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Management of Residual Masses of Testicular Cancer : Experience of our Department

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ABSTRACT

We performed a single-center retrospective study of all patients operated in our department for residual masses after chemotherapy between January 2005 and October 2021. The primary endpoints were the occurrence of intraoperative and postoperative complications and recurrence after surgery.

A total of 9 patients were included in our study. The mean age of our patients was 32 years. The primary lesion was located in the left testicle in 55.5% of the cases, non-seminomatous germ cell tumors in 33.3% and mixed germ cell tumors in 33.3%. In 55.5% of cases, it was a stage II. All our patients received at least 2 cycles of first-line chemotherapy and the tumor markers measured after chemotherapy were normal in 66.6% of cases.

The location of the residual mass was retroperitoneal in 77.7% of cases and the size was greater than 3 cm in all our patients. In our series all patients underwent extensive retroperitoneal lymph dissection by laparotomy. However, there were no intraoperative deaths.

The anatomopathological results of the lymphadenectomy were in favor of teratoma in 55.5% of cases. The main complication was anejaculation in 8 patients (88.8%) and one patient was lost to follow-up. The one-year follow-up was marked by a retro hepatic recurrence in one patient.

In spite of the small number of cases we have, our overall results are in line with those found in referent centres for this type of surgery, which is considered to be major.

KEYWORDS: *Testis; Retroperitoneal lymphadenectomy ; Residual mass.*

INTRODUCTION

Testicular cancer is a disease of the young. It is a curable cancer with a good prognosis. Testicular cancer represents 1% to 1.5% of male tumors and 5% of malignant urogenital tumors [1]. In 95% of cases, these are germ cell tumors, subdivided into either seminomatous or non-seminomatous. The initial management of testicular cancer consists of inguinal orchiectomy, followed by surveillance, radiotherapy, chemotherapy or retroperitoneal lymphadenectomy, depending on the histological type and the clinical, biological and radiological stage [2]. Management is therefore multidisciplinary and is decided at multidisciplinary consultation meetings.

The definition of a residual mass is a scannographic definition which depends on the primary germ cell tumour (seminomatous or non-seminomatous). This definition is set at more than 3 cm for seminomatous germ cell tumours and 1 cm for non-seminomatous germ cell tumours [3].

Surgery for residual masses after chemotherapy for germ cell tumors is an integral part of the management of testicular cancer and is indicated for any residual mass exceeding 1 cm for non-seminomatous germ cell tumours [4,5]. However, for seminomatous germ cell tumours, surgery is indicated for all masses larger than 3 cm with positive FDG pet-scan. At the moment, no imaging modality can differentiate with total accuracy the histological type of the residual mass. In view of the ineffectiveness of imaging, complete resection of all residual masses in patients with normalization or reduction of tumor markers after chemotherapy is the therapeutic attitude recommended by the European Association of Urology [6].

This surgery can be performed by several techniques: laparotomy, laparoscopy or robot-assisted laparoscopy. It sometimes requires the intervention of several specialities (visceral surgery, vascular surgery...). It is a complex surgery whose main complication is anejaculation which can be

limited by the modified lymph dissection. The quality of the surgery will dictate the prognosis. It must therefore be performed only in experienced centres with the necessary facilities.

We present through this retrospective study the experience of our department in surgery of residual masses after chemotherapy and the state of the art.

MATERIAL AND METHODS

We conducted a single-centre retrospective study of patients operated on in the department for residual masses after chemotherapy between January 2005 and October 2021. Data were collected from medical records and telephone calls. All treatment decisions were made in the PCR. We included in this study patients with germ cell tumors of the testis, who received adjuvant chemotherapy. All masses were larger than 3 cm on abdominopelvic CT scan performed 3 months post-chemotherapy. Due to lack of resources, none of the patients received re-evaluation positron emission tomography. In view of the particular profile (drug addiction) of some patients, our study was limited by the disappearance (loss of sight) of one of them.

- ***Study setting and design:*** Between January 2005 and October 2021, we conducted a single-center retrospective study of patients operated in the department for residual masses after chemotherapy. We included in this study patients with germ cell tumors of the testis, who received adjuvant chemotherapy. All masses were larger than 3 cm on abdominopelvic CT scan performed 3 months post-chemotherapy.
- ***Data analysis:*** We collected data from 9 patients included the patient's age, side and pathology of testicle, initial stage, chemotherapy protocol, result of tumor markers after chemotherapy and finally side and location of residual mass.
- ***Study participants (patients):*** We included in this study 9 patients with germ cell tumors of the testis, who received adjuvant chemotherapy. All patients received at least 2 cycles of BEP-based first-line chemotherapy except 2: We could not determine the protocol received. Tumor markers are measured after chemotherapy. All masses were larger than 3 cm on abdominopelvic CT scan performed 3 months post-chemotherapy.
- ***Inform consent:*** written informed consent was obtained from the patient for participation in this study.
- ***Ethical clearance:*** The ethics committee of the Faculty of Medicine of Rabat has given us its agreement. Informed consent to participate in the study was provided by the patient. The reference number is not applicable.

RESULTS

We collected data from 9 patients. All data were listed in Table 1; the mean age was 32 years with age extremes between 24 and 47 years. The primary lesion was located in the left testicle in 5 cases (55.5%), the right testicle in 2 cases, 1 case of regressive tumor and 1 case with undefined laterality. The tumor was a non-seminomatous germ cell tumor (embryonal carcinoma, choriocarcinoma or mixed) in 3 cases (33.3%), a mixed tumor in 3 cases, 1 case of seminoma, 1 case undefined and 1 case of regressed tumor. The majority of patients had stage 2, of which 5 were classified as 2c (55.5%), 1 as 2a, and 1 as 2a; in 2 cases the classification was not defined.

Table 1. Summary of Patient Characteristics and clinical information (n = 9)

Patient	Age (years)	Side	Pathology testicle	Initial stage	chemotherapy protocol	post-chemotherapy tumor markers	size and location of residual mass
1	37	left	mixed NSCT	2b	3EP	Normal	>3cm
2	24	left	Embryonal carcinoma	2c	3 BEP	normal	>3cm
3	31	right	Embryonal carcinoma	2c	3 BEP	elevate	>3cm
4	38	left	choriocarcinoma	2a	2EP	normal	>3cm
5	47	-	seminoma	2c	3 BEP	normal	>3cm
6	29	left	mixed NSCT	ND	ND	elevate	>3cm
7	28	right	mixed tumor teratoma & Embryonal carcinoma	2c	4 BEP	normal	>10cm
8	29	left	ND	ND	ND	ND	>3cm
9	26		regressed tumor "Burn out "germ cell tumors	3a	4 BEP	normal	>10cm

All patients received at least 2 cycles of BEP-based first-line chemotherapy except 2: We could not determine the protocol received. Tumor markers measured after chemotherapy were normal in 6 patients (66.6%). However, they were elevated in 2 cases and undefined in 1 case. The location of the residual mass was retroperitoneal in 7 cases (77.7%), left scrotal in 1

case and left supraclavicular in 1 case. The size was greater than 3 cm in all cases. Two patients presented with masses exceeding 10 cm.

Due to the large size of the residual masses, all patients underwent extensive retroperitoneal lymphadenectomy by laparotomy. The aorta and inferior vena cava were peeled (Figure 1). A left supra-clavicular location (Figure 2) and a duodenal lesion required vascular and visceral surgery respectively. There were no intraoperative deaths. The anatomopathological results of the lymphadenectomy were in favour of teratoma in the majority of cases: 5 cases (55.5%). There were also 2 cases of viable tumor and 1 case with an undefined result. Unfortunately, one patient presented with a retrohepatic recurrence at the 1-year follow-up (Figure 3). In collaboration with the visceral specialists, we performed a complete excision. The main complication was anejaculation in 8 patients (88.8%) and one patient was lost to follow-up.

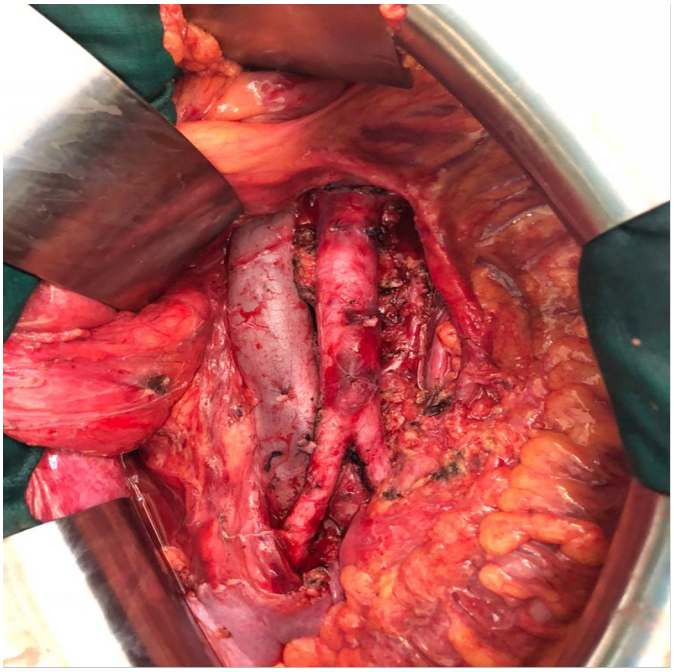

Figure 1. Operative view of retroperitoneal lymph dissection

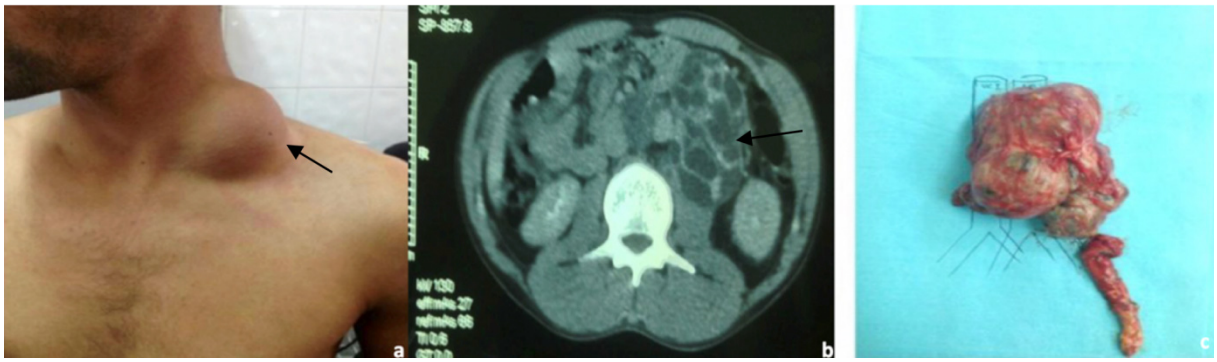

Figure 2. "Burn out germ cell tumours" (a) BEP four courses, left supraclavicular lumpectomy with normalization of biological markers; Evolution: Removal of a retroperitoneal mass greater than 10 cm, teratoma (b+c);

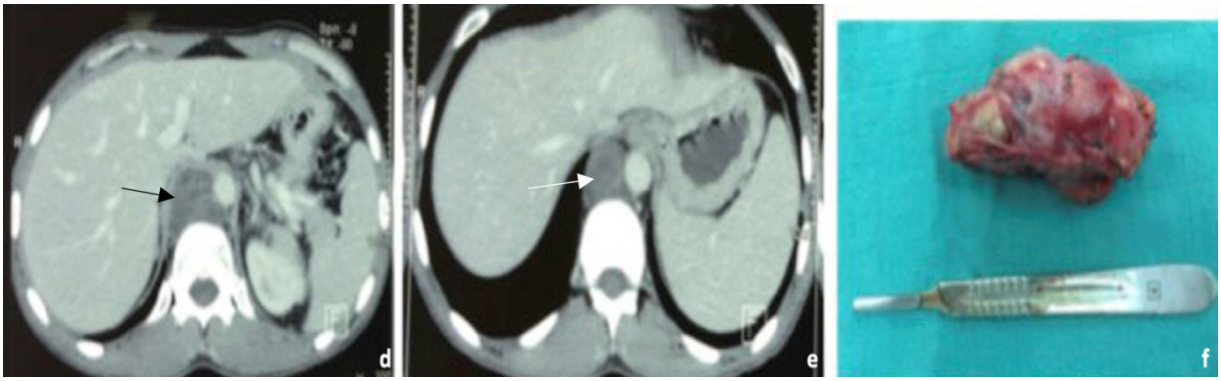

Figure 3. Recurrence six months later as a retrohepatic mass (d+e) macroscopic appearance (f)

DISCUSSION

In this study, we describe our experience of the service of nine patients with testicular cancer undergoing surgery for post-chemotherapy residual mass; although this is a small series, we believe it has several important points worth noting.

Limitations of our study include a small number of patients, the lack of long-term follow-up as one patient was lost to follow-up due to his particular profile (drug addiction) and the absence of a comparative arm. As a result, addictive behavior and non-compliance are often associated [7].

It is estimated that 30% of patients with non-seminomatous germ cell tumors will have residual lesions after chemotherapy [8] The location of the residual masses was retroperitoneal in 77% of cases, left scrotal (Figure 4 and 5) in 1 case and left supra-clavicular (Figure 2) in 1 case requiring the involvement of the vascular surgeon; in fact, the literature reports that extra-peritoneal residual masses can concern up to 35% of patients [9].

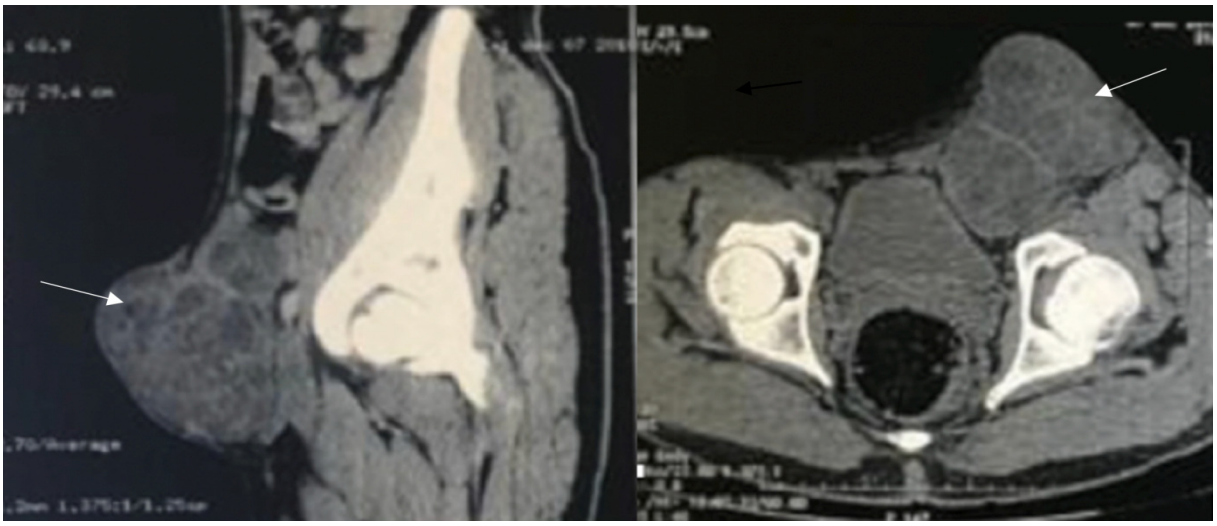

Figure 4. Left scrotal residual mass

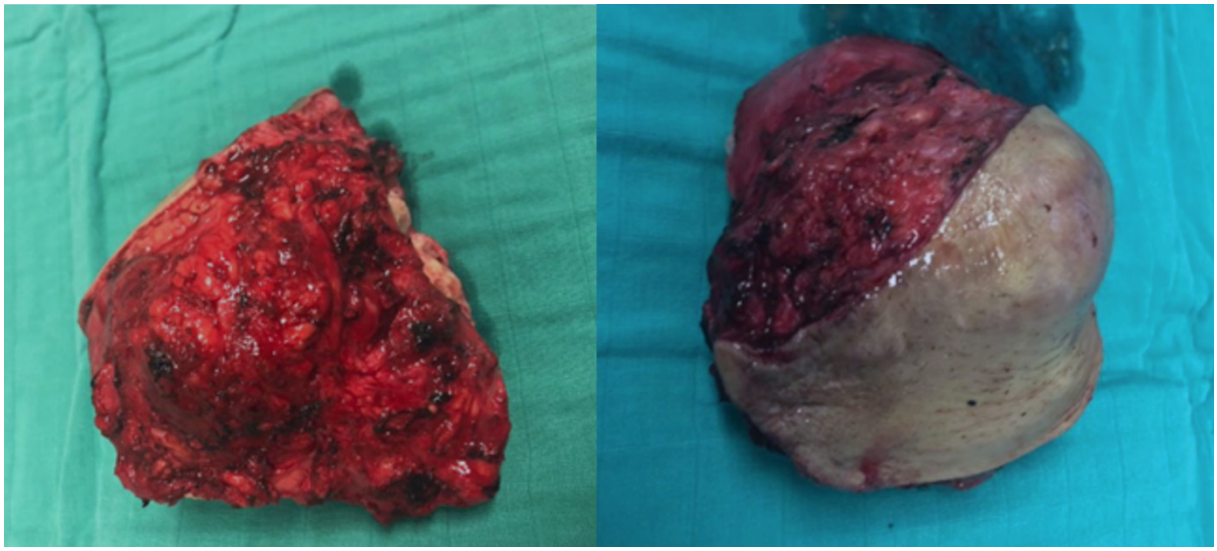

Figure 5. Macroscopic appearance

Surgery for residual masses is an integral part of the management of advanced testicular cancer as part of a concerted multidisciplinary approach [10]. Retroperitoneal dissection of residual masses is one of the major operations in urology that may be associated with other important procedures. Therefore, it is best left to well-equipped centres with a vascular surgeon, a visceral surgeon and a urologist.

We performed the standard lymphadenectomy because the quality of the excision will determine the prognosis. The modified lymphadenectomy model preserving the inferior mesenteric plexus is applicable in certain situations, which allows preservation of ejaculation in 90% of cases. However, in our series no patient fulfilled the selection criteria. [11,12]

Indeed, the topography of residual masses in relation to the limits of the modified lymphadenectomy has beeń specified by Wood et al [13]. Residual masses should be within the boundaries of the modified curing. If the residual mass is outside the modified lymphadenectomy limits, bilateral lymphadenectomy should be performed [14].

Given the volume of the tumor, all patients were operated on by laparotomy, which is also the norm in the literature [15].

Pathologically, teratoma contributed to 55.5% of the histological findings, 22.22% of viable tumor associated with fibrosis and teratoma and 11% of fibrosis, and one finding was inconclusive. Our results corroborate the conclusions found in the literature [16] Improvements in chemotherapy techniques have led to a lower incidence of viable germ cell tumors and more fibrosis and necrosis, while no significant change in the teratoma rate has been noted [17].

According to Djaladat et al. additional surgery is required for about 1/3 of patients (in 28/85 patients or 32.94%). The most common adjuvant surgeries were nephrectomy and vascular procedures (29% of the 33% of adjuvant surgeries). They suggested that excellent results with low operative morbidity and mortality would be achieved when experienced surgeons performed such aggressive operations [18].

The main complication was anejaculation in 8 patients (88.8%) and one patient was lost to follow-up. It is encouraging to note that there was no perioperative mortality in our series. Indeed, despite this major surgery, most of the young men were able to tolerate this major surgery.

The follow-up was marked by a retro-hepatic recurrence (Figure 3) in one patient who underwent salvage surgery with the digestive surgeons. Overall, the results of this series are encouraging and lead us to persevere in this direction.

Limitations

Limitations of our study include a small number of patients, the lack of long-term follow-up as one patient was lost to follow-up due to his particular profile (drug addiction) and the absence of a comparative arm.

CONCLUSION

Surgery for residual masses is an essential step in the management of germ cell tumors. Although it is currently possible to propose a modified lymphadenectomy in certain cases, large residual masses always require bilateral lymph dissection where complete removal of the residual masses is crucial, which sometimes requires extensive surgery involving multidisciplinary teams in experienced institutions.

What is already know on this topic

Any residual TGNS mass measuring > 1cm in long axis should be surgically resected after completion of chemotherapy.

The standard territory is bilateral for radical lymphadenectomy. In order to reduce the ejaculatory morbidity of lymph node dissection, a modified territory has been proposed.

The correlation is not systematic between testicular histology and residual mass.

What this study adds

The location of the residual mass was retroperitoneal in 77.7% of cases, there is a case with a supraclavicular location, a fairly rare location. The size was greater than 3 cm in all our patients.

Although it is currently possible to propose a modified lymphadenectomy in certain cases, large residual masses always require bilateral lymph dissection.

The histological results corroborate the conclusions found in the literature.

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