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ScienceDirect

EJSO the Journal of Cancer Surgery

EJSO xx (2017) 1–6 www.ejso.com

Needle tract seeding following core biopsies in retroperitoneal sarcoma

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Accepted 8 June 2017
Available online ■ ■ ■

Abstract

Background: Retroperitoneal tumours often require a preoperative core needle biopsy to establish a histological diagnosis. Literature is scarce regarding the risk of biopsies in retroperitoneal sarcomas, so the aim of this study is to identify the potential risks of core needle biopsies causing needle tract recurrences or local recurrences.

Method: Patients who underwent resection of a primary retroperitoneal sarcoma between 1990 and 2014 were identified from a prospectively maintained database from two tertiary referral centres. Patient demographics, tumour characteristics and biopsy techniques were examined. The primary endpoint was needle tract recurrence and local intra-abdominal recurrence.

Results: 498 patients were included in the analysis. The most common histological subtypes were liposarcoma (66%) and leiomyosarcoma (18%). Of the 498 patients that underwent resection, 255 patients were diagnosed with a preoperative biopsy. Five patients (2%) developed a biopsy site recurrence: 3 patients with leiomyosarcomas and 2 patients with dedifferentiated liposarcomas. All biopsy site recurrences occurred after trans-abdominal biopsies and were not performed with a co-axial technique. There was no significant difference in local recurrence rate between the patients with or without a biopsy (=0.30) or for the biopsy route (trans-abdominal or trans-retroperitoneal ($p = 0.72$)).

Conclusion: The risk of a needle tract metastasis after core needle biopsy for retroperitoneal sarcoma is very low but not zero. The safest method seems a trans-retroperitoneal approach with a co-axial technique. Local recurrence rate is not altered after doing a core needle biopsy.

Keywords: Retroperitoneal; Sarcoma; Biopsy; Tract; Recurrence; Implantation; Seeding

Introduction

Retroperitoneal sarcomas represent 15–20% of all soft tissue sarcomas.[1] However, the list of differential diagnoses of a retroperitoneal mass is long and includes benign tumours such as lipomas or benign peripheral nerve sheath tumour; primary malignant tumours such as sarcomas, lymphoma, adrenal/renal tumours; and metastatic tumours such as carcinoma, melanoma and germ cell tumours. Obtaining a histologic diagnosis via biopsy makes it possible to distinguish benign from malignant lesions, sarcomas from other malignancies and to determine the different histological sarcoma subtypes. Accurate pre-treatment diagnosis of the sarcoma subtype and grade is often pivotal in the management of soft tissue tumours.[2,3] It may influence the decision on the individualised (neo)-adjuvant strategy, and together with imaging determines the surgical extent for each patient. Core needle biopsy is the ideal method of obtaining tissue since it is easy, safe, can be performed under local anaesthesia and provides enough tissue for

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http://dx.doi.org/10.1016/j.ejso.2017.06.009

Please cite this article in press as: Van Houdt WJ, et al., Needle tract seeding following core biopsies in retroperitoneal sarcoma, Eur J Surg Oncol (2017), http://dx.doi.org/10.1016/j.ejso.2017.06.009

morphology, immunohistochemistry and tumour-specific genetic and molecular analysis.[3] Multiple biopsies are often needed to have sufficient histological material. However, a core needle biopsy carries the theoretical risk of tumour seeding along the core biopsy tract that has led some authors to advise against core needle biopsy for retroperitoneal tumours.[4] Although rare, tumour seeding along the core needle biopsy tract has been described in a range of cancers.[5] Literature is scarce regarding the risk in retroperitoneal sarcomas,[6,7] however recently published data is suggesting a 0.37% risk.[8] This data included a retrospective analysis by Wilkinson et al.[9] that did not show any recurrence along the needle tract at time of publication. Following on from this study regarding the safety of core needle biopsies,[9] we investigated the incidence of core needle biopsy (CNB) tract recurrence in retroperitoneal sarcomas in 2 large institutions during a 24-year period.

Methods

Inclusion and non-inclusion criteria

Patients who underwent resection of a primary retroperitoneal sarcoma between 1990 and 2014 were identified from a prospectively maintained database at The Royal Marsden NHS Foundation Trust (RMH), London, United Kingdom, and The Netherlands Cancer Institute (NCI)/Antoni van Leeuwenhoek hospital, Amsterdam, The Netherlands. The diagnosis was made by a specialist sarcoma pathologist. Clinical characteristics were obtained from the database and missing data was retrospectively collected from the patient files. Not included were patients with a follow up of <1 year, benign lesions, recurrent retroperitoneal sarcomas, gastrointestinal stromal tumours, and metastatic retroperitoneal sarcomas. Ethical approval for this study was not required given the retrospective nature of the study.

Patient management

Most patients were followed with 4-month intervals for 2 years after resection of the primary tumour, 6-month intervals for the subsequent 3 years, and then annually thereafter until 10 years post-operatively. Follow-up involved a combination of clinical examination, cross-sectional imaging, and chest radiography to assess for pulmonary metastases.

Study endpoint

The primary endpoint was biopsy site/needle tract recurrence and local recurrence. Recurrence was confirmed radiologically with cross-sectional imaging.

Statistics

Continuous patient and tumour data are presented as median (range). Categorical variables are presented as number and % percent and were compared using Chi square test with the Fisher's exact test when applicable. For time to event data the Kaplan–Meier analysis and the log rank test were used to evaluate a local recurrence rate, which was calculated from the date of surgery to date of death or last follow-up. Patients alive at last follow-up were censored. Time to event was calculated as the interval from treatment to the date of first event (local recurrence, distant recurrence or death without recurrence) or last follow-up. Patients alive without any event at last follow-up were censored. $p < 0{\cdot}050$ was considered significant. All analyses were done using IBM SPSS statistics 24.

Results

Patient and tumour characteristics of all patients

A total of 498 patients underwent resection of a primary retroperitoneal soft tissue tumour. Patient demographics, tumour characteristics, and operative resection outcomes were subdivided into the core needle biopsy (CNB) and non-CNB groups and are shown in Table 1. The most common histological subtype was liposarcoma (66%) and leiomyosarcoma (18%). The non-CNB group consisted mostly of liposarcoma (87.7%). Median follow-up for the whole cohort was 38 months. At last follow-up, 282 patients

Table 1
Patient and tumour characteristics.

Characteristics	No CNB (n = 243)	CNB (n = 255)	All (n = 498)
Age at diagnosis (years)			
Median	62	60	60
Range	16–89	18–87	16–89
Sex, n (%)			
Male	125 (51.4%)	140 (54.9%)	265 (53.2%)
Female	118 (48.6%)	115 (45.1%)	233 (46.8%)
Tumour size (cm)			
Median	27	18	23
Range	3.6–60	3–59	3–60
Tumour grade, n (%)			
G1	93 (38.3%)	39 (15.3%)	132 (26.5%)
G2	91 (37.4%)	104 (40.8%)	195 (39.2%)
G3	43 (17.7%)	91 (35.7%)	134 (26.9%)
Unknown or N/A	16 (6.6%)	21 (8.2%)	37 (7.4%)
Tumour resection, n (%)			
R0/1	218 (89.7%)	240 (94.1%)	458 (92.0%)
R2	25 (10.3%)	15 (5.9%)	40 (8.0%)
Histological diagnosis			
Liposarcoma:			
Well-differentiated LPS	102 (42.0%)	22 (8.6%)	124 (24.9%)
Dedifferentiated LPS	111 (45.7%)	94 (36.9%)	205 (41.2%)
Leiomyosarcoma	14 (5.8%)	75 (29.4%)	89 (17.9%)
Pleomorphic sarcoma	5 (2.1%)	17 (6.7%)	22 (4.4%)
Solitary fibrous tumour	2 (0.8%)	14 (5.5%)	16 (3.2%)
Sarcoma NOS	2 (0.8%)	5 (2.0%)	7 (1.4%)
MPNST	1 (0.4%)	6 (2.4%)	7 (1.4%)
Synovial sarcoma	1 (0.4%)	3 (1.2%)	4 (0.8%)
Other	5 (2.1%)	19 (7.5%)	24 (4.8%)

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