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Case Report

Fracture of the scapholunate coalition

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1. Introduction

Carpal coalition is a variational anomaly as a cause of the fusion of two or more carpal bones. While its incidence is 0.1% in whites, it rises up to 9.5% in some societies living in the West Africa.^{1,2}

There are two types, which are osseous and non-osseous.³ The carpal bones that form coalition in the osseous type create a single block bone by combining with each other. And in the non-osseous type, bones combine with each other either through cartilage or through fibrous tissue or through both of them. The most frequent type of carpal coalitions is the one that is between the lunatum and triquetrum (lunotriquetral) and it is followed by the coalition between the capitatum and hamatum (capitohamate).^{4,5} The coalition between the

scaphoideum and lunatum (scapholunate) is rare type and it forms approximately 2% of all carpal coalitions.⁴

The carpal coalitions are often asymptomatic and they do not lead to a functional deficit.^{4,6} They rarely may cause pain or may be presented with the fractures after trauma. In this case, clinical and radiological findings of the bilateral scapholunate fusion with fracture are presented which is rarely seen.

2. Case presentation

A 21-year-old white male patient presented to emergency service with post-traumatic pain due to hyperextension of his left wrist (right side dominant hand) while playing football. The patient was an emergency medical technician and there was not any known disease in his medical history. X-ray findings in his emergency service visit show incomplete fusion between scaphoid and lunate bones and the patient was discharged with prescription of analgesic (Fig. 1). As patient's pain continued, he was referred for physical therapy. There was tenderness over the scaphoid bone on his physical examination. His wrist motions were painful, but no swelling and change in skin color. The radial and ulnar pulses were palpable. The patient was referred to MRI due to the possibility of avascular necrosis. MRI findings showed anomaly of the scaphoid and lunate bone. Diffuse edema on the bones neighboring the line that separate these two bones is shown in Fig. 2. Comparative bilateral hand-wrist AP radiograph showing scapholunate complete fusion was observed on the right wrist (Fig. 3). Thus, it was considered that the incomplete fusion appearance on the left belonged to the fracture of the scapholunate bone. Analgesic anti-inflammatory was

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Fig. 1 – The first graphy had been taken unilateral, and the fracture line was evaluated as abnormal intercarpal joint.

prescribed to the patient and his wrist was taken into brace. Fusion was not observed on the fracture line at 6 month control plain graphy (Fig. 4). There was pain with overload his wrist but no pain within rest. There was no restriction with wrist motions. Surgical treatment was suggested for non-union and pain.

3. Discussion

The term “carpal coalition” or “carpal fusion” may be misleading, because the process that actually occurs is incomplete demarcation of cartilaginous precursors rather than the union of two previously distinct structures.¹ There may be variation in the blood supply of the normal scaphoid and lunate bones. Therefore, the blood supply to the scapholunate bone can be established by one or a few small arteries.

Fig. 2 – MRI findings showed anomaly of the scaphoid and lunate bone. Diffuse edema on the bones neighboring the line that separate these two bones.

As carpal coalitions can be seen alone, it can also be observed as a part of other congenital anomalies. Multiple bone fusions may be associated with diseases such as Ellis-van Creveld syndrome, arthrogryposis multiplex, symphalangia, dystrophic dwarfism, and Turner syndrome.⁶ In the absence of findings suggestive of congenital disease in our case, it was considered that the coalition developed as isolated.

Fusion of two carpal bones in the same row is seen typically in the isolated coalitions, while fusion of more than two carpal bones is frequently seen in the syndromic ones.⁶ Our case had the coalition of two bones, one from the proximal and the other from the distal rows. However, in our case, the fused carpal bones were two bones developed consecutively according to the development order of wrist bones. This strengthens the thesis that carpal coalitions arose from the segmentation inefficiency of primitive cartilaginous channels and the lack of joint formation.⁶ Minnaar proposed a four type classification scheme for lunotriquetral coalition based on radiographic assessment.⁸ Type 1 represents as incomplete

Fig. 3 – Comparative bilateral wrist AP radiograph showing scapholunate complete fusion was observed on the right wrist, and the fracture on the left side.

Fig. 4 – Fusion was not observed on the fracture line at 6 month control plain graphy.

fusion with a strong fibro-cartilaginous component, type 2 an incomplete osseous fusion, type 3 a complete osseous fusion, and type 4 a complete osseous fusion associated with other carpal anomalies. Our case was considered as type 3.

Carpal coalitions are asymptomatic in general and they are determined as incidental in radiographies taken with other reasons.⁴ Our patient had applied for trauma. However, as the first graphy had been taken unilateral, the fracture line was evaluated as abnormal intercarpal joint. Comparative hand wrist graphy was taken due to abnormal appearance and determination of edema in scapholunate region on MRI. Due to the scapholunate coalition in the normal side, the appearance on the left side was considered to have combined with fractured scapholunate. Fracture line may be in the position of

the expected joint. In our case, fracture line was not in the position of the expected scapholunate joint, but was located in more distal region. Therefore, non-union and avascular necrosis could be expected in such fracture. In our case, because no fusion was observed on the sixth graphy, non-union is considered to be developed.

It is reported that carpal coalitions created tendency to fractures.⁷ However, fractures could be unnoticed, particularly if they are one-sided and if fusion is not diagnosed previously. Bone marrow edema on MRI seems useful in identifying carpal coalitions.

Conflicts of interest

The authors have none to declare.

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