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Case Report

Conservative Treatment of Scaphoid Nonunion in Children - A Case Report and Review of the Literature

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Abstract

Scaphoid nonunion is an infrequent finding in children. In the absence of treatment guidelines, both surgical and nonsurgical treatments are valid options. We present the case of a 13-year-old boy with an established nonunion of the scaphoid that healed after six months of immobilisation. Subtle bone bridging was detected on a Computed Tomography (CT) scan after 3.5 months, requiring further casting. CT is a valuable tool to detect early callus formation; we advocate its use before abandoning nonsurgical treatment in cases of scaphoid nonunion in children.

Keywords: Children; Nonunion; Scaphoid; Treatment

Introduction

Scaphoid fractures are an infrequent finding in the paediatric population, representing 3% of hand fractures and 0.34% of all fractures [1]. The majority of these fractures occur at the waist of the scaphoid [2]. Nonunion of acute scaphoid fractures treated by immobilisation can develop in rare cases [3]. While surgical treatment via different methods is the standard procedure to achieve consolidation for this condition in adults, controversy exists regarding the treatment of nonunion in children [4].

Case

A 13-year-old boy was examined two weeks after being hit by a ball on the dorsoradial aspect of his left wrist. He reported pain at the anatomical snuff box and during mobilisation of the thumb. Additionally, he reported a possible fall on his left arm one year prior to the injury while playing tennis but without persisting pain. Anteroposterior and lateral radiograms showed a radiolucent line at the scaphoid waist, cystic changes, sclerosis of both fragments of the scaphoid and a densification of the proximal pole of the scaphoid (Figure 1). Magnetic Resonance Imaging (MRI) confirmed vascularisation of the proximal pole of the scaphoid. A diagnosis of retraumatised nonunion of the scaphoid was established. Treatment with a rigid below-elbow arm cast was applied. After 3.5 months, a Computed Tomography (CT) scan showed few bone trabeculae bridging the gap (Figure 2). Immobilisation was continued for another 2.5 months until a CT scan showed progressive filling of the fracture by bridging trabeculae (Figure 2). A thermoplastic splint was applied for another 2 months until radiograms showed complete consolidation (Figure 3). One month later, at 9 months after the diagnosis, the patient was pain free and began playing tennis again. At 14 months, mobility and strength were symmetric, except for a 10° deficit of wrist flexion. No physiotherapy was prescribed.

Figure 1: Established pseudarthrosis of the scaphoid at the first consultation.

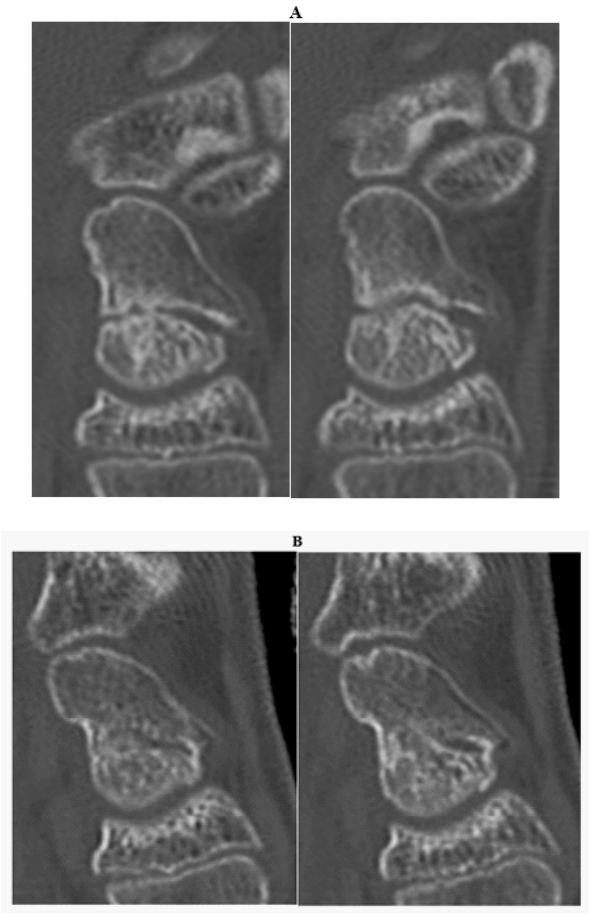

Figure 2: A) CT scan after 3.5 months of immobilisation - detection of early bone bridging. B) CT scan after 6 months of immobilisation - callus formation.

Figure 3: Established consolidation of the scaphoid after eight months.

Discussion

To date, little evidence has been presented for establishing a guideline for treating nonunion of the scaphoid in skeletally immature patients; some authors have recommend surgical treatment [5-12]. Regardless of the surgical technique (bone graft and Kirschner wire fixation, screw fixation or bone graft without osteosynthesis) these authors achieved high rates of consolidation. Chloros [5] reported a series of twelve patients (mean age 13 years) that all consolidated at a mean of 3.4 months after surgery. Other authors favour conservative treatment over surgical treatment [3,13], as stiffness and osteoporosis do not seem to be an issue in the paediatric population [13] and because the healing potential of children is superior to that of adults [7]. Even dorsal intercarpal instability, in the case of scaphoid malunion, may correct spontaneously [14].

Weber [13] reported six children (mean age 12.8 years) with scaphoid nonunion successfully treated with cast immobilisation for a mean period of 5.3 months. Cases of nonunion treated surgically tend to heal faster than conservatively treated cases. In our case, CT was a valuable tool for indicating the first signs of consolidation and thus motivating further immobilisation. CT scans allow more accurate assessment of displacement, deformity, and union and can demonstrate subtle changes in the bony architecture that are not visible on radiographs [15]. Informed consent of the patient and his/her parents is of upmost importance. Even if prolonged immobilisation is a valid treatment option, it might fail and result in surgery, which can be disappointing for the patient. Immediate surgery might result in overtreatment and have potential risks and complications both surgically and anaesthetically. Before suggesting surgery on the basis of plain X-rays after prolonged

immobilisation, we propose that a CT scan should be performed to detect early calcifications.

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