



ORIGINAL ARTICLE

Laparoscopic lumbar-aortic lymphadenectomy in residual post-chemotherapy tumors in testicular cancer[☆]

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PALABRAS CLAVE

Cáncer testicular;
Linfadenectomía
lumboaórtica;
Laparoscopia;
Masa retroperitoneal

Abstract

Introduction: Open lumbar-aortic lymphadenectomy (OLAL) is the gold standard for treating post-chemotherapy retroperitoneal masses. Laparoscopic OLAL (L-OLAL) has emerged in recent years as an alternative for the handling of patients with these masses, with the additional potential benefits of minimal invasion.

Objective: To present our experience with the laparoscopic handling (L-OLAL) of residual post-chemotherapy masses in patients with advanced testicular cancer.

Materials and methods: Between 1993 and 2009, 43 patients underwent post-chemotherapy L-OLAL. A transperitoneal technique was employed in all patients. We assessed demographic, perioperative and pathological variables, as well as complications and follow-up.

Results: A unilateral dissection was performed in 17 patients, while 26 patients underwent a bilateral retroperitoneal dissection. In the first group, 4 patients relapsed. In the second group, there were no relapses. After an average follow-up of 21 months, the overall survival rate reached 95%. We recorded a rate of perioperative complications of only 9.3%.

Conclusions: In experienced hands, L-OLAL is a technically feasible surgical alternative for the treatment of patients who are carriers of advanced testicular cancer with residual post-chemotherapy masses. The dissection performed should be bilateral to avoid tumor relapses and increase the survival rate of these patients.

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Linfadenectomía lumboaórtica laparoscópica en tumor residual posquimioterapia en el cáncer testicular

Resumen

Introducción: La linfadenectomía lumboaórtica abierta (LALA) es el estándar de oro en el manejo de masas retroperitoneales posquimioterapia. La LALA laparoscópica (LALA-L) ha

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surgido los últimos años como una alternativa para el manejo de estos pacientes, con los eventuales potenciales beneficios de la mínima invasión.

Objetivo: Exponer nuestra experiencia en el manejo laparoscópico (LALA-L) de las masas residuales posquimioterapia en pacientes con cáncer testicular avanzado.

Material y métodos: Entre los años 1993 y 2009 43 pacientes fueron sometidos a LALA-L posquimioterapia. Se utilizó una técnica transperitoneal en todos los pacientes. Se evaluaron variables demográficas, perioperatorias y patológicas, así como también las complicaciones y el seguimiento.

Resultados: En 17 pacientes se realizó una disección unilateral, mientras que 26 pacientes fueron sometidos a una disección retroperitoneal bilateral. Del primer grupo 4 pacientes recidivaron; el segundo grupo no presenta recidivas. Tras un seguimiento promedio de 21 meses la tasa de sobrevida global alcanza un 95%. Solo se registró un 9,3% de complicaciones perioperatorias.

Conclusiones: La LALA-L es una alternativa quirúrgica técnicamente factible, en manos experimentadas, en el tratamiento de pacientes portadores de un cáncer testicular avanzado con masas residuales posquimioterapia. La disección realizada debe ser bilateral en pro de evitar las recidivas tumorales y prolongar la tasa de sobrevida de estos pacientes.

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Introduction

Testicular cancer is the most frequent malignant tumor among 20–35 years old men, representing approximately 1% of all cancers.¹ The multidisciplinary approach to the management of disease has improved 5-year survival rates in low and medium risk patients.^{2–4} However, these figures show the existence of a higher absolute number of patients with advanced disease stage: those are patients who after standard chemotherapy (mainly cisplatin-based) will present residual disease for up to 30% of cases, mostly retroperitoneal.^{5,6} In most cancer centers, second-line chemotherapy is the treatment of choice for this type of patients.⁷ However, 5-year survival rates are between 15% and 40% after failure of first-line chemotherapy.⁸ The details mentioned above support the development of lumbo-aortic lymphadenectomy (LAL) as a therapeutic procedure for post-chemotherapy residual masses and open surgery is the gold standard,⁹ with survival rates of greater than 80%.¹⁰ Laparoscopic lumbo-aortic lymphadenectomy is considered as an alternative to open surgery, which has proved to be technically feasible.¹¹

The present study summarizes our results and complications in laparoscopic approach to post-chemotherapy residual masses in patients with tumor in advanced stage.

Materials and methods

43 patients with tumor in advanced stage post-chemotherapy treated in our center between August 1993 and July 2009 make up the bulk of the study. Initially, laparoscopic open lumbar-aortic lymphadenectomy (L-OLAL) was done according to surgical technique described previously by the authors, following the Weissbach and Boedefeld's templates.¹² From 2001, the authors developed modified technique consisting of a complete bilateral retroperitoneal resection.

All patients had negative tumor markers at the time of surgery. They had received at least 4 cycles of chemotherapy with bleomycin, etoposide and cisplatin

(BEC) regime. At least one month after the last cycle of chemotherapy, surgery was carried out. Data were collected in a prospective way. The following data were analyzed: personal data, primary tumor histology, surgical parameters, intraoperative and postoperative complications, histology of the resected mass and follow-up of each patient.

Results

Average age of patients was 27.8 years old (4–45 years). The proportion between right- and left-sided testicular tumors was similar. One patient was diagnosed with synchronous testicular tumor, treated with bilateral orchiectomy followed by hormone replacement therapy.

Of the patients studied 86% had clinical stage B at diagnosis. The 2 patients with clinical stage A (4.7%) had teratoma: pure in one of both and associated with choriocarcinoma in the other patient. It is remarkable the great percentage of patients with teratomatous component in the primary tumor (53.5% of studied cases). One patient showed undefined histology associated with great dedifferentiation of studied tissue. Percentage of embryonal carcinoma (ECa) and lymphatic and/or vascular invasion were considered as risk factors, which were reported in 51.2% of patients. All these data are summarized in [Table 1](#).

From the surgical point of view, average surgery time was 2 h and 15 min, with a range up to 4 h at the beginning of the series ([Table 2](#)). Bleeding rates were lower in most of the cases operated, median 50 mL. However, upper range of 3 L was reported in a patient who suffered an injury to the aorta. This bleeding was not controlled.

Total number of conversions recorded was 2: one surgery was converted to open surgery in former patient (aorta injury), and the second too was a conversion secondary to the finding of a lesion classified as unresectable by laparoscopy. The average hospital stay was 53 h (range 24–144 h, mode 21 h).

[Table 3](#) summarizes the complications observed in our series. All were vascular complications observed in 4 patients (9.3%). Once death was registered due to aortic

Table 1 Clinicopathological characteristics of the series.

| | |
|-------------------------------------|-------------|
| Number of patients | 43 |
| Mean age (years) | 27.8 (4–45) |
| | N (%) |
| Primary tumor site | |
| Right | 22 (51.2) |
| Left | 20 (46.5) |
| Bilateral | 1 (2.3) |
| Clinical staging diagnosis | |
| A | 2 (4.7) |
| B | 37 (86) |
| B1 | 14 |
| B2 | 18 |
| B3 | 5 |
| C | 4 (18.6) |
| Primary tumor histology | |
| Seminoma | 7 (16.3) |
| ECA | 11 (25.6) |
| Teratocarcinoma | 9 (20.9) |
| Mixed (with teratomatous component) | 14 (32.6) |
| Rhabdomyosarcoma | 1 (2.3) |
| Unknown | 1 (2.3) |
| Diagnosis risk factors | |
| Absent | 21 (48.8) |
| ECA | 11 (25.6) |
| Vascular invasion and/or lymphatic | 11 (25.6) |

ECA: embryonal carcinoma.

injury. Should be noted that transfusion was required only in 7% of cases (3 patients).

Table 4 results from preoperative and pathological studies of patients who underwent O-LAL handling of residual post-chemotherapy masses. In preoperative computed tomography, average size of the mass was 3.8 cm (range: 1.2–13 cm). The dead patient had para-aortic tumor of 5 cm. The average number of lymph nodes seen in resected masses was 12 (range 0–12). This value was evidenced as dominant histologic pattern of ECA in 18% of cases (12

Table 2 Perioperative outcomes.

| | |
|---------------------------|--------------|
| Operative time x (min) | 135 (60–240) |
| Bleeding x (ml) | 50 (0–3000) |
| Number of conversions (%) | 2 (4.7) |
| Hospital stay x (h) | 53 (24–144) |

x: average.

Table 3 Complications.

| | N (%) |
|--|---------|
| Total | 4 (9.3) |
| Aortic injury | 1 |
| Ligation of inferior mesenteric artery | 1 |
| Lumbar bleeding | 1 |
| Vena cava injury | 1 |

Table 4 Pre- and postoperative characteristics of the retroperitoneal mass.

| | |
|--|--------------|
| Tomographic size x (cm) | 3.8 (1.2–13) |
| Number of lymph nodes removed x | 12 (0–22) |
| Nodal tumor involvement | |
| N (%) | 33 (76.6) |
| Number of positive nodes x | 4 (0–17) |
| | N (%) |
| Histology of the excised tissue | |
| Malignant | 33 (76.7) |
| Teratoma | 11 (33.3) |
| ECA | 12 (36.3) |
| Choriocarcinoma | 1 (3) |
| Mixed | 9 (27.3) |
| Fibrosis | 10 (23.3) |

ECA: embryonal carcinoma; x: average.

patients), followed by teratoma in 25.6% (11 patients). The average number of positive lymph nodes was 4 (range 0–17). Lymph node tumor involvement was showed in 77% of patients. Histopathological study revealed that only 10 patients (23.3%) had fibrosis.

The average follow-up in this series is 21 months (range between 3 months and 7 years). Tumor recurrence after surgery was reported in only 11.6% of patients, 80% of which (4 patients) relapsed in the retroperitoneum and one patient in lung. The survival rates in this series are 95%.

Discussion

O-LAL plays an important role in the multidisciplinary approach to the management of testicular cancer, either for staging or therapeutic purposes.¹³

Laparoscopic approach of testicular tumor was published firstly in 1992.¹⁴ Since then, several studies have proven its safety as well as the advantages of minimally invasive approach. However, its acceptance remains controversial due to the lack of long-term oncologic follow-up.¹⁵ Seven years later, the first results of use of laparoscopic approach for the management of post-chemotherapy residual masses in patients with advanced-stage testicular neoplasia are published.¹⁶ Our experience in this field commenced in 1993 with selected patients with small masses on imaging tests.

Probably, one of the major obstacles of this surgery is its technical difficulty, which occasionally can determine a high percentage of complications. The first publications of OLAL reported a percentage of complications between 18% and 30%.^{17,18} Morbidity rates after OLAL for post-chemotherapy testicular cancer are obviously higher than for primary OLAL.¹⁹ This is due to special features of the disease such as the size of the mass to resect and the desmoplastic reaction surrounding.²⁰ Range of complications for L-OLAL is between 25% and 50%.^{16–21} In our series we have reported a complications range from 9.3% and the death of one patient. Despite of these complications, L-OLAL is essential in the management of those patients with radiologic relapse post-chemotherapy,²² because between 50% and even 70% of patients may have a viable tumor, and after undergoing

complete resection,^{11–23} the survival rates free of disease of these patients can be up to 95%.

In a series of 628 patients operated on with open surgery,²⁴ histological study of the resected mass revealed fibrosis in approximately 57% of patients and teratoma in 43% of patients. In our experience ECa was the dominant histologic pattern followed by teratoma. Only 23.3% of patients showed fibrosis.

The incorporation of abbreviated resection based on template resection and nerve-sparing has reduced significantly the morbidity²⁵ associated with L-OLAL. However, during last few decades a controversy has emerged regarding to the surgical management of patients with retroperitoneal masses at the end of chemotherapeutic treatment. Evidence supporting bilateral lymph node resection as standard surgery due to significant presence up to 30% of viable cancer out of margins of abbreviated resection has been published.^{26–29} Complete resection of all residual masses after primary chemotherapy can result in a significant difference in the clinical evolution of this group of patients. In first period of our series (1993–2000) abbreviated resections were developed,¹² and later (2001–2009) in accordance to former evidence, bilateral resections were carried out.

Although in our series the follow-up period is short (21 months), calculated survival ups to 95%, which promotes the development of this technique.

Conclusions

In experienced hands, L-OLAL is a technically feasible surgical alternative for the treatment of patients with advanced testicular cancer with residual post-chemotherapy masses.

The resection performed should be bilateral to avoid tumor relapses and to increase the survival rate of these patients.

Conflict of interests

The authors declare that they have no conflict of interest.

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