

TUMOR CONTAMINATION IN THE BIOPSY PATH OF PRIMARY MALIGNANT BONE TUMORS

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ABSTRACT

Objective: To study factors possibly associated with tumor contamination in the biopsy path of primary malignant bone tumors. **Method:** Thirty-five patients who underwent surgical treatment with diagnoses of osteosarcoma, Ewing's tumor and chondrosarcoma were studied retrospectively. The sample was analyzed to characterize the biopsy technique used, histological type of the tumor, neoadjuvant chemotherapy used, local recurrences and tumor contamination in the biopsy path. **Results:** Among the 35 patients studied, four cases of contamination occurred (11.43%): one from osteosarcoma, two from Ewing's tumor and one from chondrosarcoma. There was no association between the type of tumor and presence of tumor contamination in the biopsy path ($p = 0.65$). There was also no association between the presence of tumor con-

tamination and the biopsy technique ($p = 0.06$). On the other hand, there were associations between the presence of tumor contamination and local recurrence ($p = 0.01$) and between tumor contamination and absence of neoadjuvant chemotherapy ($p = 0.02$). **Conclusion:** Tumor contamination in the biopsy path of primary malignant bone tumors was associated with local recurrence. On the other hand, the histological type of the tumor and the type of biopsy did not have an influence on tumor contamination. Neoadjuvant chemotherapy had a protective effect against this complication. Despite these findings, tumor contamination is a complication that should always be taken into consideration, and removal of the biopsy path is recommended in tumor resection surgery.

Keywords – Neoplasm Seeding; Biopsy; Sarcoma; Bone Neoplasms; Neoplasm Recurrence, Local; Musculoskeletal System

INTRODUCTION

Malignant tumors of the musculoskeletal system are relatively rare forms of neoplasia, representing only 0.2% of all new cases of cancer⁽¹⁾. Approximately 80% of them originate from soft tissues, and the remainder originate in bone tissue. On the other hand, they represent a group of very important diseases, given the morbidity and mortality that they cause and their particular incidence among young patients, which gives rise to great impairment to the lives of the individuals affected⁽²⁻⁵⁾.

Dealing with these tumors requires integration of clinical, laboratory, radiographic and histological cha-

racteristics in order to achieve a precise diagnosis and management leading to successful treatment. In this respect, biopsy can be highlighted as a fundamental step in dealing with tumors of the musculoskeletal system, and it is indispensable for achieving a definitive diagnosis and for identifying the histological pattern of the tumor^(4,6,7). Biopsies should provide sufficient representative tissue sample for a precise diagnosis, but without excessively manipulating the lesion, so as to avoid modifying the tumor's relationship with the anatomical compartments and contaminating the neighboring tissues with tumor cells⁽⁷⁾.

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Many surgeons with experience in treating musculoskeletal tumors advocate removal of the biopsy path at the time of surgically resecting the tumor, taking the view that this path is potentially contaminated by tumor cells^(5,6,8-18). However, no basis for this practice has been found in any scientific studies, and it is based more on personal experience than on the current literature. Even so, many issues are covered in a wide variety of studies, and untested hypotheses have arisen. Among these, there is a hypothesis that attempts to obtain several tissue samples in biopsies are associated with greater dissemination and consequently greater likelihood of contamination of the biopsy path⁽¹¹⁾. Another hypothesis that has been published is that biopsies performed using a percutaneous technique are associated with less contamination of the biopsy path because they involve less manipulation of the tumor tissue^(8,11,19-21). It has also been observed that contamination of the biopsy path occurs more frequently in cases of soft-tissue sarcoma than in bone and cartilage lesions⁽¹⁷⁾. It is also believed that implementing neoadjuvant chemotherapy has a protective effect with regard to controlling tumor infiltration at the biopsy site^(20,22) and that this contamination has a negative value in the prognosis for affected patients⁽²³⁾.

In the literature, there is a lack of detailed studies on biopsy paths in cases of musculoskeletal tumors^(17,20,21). Knowledge of the characteristics of contamination of biopsy paths within orthopedic oncology may provide important support for improving biopsy techniques and for following up patients affected by these tumors.

The aim of the present study was to study the factors possibly associated with tumor contamination of the biopsy path in cases of primary malignant bone tumors.

METHODS

A retrospective study was conducted on the medical files of all patients who underwent surgical treatment with a diagnosis of osteosarcoma, Ewing's tumor or chondrosarcoma at Hospital das Clínicas, Federal University of Pernambuco (HC-UFPE), between June 2005 and July 2011. The analysis was conducted independently of gender and age, biopsy technique used (whether open or percutaneous), ins-

titution (whether at HC-UFPE or elsewhere), team performing the biopsy and whether neoadjuvant chemotherapy was administered. The following patients were excluded: those whose biopsy path was not removed during the operation to resect the tumor; those whose biopsy path had not been examined from an anatomopathological point of view to define whether tumor cell contamination was present or absent; and those whose records did not present complete data for the required analyses.

At HC-UFPE, whenever possible, it is preferred to perform biopsies by means of the percutaneous technique, except in cases in which there is a risk of injury to prime structures, or in some cases of repetition of the biopsy because the previous examination was inconclusive. In addition, biopsies are performed by the same team that will perform the surgical treatment of the lesion. With regard to the biopsy path, it is routinely removed at the time of tumor resection surgery. To study the path, after this has been collected from the surgical specimen, the normal histological technique is used: fixing in 10% formol, dehydration in a series of alcohols, diaphanization, impregnation and embedding in paraffin, sectioning using a microtome and staining with hematoxylin and eosin); followed by analysis under an optical microscope to identify the presence or absence of tumor cells in the sample, which defines the presence or absence of tumor contamination, respectively.

All the patients in this study were operated by the same surgeon, who was one of the authors of this study (PMAL), and the anatomopathological evaluations were performed by the same pathologist, who was also one of the authors of this study (RJVM). Some of the patients evaluated came with biopsies already performed at another clinic, and this variable was not controlled for in this study.

It was observed that a total of 46 patients underwent surgical treatment with the abovementioned diagnoses during the study period. Of these, 11 were excluded because their data were incomplete, thereby impeding analysis. Thus the sample available for this study comprised 35 patients, of which 19 were female and 16 were male, with a mean age of 30.7 years (ranging from eight to 77 years).

The sample was analyzed to characterize the biopsy technique used (open or percutaneous), histological type of tumor (osteosarcoma, Ewing's tumor or

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