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NORA'S LESION OF THE HAND IN AN 18-YEAR-OLD: A CASE REPORT HIGHLIGHTING IMAGING AND DIAGNOSTIC CHALLENGE

Radio-Diagnosis

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ABSTRACT

An 18-year-old patient presented with a painless, firm swelling on the dorsum of the right hand. Imaging revealed an exophytic lesion with cortical continuity but no medullary involvement. Diagnosis of benign tumor of chondroid origin was given radiologically.Histopathology confirmed BPOP, showing proliferative cartilage, bone, and spindle cells. The lesion was surgically excised, with no recurrence at follow-up.BPOP should be considered in the differential diagnosis of hand tumors. MRI aids in distinguishing it from malignancies, and complete surgical excision is the treatment of choice.

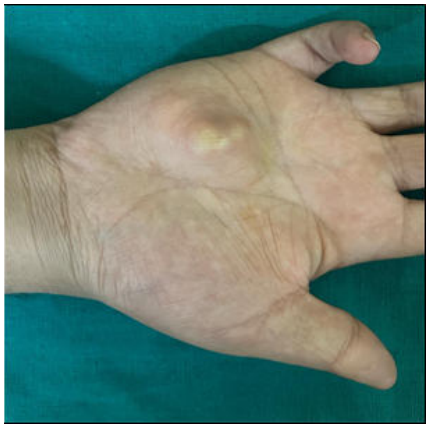
KEYWORDS

BPOP, Nora's lesion, hand tumors, MRI, bone lesions

INTRODUCTION

Benign parosteal osteochondromatous proliferation (BPOP), first described by Nora et al. in 1983, is a rare reactive bone lesion affecting the small bones of the hands and feet. BPOP lacks medullary continuity with the underlying bone, a key distinguishing feature on imaging. The etiology remains unclear, but trauma has been implicated as a potential trigger.

This case report highlights a pediatric presentation of BPOP, detailing the clinical, radiological, and histopathological findings that aided in its diagnosis.



Case Presentation

An 18-year-old male presented to our outpatient clinic with a swelling on the volar aspect of his right hand. The mass had gradually increased in size over time. The swelling was firm, non-tender, and localized between the 4th and 5th metacarpals.Movements of the 5th MCP joint were painful and mildly restricted.

Lab Investigations- severely low vit .D level of 6.4 ng/dL and an elevated CRP level of 211 mg/L, indicating an inflammatory response.

Radiological Findings

1. **X-ray Of Right Hand:** The plain radiograph demonstrated a heterogeneous, calcified lesion located between the 4th and 5th metacarpal bones. (Fig.a)The lesion had an irregular shape and calcified appearance. The lesion was centered on the periosteal surface, adjacent to the bones, without clear involvement of the bone marrow.

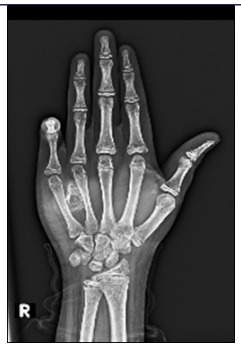


Fig. A

2. **MRI Of The Right Hand:** To further evaluate the lesion, an MRI of the right hand was performed, revealing the following:

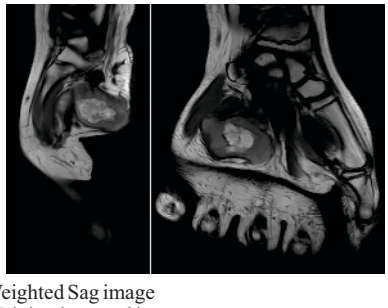


Fig. B T1 Weighted Sag image
Fig. C T1 Weighted coronal image

T1-weighted Imaging: The lesion appeared isointense to muscle, with areas of irregular hyperintensity within it and peripheral hypointensity.

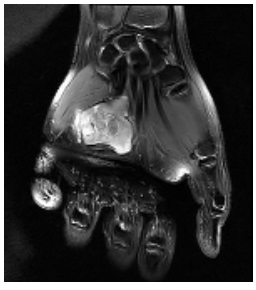


Fig D. T2 W coronal image- The lesion was heterogeneously hyperintense, suggesting mixed bone and soft tissue components.

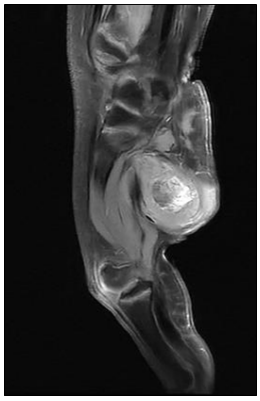


Fig E.T1 W Post contrast image- Peripheral enhancement was noted, indicating increased vascularity at the lesion's borders.

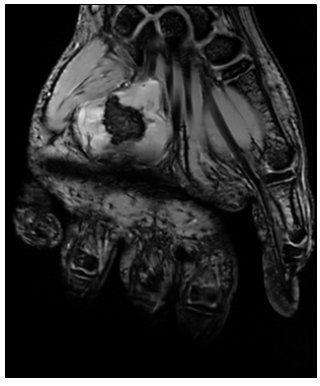


Fig F. GRE sequence image show central area of blooming was observed, indicative of ossified tissue within the lesion.

The lesion abutted and displaced the medial tendons of the flexor digitorum superficialis and flexor digitorum profundus with extension up to the skin and subcutaneous plane. Imaging features suggested the possibility of a benign lesion with bony and cartilaginous components.

Based On Imaging, The Following Differentials Were Considered:

1. Benign parosteal osteochondromatous proliferation (BPOP) – favored due to lack of medullary continuity and well-defined lobulated growth pattern.
2. Osteochondroma – less likely as these typically exhibit medullary continuity with the parent bone.
3. Periosteal chondroma – unlikely due to the more aggressive appearance of the lesion.
4. Parosteal osteosarcoma – excluded based on the lack of aggressive features such as cortical destruction or soft tissue invasion.

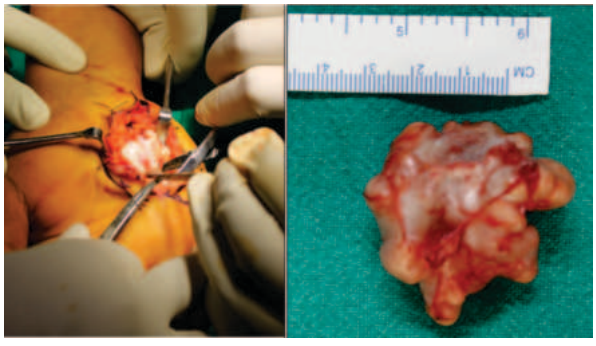


Figure G. Surgically excised specimen

The lesion was surgically excised and sent for histopathological examination.

Microscopically, the lesion exhibited deep mature bone, cartilage, and fibroblastic spindle-cell proliferation, and overlying fibrous tissue characteristic of BPOP.

No cytological atypia or mitotic activity was noted, confirming the benign nature of the lesion.

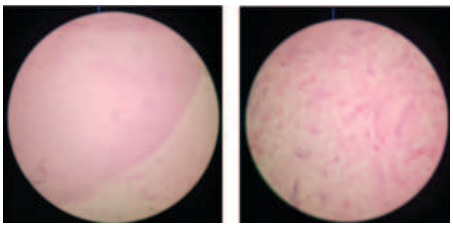


Figure H. Microsopic slide images.

DISCUSSION

Benign Parosteal Osteochondromatous Proliferation (BPOP), also known as Nora's lesion, is a rare, reactive, tumor-like bone lesion first described by Nora et al. in 1983.

Radiologically, BPOP is characterized by an exophytic, well-defined lesion with cortical continuity but no medullary extension. MRI plays a crucial role in differentiating it from more aggressive neoplasms, such as periosteal osteosarcoma and chondrosarcoma. The absence of bone marrow invasion on T1-weighted sequences helps confirm its benign nature. However, as noted by Dhondt et al. (2006),

Histopathologically, BPOP demonstrates a characteristic tri-layered structure consisting of proliferative cartilage, reactive bone, and spindle cell element.

Surgical excision remains the primary treatment modality. However, recurrence rates as high as 50% have been reported, likely due to incomplete excision or persistent reactive changes at the lesion site (Gruber et al., 2008).

A recent update by Dharmshaktu et al. (2022) suggests that recurrence may be linked to an underlying genetic alteration in the USP6 gene.

CONCLUSION

This case highlights the diagnostic challenge of differentiating benign chondroid tumors from BPOP, as both can exhibit overlapping radiological features. Initial imaging suggested a benign chondroid-origin tumor, but histopathology confirmed BPOP, emphasizing the importance of tissue diagnosis in such cases. MRI played a crucial role in assessing cortical continuity and ruling out medullary involvement, guiding appropriate surgical management. Given BPOP's potential for recurrence, careful follow-up is essential.

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