Core Needle Biopsy of Periacetabular Chondrosarcoma Often Results in Under-Grading but Does Not Change Management by Experienced Orthopaedic Oncologists

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INTRODUCTION:

Chondrosarcoma is a malignant hyaline cartilage neoplasm most commonly diagnosed in adults older than 50 years of age and typically affecting the long bones and pelvis. It represents the most common primary bone tumor affecting the periacetabular region, followed by osteosarcoma and Ewing's sarcoma. Periacetabular tumors are unique in that curative treatment with wide resection is associated with significant patient morbidity. It is also challenging to attain an open biopsy of pelvic chondrosarcoma. Percutaneous biopsy is a more favorable procedure, however limited by its diagnostic capacity and uncertainty around tumor grade or subtype. As a result, a multidisciplinary team is required to evaluate the presentation, imaging, histopathology, and the biopsy to make treatment decisions. This differs from other primary bone tumors which are definitively diagnosed and graded before treatment. While radical resection of these lesions is the curative treatment, there are chondrosarcomas (dedifferentiated and mesenchymal chondrosarcoma) that can be responsive to neoadjuvant chemotherapy. However, with the narrow samples percutaneous biopsies provide, some tumors could be missing treatment opportunities outside of radical resection that are not as morbid. This situation begs the question of what the concordance is on tumor diagnosis based on the preoperative percutaneous biopsy versus the sample after radical resection. To address this, the authors performed a retrospective review of patients with periacetabular cartilaginous tumors at a single institution. The authors aimed to determine whether any changes in diagnosis or grading following resection and complete histopathologic review of the entire lesion would have resulted in any deviations from the executed surgical plan and highlight the presence of overaggressive treatment measures. To the author's best knowledge, this represents the first retrospective review focusing on accuracy of different biopsy methods for cartilaginous tumors about the periacetabular region.

METHODS: This is a retrospective review of patients with periacetabular cartilaginous tumors who were treated between the years 2000 and 2022 at a single institution. All patients included in the analysis underwent surgical resection. The preoperative biopsy and post-surgical resection histological grades were compared. Concordance and treatment implications were evaluated.

RESULTS: Of the 23 preoperative biopsies performed, there were 19 Image Guided Core Needle Biopsies (IGCNB), three Fine Needle Aspirations (FNA), and one open biopsy. There was concordance between preoperative and surgical resection histological grade in only 10 cases using all methods of biopsy (IGCNB, FNA, and open biopsy), giving a (10/23) 43.5% accuracy rate. When considering biopsy techniques individually there was an accuracy rate of 7/19 (36.8%) for IGCNB, 2/3 (66.7%) for FNA, and 1/1 (100%) for open biopsy. In total there were 13 cases of discrepancy between preoperative biopsy and surgical resection regarding histological grade. In 12 cases of discrepancy, surgical resection histology revealed a higher grade than that of preoperative biopsy histology. In one case of discrepancy, preoperative IGCNB biopsy histology revealed a high-grade chondrosarcoma while the surgical resection histology revealed an intermediate-grade. There were no situations in which the plan made based on a preoperative biopsy resulted in an inappropriate treatment decision, even when there was not concordance between preoperative diagnosis and diagnosis after definitive resection.

DISCUSSION AND CONCLUSION: Significant discrepancy in grading was observed with preoperative IGCNB and FNA of periacetabular cartilaginous lesions. However, while 12 out of the 13 discordant cases (92.3%) underestimated the true grade of the tumor, there was no impact on treatment decision making.

Table 1. Concordance of histological grading between pre-operative biopsy and surgical resection pathology.						
	Total Number	Concordant	Discrepant 56.5% (13/23)			
All Methods (IGCNB, FNA, Open)	23	43.5% (10/23)				
IGCNB	19	36.8% (7/19)	63.2% (12/19)			
FNA	3	66.7% (2/3)	33.3% (1/3)			
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Open Biopsy	1	100% (1/1)	0% (0/0)		

Polen	Sex	Apr	Location of Samuel	Keps nebel	Per-operative Napop	Region marries Extraction	Scrape among Salespe	Hard Eliagnesis
	N	66	Astronom	100%	Lew grade	Internalise grade	HEW	Clondrogrome
177		10	Astaloulous	100%	Lew grade	Intermediate greak	1678	Clondrosevens
100		84	Australian	100%	Lewysie	Intermediate grade		Chendrosavena
25	M	56	Acosholostikos	190%	Lew-grade	bromotier-grak	5.98	Cheedrownoma
21	M	39	Armholomipelia	100%	Lew grade	Intermediate grade	HERE	Clondrownens
26	M	55	Acestologicalism	F964.	Lewgrate	Intermediate grade	600	Clondrowners
20		94	Autobalom	10078	Levynde	beamsday-gody		Chondroscome
35	M	100	Acadedon/edison	100%	Lew-grade	Deliterated	MUSEUS Extend	Debthrootand Christmannon
	M	36	Anthibophi	190%	barredin-gabi	bromoter-gody	606	Condonnoma
13	M	86	Annalmination	100%	Internation grain	Intermediate greate	SHEEK	Clemimaruma
22	M	10	Annial advantage	1964.	Interestinia grade	Intermediate greats	100	Clombroarums
34	M	50	Australian (miles	296A	Intermediate grade	betweenheir-grock	100	Cheedronorma
N	M	95	Aconholostikos	100%	Incredim gold	Intermediate grade	HERE	Clondrowness
27		46	Arministrajohis	100%	Increasion grain	Introduction grade	696	Clondrownens
38		79	Antohologiphicilism	100%	Internation grain	Intermediate grade	DRIVEN	Clondroanoma
36	M	10	Autobardise/scheedigh	100%	barredin-yadr	bromedies-gody	HE/SECY Extend	Cheedonaoma
39	M		Acabelos	Open Biopsy	barredon-gade	bromoties-gody		Choedrownoma
5	M	56	Astrobolom/policy more	190%	Incoden gold	High-grade	1678	Condowness
14		26	Astaloslam	10078	Internation grade	High-grade	1676	Chemirosaruma
16	м		Australian/Stem.	100%	Intermediate grade	High-produ	1678	Chandrosecome
23	M	56	Australian/Dan.	100%	Migh-produ	bramedite-pode	THERE'S	Clondovaroma