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Original research

Feasibility and safety of conservative surgery for the treatment of spermatic cord leiomyosarcoma

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HIGHLIGHTS

- How to treat surgically spermatic cord leiomyosarcoma.
- European Mulcentric study, 23 patients enrolled.
- Spermatic cord leiomyosarcoma is a rare disease.
- Conservative treatment of spermatic cord leiomyosarcoma is a therapeutic option.

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ABSTRACT

Objectives: To assess the feasibility and the safety of conservative surgery to treat spermatic cord leiomyosarcoma.
Methods: Patients undergoing inguinoscrotal exploration in 10 different Urological Centers with diagnosis of leiomyosarcoma were enrolled. Preoperative evaluation included physical examination, Scrotal US, Abdominal CT and Scrotal MRI in selected cases. Patients underwent organ sparing surgery or orchiectomy in case of intraoperative FSE was positive for a local infiltration. Data collected were: age, presence of infiltration, length of the lesion, number of lesions, definitive histological outcome, pre and postoperative testosterone level. Follow up was performed with abdomen CT scan and scrotal US.
Results: From January 2007 to December 2013, 23 patients (mean age: 64.7 yrs) were diagnosed with spermatic cord leiomyosarcoma. Each patients underwent scrotal US. 10 patients underwent radical orchiectomy and 13 patients underwent conservative surgery. Mean follow up was 36.5 months. 5 patients (21.7%) developed a recurrent disease, 18 patients (78.3%) had a negative follow up (mean time: 40.8 months). Statistical analysis reveals that there is a significant correlation between number of lesions, length of the lesions and recurrent disease.
Conclusions: Spermatic cord leiomyosarcoma is a rare disease. Conservative surgical treatment of spermatic cord leiomyosarcoma is a feasible therapeutic option for small, single and not infiltrating lesion.

1. Introduction

Primary intrascrotal extra testicular tumors are rare (7–10% of all intrascrotal tumors). Leiomyosarcoma is thought to originate

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from the smooth muscle cells of mesenchymal origin in the wall of cremaster muscle and deferential ducts [1–3]. Low grade leiomyosarcomas have a good prognosis, whereas high grade tumors often develop metastases and have a significant tumor-related mortality [4]. Scrotal ultrasound has a key role in the first identification and description of the lesion; the appearance of these lesions is variable and non-specific. With the exception of liposarcoma, none of the others sarcomas can be differentiated from one another radiologically [2,5]. Frozen section examination (FSE) is necessary [6], but a correct diagnosis is difficult for the predominant lipid component of the lesion [2,3]. These masses are often identified only as mesenchymal tumors, without information about malignancy. Therefore the surgeon discovers that it is a leiomyosarcoma only at the time of the definitive histological report. Spermatic cord leiomyosarcoma is a rare entity and there is no international and validated guideline about its surgical management. Usually intrascrotal extra testicular masses are treated as high grade testicular tumors and a radical inguinal orchiectomy with high ligation of the spermatic cord is performed [1]. However the testicular and scrotal conservative surgery is of great interest in current literature [7,8]. Current literature offers only case reports and literature reviews [9–15]. Purpose of the study is to assess the feasibility and the safety of conservative surgery to treat spermatic cord leiomyosarcoma and to define preoperative criteria to go for a conservative surgery in patients with the evidence of localized disease.

2. Methods

Patients who underwent inguinoscrotal exploration in 10 different European Academic Medical Centers with definitive diagnosis of leiomyosarcoma as postoperative histological outcome were prospectively enrolled. This prospective study got the approval of the Ethical Committees of the different Centers. Central review of the histology was done by a senior pathologist to ensure the definitive diagnosis. Preoperative evaluation included physical examination, Chest X-ray, serum tumor markers (alpha fetoprotein, beta human subunit of chorionic gonadotropin, lactate dehydrogenase), testosterone level, Scrotal US, Abdominal CT scan and Scrotal MRI only in centers where this test was feasible. Patients were informed about the planned surgical procedure and signed a consent form. The procedure was performed by the same Surgeon for each participating center. The Surgeon identified for each center is a Consultant Urologist with particular expertise in testicular malignancy and in testicular sparing surgery. Each patients underwent an inguinal access to the testis. Once the spermatic cord was identified it was clamped to enable the Surgeon to safely manipulate the spermatic cord and the neoplastic lesion(s). Once the lesion was about to be excised a separate FSE of the spermatic cord lesion margins, whose length was 5 mm, was performed. In case of FSE was positive for a local infiltration an orchifuniculectomy with an high ligation of the spermatic cord was performed. If no infiltration was detected an organ sparing surgery (OSS) was the treatment of choice. Local infiltration was assessed during the FSE looking at the section margins separetly excised and at margins of the lesion excised. Data collected in the two groups were: age, presence of infiltration, length of the lesion, number of lesions, definitive histological outcome, pre and postoperative testosterone level at 6 months. Follow up was performed with abdomen CT scan to assess nodal involvement and scrotal US to assess local recurrence every 3 months for the first 12 months and then every 6 months. Data were summarized using descriptive statistics. Uni/multivariate logistic regression models were used to describe the probability of recurrence as a function of the following variables: patient's age, presence of infiltration, length of the lesion, number of lesions, and definitive histological outcome. A Wald Chi square test was used to assess p value.

3. Results

23 patients were enrolled in 10 Urological Division in the period between January 2007 and December 2013. Each patient had a confirmed postoperative histology report of a Leiomyosarcoma. Enrolled patients mean age is 64.7 years (SD 5.9) (Table 1). The two groups considered (OSS vs Radical Orchiectomy) appeared homogenous from a demographic point of view as the mean age is 62.8 years (SD 5.1) for OSS group and 66.1 years (SD 6.7) for Radical Orchiectomy group. Each patient's clinical history was similar as anyone underwent a Urological assessment because of a rapidly growing scrotal mass. In all patients, physical examination reveals the presence of a palpable mass. 5 patients had more than one extra testicular scrotal lesion. 18 patients had a solitary lesion at the scrotal US, 3 patients had two lesions while 2 patients had three lesions. Each patient had a preoperative CT scan which was negative for nodal involvement for any of them. Negative were also the preoperative serum markers in all the patients. 17 patients underwent preoperative scrotal MRI and none of them had a mismatch compared to the scrotal US findings. The mean size of the extra testicular lesion was 17.6 mm (range 8–50 mm. SD 10.4). The bigger ones were found to be in that cases in which there was more than one solitary lesion. 10 patients (43.4%) underwent orchifuniculectomy and 13 patients (56.6%) had an OSS. Table 2 underlines the surgical outcomes. Intraoperative frozen-section results were: 8 malignant tumors, 1 benign tumor and 14 mesenchymal neoplasia. The review of the definitive pathological report confirmed the diagnosis of leiomyosarcoma for all cases. Mean follow up was 36.5 months (SD 25.3). 5 patients (21.7%) developed a local recurrent disease discovered clinically and by scrotal ultrasound. This 5 patients had orchiectomy before and they were surgically re-treated for the local recurrence and then sent for oncological referral. 18 patients (78.3%) had no recurrence during their follow up period (mean time 38.3 months). None of the 13 patients treated with OSS relapsed or died with no evidence of local recurrent disease. Statistical analysis reveals that there is a significant correlation between number of lesions, size of the lesions and recurrence (Table 3). There is a significant reduction of postoperative testosterone levels in patients treated with radical orchiectomy but no patients reported associated symptoms.

4. Discussion

This series on Spermatic Cord Leiomyosarcoma represents one of the largest available in the Literature and may provide an insight on the clinical behavior of the disease and the efficacy of surgical treatments provided.

Primary intrascrotal extra testicular tumors are rare (7–10% of all intrascrotal tumors). More than 75% of these lesions arise from the spermatic cord. Mesenchymal tumors can be benign or malignant [1–3]. Among the malignant tumors, 20% has a leiomyosarcoma

Table 1
Preoperative patients features.

	Pts charateristics
Number	23
Age yrs (range, SD)	64.7 (56–75, 5.9)
Scrotal US findings	18 singular lesion 3 two lesions 2 three lesions
N° MRI performed (%)	17 (73.9%)
N° positive serum markers	0 (0%)
N° pts with normal preoperative testosterone	21 (91.3%)

Table 2
Surgical outcomes and FU.

	Radical orchiectomy	OSS	Overall
Number (%)	10 (43.4%)	13 (56.6%)	23 (100%)
Infiltration at FSE	yes	no	10 yes, 13 no
N° of lesions	5 pts 1 lesion 3 pts 2 lesions 2 pts 3 lesions	13 pts 1 lesion	18 pts 1 lesion 3 pts 2 lesions 2 pts 3 lesions
Mean lesion size mm. (range, SD)	29.3 (8–50, 14.8)	11.8 (8–15, 2.7)	17.6 (8–50, 10.4)
FSE	6 malignant npl 4 mesenchymal npl	8 malignant npl 4 mesenchymal npl 1 benign npl	14 malignant npl 8 mesenchymal npl 1 benign npl
Follow up moths (range, SD)	34.3 (7–90, 28.1)	38.3 (7–72, 24.0)	36.5 (7–90, 25.3)
N° recurrence (%)	5 (50%)	0 (0%)	5 (21.7%)
N° normal postoperative testosterone (%)	4 (40%)	13 (100%)	17 (73.9%)

Table 3
Correlations in postoperative risk recurrence.

Risk of recurrence	DF	Statistic	p-Value[a]
Age at intervention	1	0.37	0.481
Presence of infiltration	1	2.99	0.258
Lenght of the lesion	1	6.13	**0.049**
Number of the lesions	1	5.80	**0.035**
Definitive histological outcome	1	1.05	0.675

Significance $p < 0.05$ in bold.
[a] Wald Chi-square test.

as histotype. Concerning leiomyosarcoma, the peak is in the sixth and seventh decade [2,3]. While benign lesions may present as slowly enlarging, asymptomatic or mildly uncomfortable masses, malignant tumors are more likely to be symptomatic, large and have a history of rapid growth [4]. In Literature, MRI imaging role is currently not clear and it is usually performed in centers which had a previous experience on testicular tumors.

This series confirms that MRI gave same preoperative information as scrotal US did with a certain lower cost. There were no mismatches between this two tests. The reason could be that as an extra testicular tumor it can be easily diagnosed clinically and imaging is just a confirmation of a clinical evidence [9]. On the other hand CT scan is used to recognize retroperitoneal masses and its role is clear [1].

As Leiomyosarcoma is an extra-testicular tumor no patients had an alteration in preoperative serum markers and no alteration on preoperative Testosterone level could be seen [9,10].

After the identification of a scrotal mass, inguinoscrotal exploration with FSE is mandatory [6]. Despite this, a prompt and a correct diagnosis in this cases is difficult for the predominant lipid component of the lesion [4]. These masses are often identified only as mesenchymal tumors, without any information about malignancy. Conservative treatments for Leiomyosarcoma in extra-Urological field are reported in Literature but indications remain controversial [1]. Radical orchiectomy still play an important role in the current surgical approach whereas psychological, esthetic, hormonal, and reproductive issues are arising in patients. This is why testicular and scrotal sparing surgery is currently of great interest [7,8]. There are no guidelines about the surgical management of spermatic cord leiomyosarcoma and in Literature there are only case reports and reviews [9–15]. Case reports patients' mean age is quite similar to the current series.

Lesions size varied from 8 to 50 mm but the mean value of the lesions in patients that underwent OSS is 11.8 mm while mean size in patients treated with radical orchiectomy is 29.3 mm (Table 2). This leads to think that a smaller lesion has a minor risk of infiltrative disease and could be safely treated with OSS.

Statistical analysis revealed that there is a significant correlation between number of lesions their size and risk of recurrence (Table 3). Even if dimension of the lesions does have a correlation with a recurrent disease it is difficult to consider this features as an independent one not related to the infiltrative behavior of the neoplasm. On the other hand we do not find any correlation between infiltrating disease and evidence of recurrence. This can be explained with the small numbers we are dealing with and assuming that the 5 cases of recurrences (who had multiple lesions) could be seen as a non organ-confined diseases different from the other 5 (who had a single lesion) that had infiltration but no recurrence. Actually current Literature on the subject presents just case reports and attached reviews [9–15] and as spermatic cord Leiomyosarcoma is a rare disease there is no orientation in Literature different from orchiectomy as a surgical approach. Nevertheless this series underlines how an OSS can be a feasible option in small, singular non infiltrating lesion. Despite this it is hard to state if it is a pure matter of timing of the surgical approach or an intrinsic feature of the neoplasm that lead to a good or a poor outcome.

On the other hand the 5 patients that had a recurrence underwent a previous radical orchiectomy. This could be explained assuming that a multiple infiltrating disease not only cannot be safely treated with OSS but should be regarded as a non-localized disease too who needs further therapeutic approach. The presence of more than one lesion can be seen as a worsening feature of an infiltrating Leiomyosarcoma of the spermatic cord.

A significant reduction of postoperative testosterone levels at 6 months can be seen in patients treated with radical orchiectomy. The same reduction cannot be reported for patients who underwent OSS. This can be regarded as a problem if the population studied would have been younger. In our study testosterone deficiency do not lead to any clinical associated symptoms.

A study limitation is the small number of cases mainly due to the fact that spermatic cord Leiomyosarcoma is a rare disease. Another limitation is the need for a longer follow up not only on OSS group but mainly on patients that had an infiltrating disease to see if the recurrence risk can be affected by other variables. The FSE and the definitive pathological outcome surely play an important role.

5. Conclusions

Spermatic cord leiomyosarcoma is a rare disease. Even if more studies are necessary and longer follow up is needed, conservative surgical treatment of spermatic cord leiomyosarcoma seems to be a feasible therapeutic option for small, single and not infiltrating lesion. Correct preoperative assessment and selection of the patients with physical exam, scrotal US and abdomen CT scan is mandatory.

Ethical approval

ASLMI2 Milan Ref 324/13.
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Guarantor

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