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Case Report

Hamate-pisiform coalition complicated by fracture in a pediatric patient

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ABSTRACT

Coalition of the carpal bones is a relatively uncommon anatomic anomaly. The majority of carpal coalitions occur between the lunate and triquetrum. There are rare reports of coalition involving the hamate and pisiform. We report a case of a previously asymptomatic male who sustained minor trauma and was found to have hamate-pisiform coalition complicated by a minimally displaced pisiform fracture.

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Introduction

Coalition of the carpal bones is an uncommon anatomic anomaly, most often asymptomatic and found incidentally, occurring in approximately 0.1% of the population [1,4]. Carpal coalition is characterized by anomalous osseous or nonosseous union of at least 2 carpal bones [2] and most commonly results from failure of differentiation during the early stages of embryonic development [3,4]. The most common carpal coalition involves the lunate and triquetrum, followed by coalition of the capitate and hamate [4–6].

We present an unusual case of a 13-year-old male with nonosseous coalition of the hamate and pisiform with a trans-

verse fracture through the pisiform portion of the coalition after mild trauma.

Case report

A 13-year-old African-American male, without substantial past medical history, presented to his pediatrician with a few weeks of right wrist pain from doing push-ups. Wrist radiographs performed at that time were interpreted as normal. Three months later, he presented again to his pediatrician with intermittent pain at the same location, palmar ulnar base of hand, this time starting after landing “funny” on a

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Fig. 1 – (a) AP view of the right wrist demonstrates abnormal elongation of the pisiform and the transverse fracture through the mid body of the pisiform. (b) Annotated, coned down view of the right wrist radiograph demonstrates abnormal elongation of the pisiform (dashed yellow line) and the transverse fracture through the mid body of the pisiform (yellow arrow). (Color version of figure is available online.)

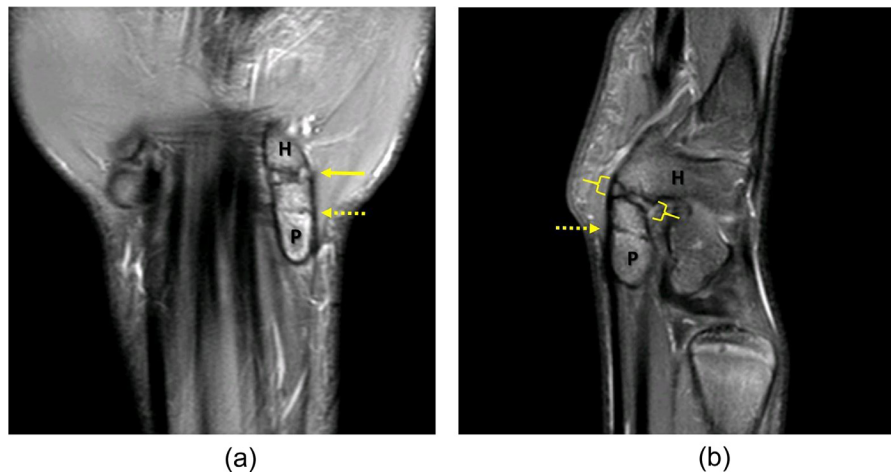


Fig. 2 – (a) Coronal fat-saturated proton density magnetic resonance images demonstrate the fibro-cartilaginous coalition (solid yellow arrow) between the hamate (H) and the pisiform (P), the transverse minimally displaced fracture through the mid body of the pisiform, and the marrow edema involving the hook of the hamate and the pisiform. (b) Sagittal fat-saturated proton density magnetic resonance images demonstrate the fibro-cartilaginous coalition (yellow brackets) between the hamate (H) and the pisiform (P), the transverse minimally displaced fracture through the mid body of the pisiform, and the marrow edema involving the hook of the hamate and the pisiform. (Color version of figure is available online.)

long jump. Hand radiographs at this time were interpreted as normal. He failed conservative treatment with ice and nonsteroidal anti-inflammatories and was referred to a specialist several weeks later. The hand surgeon elicited a history of 4 months of unresolved right wrist pain after performing push-ups. He denied any numbness, tingling, or funny feelings in his right hand. Physical examination demonstrated full active and passive range of motion and pain with ulnar deviation. Irritation to the flexor carpi ulnaris and/or structures surrounding the pisiform was clinically suspected. Right wrist magnetic resonance imaging without contrast was ordered for further characterization.

In retrospect, his initial presentation of right wrist radiographs demonstrates abnormal elongation of the pisiform with a transverse mid-body fracture (Fig. 1). Magnetic resonance images of the right wrist demonstrated a fibro-cartilaginous coalition between the base of the hamate hamulus and the distal margin of a very elongated pisiform. In addition, there was a transverse minimally displaced fracture through the mid body of the pisiform (Fig. 2). Increased signal was present in the hook of the hamate; however, there was no fracture. The flexor carpi ulnaris tendon and insertion were normal. The neurovascular structures were intact, and no other abnormalities noted.

Discussion

Both genetic and acquired etiologies can lead to carpal coalition. Acquired factors are rarely reported in the literature and may result in carpal coalition secondary to metabolic and rheumatologic disorders [4]. Congenital causes are thought to arise secondary to failure of cartilaginous precursors to differentiate during the embryologic period [4]. However, the pisiform and hamate bones are not formed from a cartilaginous joint during development [7–8] and metaplastic conversion of fibrous, cartilaginous, and ligamentous tissue to bone may actually lead to hamate-pisiform (HP) fusion [4,7].

The most common pattern of carpal coalition is lunate-triquetral [4–6]. DeFazio et al. demonstrated that out of 103 cases of carpal coalition, 89% cases were lunate-triquetral, 4% were capitate-hamate, 3% capitate-trapezoid, and 2% scaphoid-lunate [4]. Another study by Pruszczynski of 20,929 pediatric patients demonstrated the LT coalition prevalence at 69% and capitate-hamate coalition at 17% [6].

There have been rare reports of HP coalition. In 1959, Cockshott presented 6 cases of asymptomatic HP coalition originating from the Yoruba tribe in Nigeria [9]. Since then there have been reports of 3 cases of asymptomatic HP coalition and 4 cases of symptomatic HP coalition [8,10]. Three of the symptomatic cases involved people with careers involving repetitive motion (musicians and a factory worker) [11,12], and in one case, HP coalition resulted in median nerve compression [13].

Isolated fractures of the pisiform bone are very rare in the pediatric population [14]. This is an interesting case in that there is a rare complication of a rare coalition type and unfortunately the plain radiograph imaging findings were overlooked twice, leading to a delay in treatment. Just like in the hindfoot, coalitions can be a potential blind spot for radiologists and can be a symptom generator for patients. Presumably, the minimally displaced fracture was stress related secondary to the abnormal prominence of this anatomic variant and its influence on altered mechanics and pressure when performing push-ups. In addition, the marrow edema about the HP synchondrosis could indicate stress reaction of this “joint” from altered mechanics ensuing from repetitive micro-trauma and/or motion in the setting of continued activities from an unrecognized fracture. Once the fracture was identified by MRI, the patient underwent immobilization and the pain improved.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2018.07.032.

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