

Is Needle Biopsy Clinically Useful In Pre-Operative Grading Of Central Chondrosarcoma Of Pelvis And Long Bones?

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Background

Central chondrosarcoma of bone is graded on a scale of 1 to 3 according to histological criteria. Clinically, these tumors can be divided into low-grade (grade 1) and high-grade (grade 2, grade 3 and dedifferentiated). While en bloc resection has been the most widely used treatment, it has become widely accepted that, in selected patients with low-grade chondrosarcomas of long bones, curettage is safe and effective. This approach requires an accurate pre-operative grading in order to avoid under or overtreatment. In our clinical practice we have noticed some differences in pre-operative grading accuracy between chondrosarcomas located in the pelvis and the ones located in long bones.

Purpose/questions:

The aim of this study was to determine the clinical usefulness of needle biopsy in pre-operative grading of pelvic and long bones chondrosarcomas. To evaluate the biopsy accuracy we purposed to answer the following questions:

Is image-guided needle pre-operative biopsy an accurate method to determine the histological grade of central chondrosarcomas of the pelvis?

Is image-guided needle pre-operative biopsy an accurate method to determine the histological grade of central chondrosarcomas of long bones?

Is image-guided needle pre-operative biopsy an accurate method to differentiate low-grade and high-grade central chondrosarcomas of the pelvis?

Is image-guided needle pre-operative biopsy an accurate method to differentiate low-grade and high-grade central chondrosarcomas of long bones?

Methods

We retrospectively reviewed the records of 39 patients with central chondrosarcoma of the pelvis and 40 patients with central chondrosarcoma of a long bone, who had been treated at our institution between 1997 and 2014. Cases, in which information regarding pre-operative and post-operative tumor grading was available, were retrieved from the files of our institution. To evaluate the needle

biopsy accuracy we compared the histological tumor grade, obtained from the preoperative biopsy, with the final histological grade obtained from the postoperative surgical specimen. Pre-operative grading was assessed on a biopsy obtained with a Jamshidi needle, under computed tomography guidance. Post-operative grading was assessed after extensive sampling of surgical specimens. A univariate analysis was performed to determine the differences in histological accuracy between pelvic and long bone chondrosarcomas.

Results

In 36% (14 of 39) of pelvic chondrosarcomas the histological grade reported in the pre-operative biopsy was concordant with the final grade obtained from the post-operative specimen. In 83% (33 of 40) of long bone chondrosarcomas the histological grade reported in the pre-operative biopsy was concordant with the final grade obtained from the post-operative specimen. This difference in accuracy rate between tumors of the pelvis and tumors of the long bones was statistically significant ($p=0.000$).

When categorizing the lesions as low-grade or high-grade, in 67% (26 of 39) of pelvic chondrosarcomas the pre-operative biopsy and the surgical specimen reported similar results while, in long bones, concordance was evidenced in 90% (36 of 40) of the cases. This difference was also statistically significant ($p=0.027$).

Conclusions

Image-guided needle biopsy, when performed by a specialist radiologist and evaluated by an experienced bone pathologist, is a useful tool in determining the histological grade of long bone chondrosarcomas allowing to identify true low-grade tumors that may be treated by curettage. In pelvic lesions, histological grade established by needle biopsy should be interpreted with caution.