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Case Report

Interest of Modified Sauvé-Kapandji Procedure in Wrist Deformities

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Abstract

Introduction: Wrist deformities are a challenging diagnosis.Through reporting two cases, we analyzed the interest of modified Sauvé-Kapandji procedure in those pathologies.

Observation: The first patient was a boy 15-year-old. He got a modified Sauvé-kapandji procedure for inferior radio-ulnar dislocation. After 9 years at follow up, functional outcome was excellent. The second patient was a girl 13-year-old. She got a modified Sauvé-kapandji procedure for inferior radio-ulnar dislocation due to congenital Madelung deformity.

Discussion: Several procedures were described in management of wrist deformities. We recognized that modified Sauvé-kapandji permitted an ulnar shortening and distal radio-ulnar stabilization.

Conclusion: Sauvé-Kapandji procedure is reliable technique in surgical treatment of inferior radio-ulnar dislocation.

Keywords: *Sauvé-Kapandji, distal radioulnar joint, arthrodesis, surgical technique*

Introduction

Fractures of the inferior radial epiphysis are most common in children [1,2] and the sequelae impair grip strength. Post traumatic radial club hand is one of the rarest complications. Wrist trauma may reveal a pre-existing deformity such as Madelung's deformity. It corresponds to partial antero medial epiphysiodesis of the inferior radial epiphysis, causing spontaneous and progressive palmar subluxation of the wrist. Several surgical techniques have been described previously [1-6]. Through two observations, we detail the interest of the modified Sauvé-Kapandji technique in wrist deformities.

Observations

Observation N°1

This is a 14-year-old teenager, victim of a domestic accident causing physeal fracture of the inferior radial epiphysis. After one year, the evolution was marked by radial club hand following a post-traumatic inferior radial epiphysiodesis (see figures N°1 and N°2). Wrist motion was limited, especially supination (45°). On the radiology, we objectified a shortening of the radius, an epiphysiodesis bridge and a lower dislocation of the distal radio ulnar joint. Faced with the weakness of the grip and the ulno carpal conflict, we opted for the modified Sauvé-Kapandji technique (see figures N°3 and N°4). After six months, the supination was around 80° and the grip strength was satisfactory.

Observation N°2:

This is a 15-year-old young girl, the victim of a domestic accident causing old trauma to her right wrist (see figures N°5 and N°6). On examination, the ulnar head was abnormally prominent in pronation. The grip strength was weak. The wrist deformity was mimiking “baionnette” (see figures N°7 and N°8). This is an old trauma on bilateral deformation of the wrist more accentuated on the right falling within the framework of the deformation of Madelung. Radiologically, the radial glenoid, at the level of the lunar fossa, had a modified orientation: oblique in proximal, palmar and ulnar. The ulnar head is dislocated dorsally. The carpus had an ogival appearance whose apex is the triangular shaped lunate, which is ascended between the radius and the ulna. The ulnar translation index was 20 mm. The lunate coverage ratio was 30%. The radial height was 12 mm. The measurement of the inclination of the lunar dimple was 46°. In front of the embarrassment with the execution of many gestures of the everyday life, we decided to operate. Modified Sauvé-Kapandji technique provided satisfactory clinical and radiological results (see figures N°9 and N°10).

Follow-up was simple. Active prono-supination was normal in two months. The impression of wrist stability is restored, as well as grip strength. Review six months after her operation, the patient used her hand normally in the gestures of everyday life; strength was relatively satisfactory; it only signals a certain pain to fatigue.

Figure 1&2: *Inferior islocation of radio-ulnar joint*

Figure 3&4: *Modified Sauvé-Kapandji procedure*

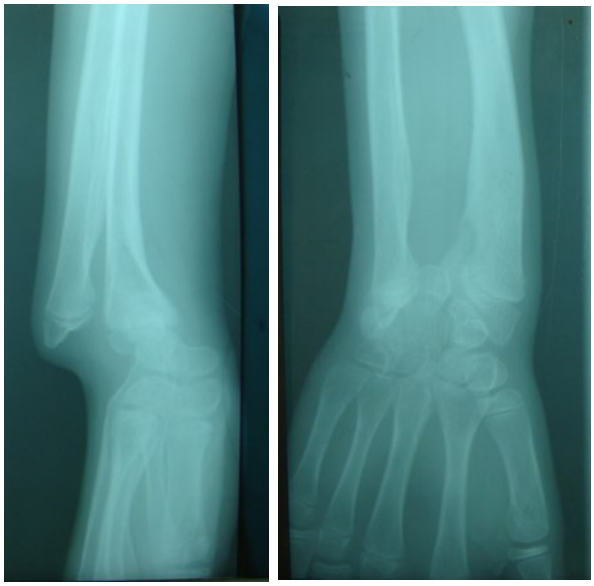

Figure 5&6: *Radiological aspect of Madelung deformity*

Figure 7&8: *Wrist deformity in « baïonnette ».*

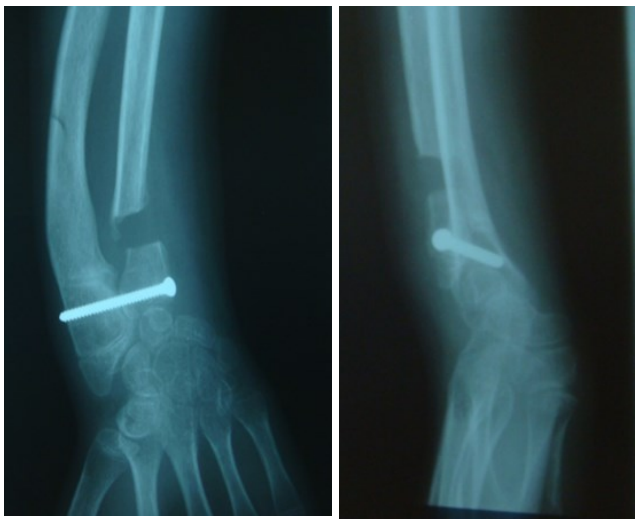

Figure 9&10: *Post operative result of Modified Sauvé-Kapandji procedure.*

Discussion

Several procedures have been described for distal radio ulnar joint dislocations [11]. According to several authors, the shortening of the ulna makes it possible to correct the ulno-carpal syndrome. However, the Sauvé-Kapandji technique [1,3,4] applies when the dislocation of the distal radio-ulnar joint is added to an inequality of the two bones of the forearm, by relative ascent of the radial epiphysis. Indeed, if during the epiphysiodesis of the inferior radial epiphysis, the ulnar head is located below the sigmoid cavity of the radius, the operation must necessarily include a raising of the ulnar head in the sigmoid cavity, in order to to restore a neutral or positive radio-ulnar index. It underwent some modifications, namely resection of the ulnar diaphysis in two stages, section of the internal lateral ligament of the radiocarpal joint, suturing of the pronator quadratus muscle at the arthrodesis site and tenodesis of the extensor carpi [1]. . The grip is found to be excellent in both cases after six months. According to Zimmermann et al [2], 5% of patients had carpal ulnar translation. This complication is explained by the ogival aspect of the distal radial epiphysis. Inferior dislocation of the distal radioulnar joint is a very rare complication [1] of wrist trauma in children. Few such cases have been published [1]. Indeed, Kapandji reports the case of a patient in 1996 presenting to describe an epiphysiodesis of the lower end of the radius with inequality of the two upper limbs [1]. Our first case resembles him in the evolutionary circumstances but it does not exist a significant difference in the inequality of the 2 upper limbs [1].

According to Flatt and colleagues [2,8], Madelung's deformity is rare and represents 1.7% of congenital pathologies. It can be isolated or integrated into a polymalformative syndrome such as Turner syndrome. Diagnosis of Madelung deformity is difficult in some cases, surgical proposals to improve aesthetics and function are numerous and difficult to assess [1].

Darrach procedure [5] has the double disadvantage of favoring ulnar deviation of the carpus and reducing grip strength. If it can be considered in the stiffness of the prono-supination during malunion of the radius, its indication is illogical in the instabilities of the distal radio-ulniare joint. In Madelung deformity, the goal of the wedge-shaped reversal osteotomy is to model the dysplastic distal radius [6,8]. Wrist pain on exertion disappears in one to six months. Those that are triggered by lifting a load with the hand in supination take the longest to disappear [5]. In a study conducted by Lluch et al, 44 wrist instabilities and 3 Madelung deformities were operated on [4]. With an average follow-up of 3 years, Sanders et al. [7] show excellent results in six cases and good results in 3 cases, with pain on exertion. Taleisnik [7] noted the absence of pain in 11 out of 17 operated on, and pain on exertion in five patients. A patient has constant pain. In all cases, wrist strength was improved. Instability was observed in two cases.

There is an ulnar carpal translation in Madelung deformities [5, 8]. Indeed, the modified Sauvé-Kapandji technique stabilizes the distal radi oulnar joint and does not modify the distal radial epiphysis [8]. It improves the coverage of the semi lunar. Prono supination was improved in 46% of cases [11]. According to De Smet, it is recommended to combine the two techniques in severe forms of Madelung [9]. Some complications are secondary to the technique itself. Pseudarthrosis in the arthrodesis site is a frequent possibility [4]. Some authors recommend combining tenodesis of the flexor carpi ulnaris or the extensor carpi ulnaris [2,4]. In a study conducted by Angelini [10], 93% of patients were aesthetically and functionally satisfied.

Conclusion

Wrist deformities caused by partial or complete epiphysiodeses of the inferior radial epiphysis lead to dislocations of the distal radio ulnar joint. A post traumatic radial club hand is a currently rare etiology and may result in an inferior form of the dislocation. Madelung deformity results in dorsal dislocation. The treatment chosen, the modified Sauvé-Kapandji technique, allows this hand to be realigned while maintaining normal stability and function [1,10].

Conflict of Interest

The authors declare no conflict of interest.

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