar

2. Veres needle puncture to establish the pneumoperitoneum using medical CO_2.

3. Insertion of a 10mm umbilical trocar and then, under direct vision, three 5 mm trocars in both flanks and in the suprapubic region.

4.Suspension of the ovaries using clinch forceps and identification of each ureter by transparency in the peritoneum.

5. Cauterization and ligation of the pelvic infundibulum and broad ligament, laterally to medially,

1 cm below the uterine tube so that each ovary and uterine tube are delivered as a single specimen.

6. Placement of the specimens in "endobags".

7. Specimens are withdrawn through the umbilical trocar incision.

8. Withdrawal of 5mm trocars under direct vision.

9. Deflation of the pneumoperitoneum and simultaneous withdrawal of the 10mm trocar and optic (while viewing hemostasis of the incision).

10. Suturing of the aponeurosis of the umbilical scar with 1 Vicryl and, continuous sutures of the skin with 4-0 Vicryl inverted intradermal sutures.

11. The patient is observed for 24 hours with a cotton compress over the operative wound.

The technique employed in single-port laparoscopy involves the following steps:

1. A 2.0 to 2.5 cm wide surgical opening to left at the umbilical scar is made by dissecting the planes under direct view and insertion of properly lubricated access device into the abdominal cavity with the aid of Mixter forceps.

2. Insertion of the optic through the largest (12mm) trocar; laparoscopic clinch forceps are placed through one 5mm trocar and the cautery is passed through by another 5mm trocar.

3. Suspension of the ovaries using clinch forceps and identification of each ureter by transparency in the peritoneum.

4. Cauterization and ligation of the pelvic infundibulum and broad ligament, laterally to medially, 1 cm below the uterine tube so that each ovary and uterine tube are delivered as a single specimen.

5. Placement of the specimens in "endobags".

6. Grabbing the "endobags" with the clinch forceps

7. Withdrawal of the access device.

8. Withdrawal of the surgical specimens through the umbilical incision.

9. The aponeurosis is sutured with continuous 1-0 Vicryl sutures and the skin is sutured with inverted intradermal 4-0 Vicryl sutures

The intraoperative variables recorded included: blood loss, surgical time and intraoperative complications. All blood aspirated during the procedure was quantified in an appropriate collector bag at the end of surgery, before washing the cavity. The surgical time was measured from the insertion of the trocar until the placement of the final wound dressing.

Because these variables had values that do not follow a normal distribution, we chose to compare the medians by using the Mann-Whitney nonparametric test with p value significance set at < 0.05.

RESULTS

We analyzed 44 women with advanced stage (III and IV) breast cancer referred by the Clinical Oncology Department of Barretos Cancer Hospital for surgical castration.

For 25 cases traditional laparoscopy was used; with the subsequent 19 cases SPL was used. The traditional laparoscopy and single-port laparoscopy groups were not statistically different with respect to mean age and body mass index (BMI).

No statistical difference was noted in median blood loss between the groups by the Mann-Whitney test (median = 10ml of for conventional laparoscopy and 2.5 ml with SPL; $p = 0.112$). The average blood loss with traditional laparoscopy was 28 ml and 5 ml with single portal laparoscopy.

One of conventional laparoscopic procedures was converted to laparotomy due to injury of the external iliac artery, requiring arteriorrhaphy for correction. This was the only intraoperative complication observed in either group; this case was not excluded from our analysis.

According to the Mann-Whitney test, surgical time was significantly longer in the group that underwent conventional laparoscopy (median 50 vs. 30 minutes, $p = 0.006$). The mean surgical time was 65 minutes for traditional laparoscopy and 40 minutes for the SPL. No postoperative complication was recorded in this series. The patients were discharged 12 to 24 hours after surgery.

DISCUSSION

Currently there are several devices for single-port laparoscopy on the market. The safety and functionality of the equipment were found to be excellent when used for surgical castration, with virtually no limitations in terms of their feasibility as was reported in previous studies.[9,10, 17]

A review of the literature found studies that describe the applicability of SPL in oophorectomy in a total of 233 cases.[4, 6, 8-10,16-19] In only one study was there a comparison between salpingo-oophorectomy

by traditional laparoscopy and by SPL suggesting the benefits of the latter.[19]

With the 19 cases of single-port laparoscopic salpingo-oophorectomy we observed promising initial results. Even though the one complication in the traditional laparoscopy group contributed to this group's increase in average blood loss, it did not cause a statistically significant difference according to the Mann-Whitney test.

To date no complications have been reported with the use of SPL, and no patient required conversion to conventional laparoscopy or laparotomy.

The similar or prolonged surgical time required by SPL reported in earlier studies was not observed in our study; indeed the surgical time was shorter with SPL, and the difference was statistically significant. It is possible that the ease of removing the specimens from the cavity and closure of a single incision contributed to the shorter surgical time. Moreover, the studies that reported a longer surgical time with the use of SPL involved more complex procedures because most of the patients had adnexal lesions.[4,8,9,19]

Oophorectomy in patients without adnexal lesions is a procedure indicated primarily for surgical hormonal castration. The technical simplicity of the procedure ensures a quick learning curve when compared with the literature, both for surgeons already familiar with traditional laparoscopy, and for surgical oncology residents with incipient laparoscopic experience. Surgeons already familiar with conventional laparoscopy apparently have fewer difficulties adapting to this new modality, requiring around 15 cases to achieve proficiency. [9,10,20,21]

In previous studies, the participation of residents, when described, was limited to minor supportive roles.[4] In our study, the execution of the entire surgery by residents did not increase the rate of complications nor the operative time. While the use of three trocars in the traditional laparoscopic procedure is appropriate and feasible, in order to better aid the residents and avoid intraoperative complications four trocars were used.

Articulated forceps may facilitate the execution of single trocar surgeries, but the high cost of such equipment hinders universal implementation. It is believed that the experience of the surgeon can overcome the technical difficulties of carrying out SPL with traditional forceps when the surgical indication is compatible with this surgical approach.[1]

In this study we used traditional laparoscopic forceps and not articulated forceps designed specifically for SPL. The difficulty presented by the proximity of forceps was overcome by the technique of apprehension and traction of the structures (ovaries and uterine tubes) to be resected, maintaining one forceps static, and with the other hand in carrying out horizontal movements/motions for the cauterization and resection of the structures. This simple maneuver greatly facilitated the procedure.

The device used in our SPL surgeries is available in the domestic (Brazilian) market at an accessible cost, roughly the same cost as a set of three 5 mm trocars. The low reimbursement paid by the National Health System (known as the *Sistema Único de Saúde* or SUS) for salpingo-oophorectomy hinders the large scale implementation of SPL in Brazil's public healthcare system.

Only one prior study specifically evaluated oophorectomy indicated for surgical castration,[18] but without a control group. Our study highlights the safe application of SPL in salpingo-oophorectomies by demonstrating a transition from traditional laparoscopy to this new surgical approach without the occurrence of perioperative complications. Its application in a teaching setting by surgical residents, moreover with the benefit of shorter operative time, demonstrates the rapid learning of this technique when the clinical team is already familiar with traditional laparoscopy. Randomized studies and larger cohorts are needed to validate these findings.

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RESUMO

INTRODUÇÃO: Uma vez consolidados os benefícios intra e pós-operatórios da cirurgia laparoscópica tradicional em relação à cirurgia aberta, a cirurgia laparoscópica por portal único vem sendo cada vez mais empregada por apresentar potencial de reduzir ainda mais a morbidade das técnicas minimamente invasivas. OBJETIVOS: comparação de variáveis como tempo cirúrgico, complicações e sangramento intraoperatórios entre pacientes submetidas à ablação ovariana realizada por laparoscopia convencional e por portal único. MATERIAIS E MÉTODOS: coleta prospectiva de dados de 44 mulheres submetidas à salpingooforectomia bilateral, sendo 25 delas por via laparoscópica convencional e 19 por portal único entre o período de março/2011 a abril/2012 no Hospital de Câncer de Barretos. RESULTADOS: As variáveis: idade, índice de massa corporal e perda sanguínea intra-operatória foram semelhantes entre os dois grupos (média de idade=41 anos; p=0,722; média de IMC=27; p=0,787; média de sangramento na laparoscopia: 28 ml; portal único= 5ml; mediana da laparoscopia = 10ml e do LPU 2,5ml; p=0.112). Foi observada diferença estatística significativa apenas no tempo cirúrgico que foi maior no grupo que realizou laparoscopia convencional (média de 65 minutos na laparoscopia vs. 40 minutos no portal único e mediana de 50 minutos na laparoscopia vs. 30 minutos no portal único p=0.006). CONCLUSÃO: Após atingido a curva de aprendizado da cirurgia por portal único, acredita-se que se pode fazer a mesma com um menor tempo quando comparada a laparoscopia tradicional, sugerindo assim benefício desta nova via de acesso cirúrgica para a salpingo-oforectomia bilateral visando castração hormonal.

Palavras chave: Laparoscopia. Portal único. Ooforectomia.

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