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Research Article

The Surgical Closure of Neglected Ulnar Deficiency of the Hand; Unclassified Phenomenon "Ulnar Cleft Hand"

Tolgay Şatana*

Orthopedics and Trauma, Istanbul, Turkey

***Corresponding Author:** Tolgay Şatana, Orthopedics and Trauma, Istanbul, Turkey.

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Abstract

Cleft hand classified as central deficiencies of the hand.

We present a patient who had cleft hand between the fourth and fifth ray at ulnar side which was not be classified in current classification of congenital hand deformities neither in central cleft hand anomalies nor ulnar deficiencies. Eventually we defined it as ulnar cleft hand.

Twenty-six years old man examination revealed fifth ray of the hand was divided from carpometacarpal joint to ulnar sides about forty-five degrees. The fifth fingers rotated to dorsoradial from Metacarpophalengeal joint about ninety degrees. Little finger was hypoplastic and hypotenar side of the hand completely divided therefore the palm was narrow and shallow. Range of motion of distal and proximal interphalangeal joint was limited by ankylosis.

The aims of the surgery are to improve grasping function, to keep the palmar continuity and obtain acceptable cosmesis.

The cleft closure was performed with volar and dorsal skin flaps. Fifth metacarp released from flexor carpi ulnaris tendon, capsule and muscles. FCU was transferred distal of ulnar carpal bone, which seemed triquetro-hamate coalition bone.

We defined this deformity as ulnar cleft hand.

It is indisputable that treatment of congenital deformities before development ends will provide acceptable and more successful outcomes. At older ages, treatment of such rare hand deformities should be planned in stages with functional outcomes in mind according to patient's needs while cosmetic appearance should be tackled at the second stage.

Keywords: Clefthand; Carpal Coalition; Bardimetacarpi; Ulnar Cleft Hand

Introduction

Ulnar and central deficiencies of the hand are one of the least common congenital hand anomalies. They are commonly associated with Carpal coalitions [1-12]. We present a patient who had cleft hand between the fourth and fifth ray at ulnar side which was not be classified in current classification of congenital hand deformities neither in central cleft hand anomalies nor ulnar deficiencies. Eventually we defined it as ulnar cleft hand.

Material and Methods

Twenty-six years old man presented to outpatient clinic during his military service. His complaint was cosmetic deformity of left hand as well as inefficient grasping with his left hand. Past medical history of the patient was unremarkable. Local examination revealed fifth ray of the hand was divided from carpometacarpal joint to ulnar sides about forty-five degrees. The fifth fingers rotated to dorsoradial from Metacarpophalengeal joint about

ninety degrees. Little finger was hypoplastic and hypotenar side of the hand completely divided therefore the palm was narrow and shallow. Range of motion of distal and proximal interphalangeal joint was limited by ankylosis. Metacarpophalengeal joint movement was not functional because of flexor contracture. X-ray showed bradimetacarpy and carpal coalition. Other digits were normal. There was no associated musculoskeletal system anomaly except carpal coalition.

The aims of the surgery are to improve grasping function, to keep the palmar continuity and obtain acceptable cosmesis.

The cleft closure was performed with volar and dorsal skin flaps. Fifth metacarp released from flexor carpi ulnaris tendon, capsule and muscles. FCU was transferred distal of ulnar carpal bone, which seemed triquetro-hamate coalition bone. The basis of fifth metacarp was transposed nearly original place on triquetro-hamate coalition and fixed with a Kirschner wire. An autograph was performed for fifth carpo-metacarpal arthrodesis.

A long arm cast was applied after the surgery, which changed to a short arm, four weeks later. The wire and cast were removed eight weeks after the surgery when the bone healing was complete.

Results

The fifth digit in the left hand of our twenty-six year old male patient was angulated laterally on the ulnar side at ninety degree from the carpometacarpal joint. As a result of the deformity, the integrity of the palmar arch was impaired and his grip was difficult. He didn't have a family history and any characteristics in his history. During the local examination, the fifth digit was detached from the carpometacarpal joint and slightly deviated to the palmar arch ulnolaterally at an angle of ninety degrees. Movements in the distal interphalangeal joint was ankylosed, proximal interphalangeal and metacarpophalangeal joints were fount to be almost complete. Flexor and extensor mechanisms were working while there was no controlled movement doe to the lack of interosseos and lumbrical muscle functions. The little finger was hypoplastic and 17 mm shorter than the contralateral one. The integrity of the palmar arch was achieved through the thenar eminence while grip was achieved on the thenar eminence. Hypothenar eminence was completely detached. The radiological examination revealed bradymetacarpia and carpal coalitions.

Two-staged surgery was planned for the deformity. At the first stage of the surgical treatment, the integrity of the palmar arch would be restored and grip strength would be increased while at the second stage bradymetacarpia would be elongated to have a more valid cosmetic appearance. At the first stage, the fifth digit was exposed with appropriately prepared volar and dorsal flaps from the carpometacarpal level. Flexor and extensor carpi ulnaris was cut from the attachment point. The capsule and soft tissues were liberated. The proximal relation between the fifth metacarpus and fourth metacarpus was established. As the ulnar side did not have sufficient carpal support, arthrodesis was performed for 4-5 metacarpi and attached carpal bones (triquetrohamat) with tricortical graft harvested from the iliac wing. Then tenodesis was performed for flexor carpi ulnaris and extensor carpi ulnaris towards the distal end as much as possible. Lumbrical and interosseos muscles were ligated to the palmar fascia. The integrity of the palmar arch was restored by closing the flaps. Long arm was fixed with a splint for three weeks and short arm was fixed with a splint for six weeks. Movement was initiated. At month three, K wire was removed. At month six, the fifth carpometacarpal arthrodesis was observed to be successful but movement limitation developed in the PIP joint, which was associated with short extensor tendor. At month twelve, flexion limitation of the PIP joint went down to an acceptable level but ulnar subluxation could not be prevented. Elongation was planned for bradymetacarpia. Elongation was not performed because the patient was observed to have hand functions which would be sufficient for him to practice his profession as a teacher at the first year.

Grasping function of hand is allowed palmar continuity. Palmar continuity is one of the important things for grasping function. After the procedure we had obtained palmar continuity and improved of grasping function of hand. Although has been provided acceptable cosmesis, little finger had not functional benefit after operation. It would be more successful if the treatment had been performed during childhood.

During the control follow-up at the third year, the treatment was considered to be sufficient in terms of patient satisfaction and function.

Discussion

S C Sandzén Jr made classification of the central defect of hand three general catacogories: Type I (typical), Type II (atypical), and Type III (two, three, and four digit hand) in order that with central metacarpal deficiencies or absent. Our case almost similar Type II but more severe ulnar tear deficiencies than described [1].

Ogino defined felp techniques to closure of defect useful for transfer columns to provide continuity palmar and dorsal face [6]. Also mention that teratogenic effect of Busulfan in rats possible to lead hand deficiencies. Upton defined variation of abnormal tendon structures, we transferred extensor wrist tendons extensor carpi ulnas to fusion site. Buss., *et al*. reported, concomittant preaxial anomalies over %50 significant, also genitourinary problems around %10 [15]. Vogels reported chromosomal unique anomalia with thrombocytopenia monozomi 21 [16], Miiura, Duran., *et al*. rand many author eported genetic disorders with cleft hand [17-22].

Since our case had an ulnar cleft hand, we applied a different intervention than the central cleft hand. Unlike the classical approach [23-27] due to the shifting of the ulnar row to ulnar side, we performed additional tenotomies and carpal fusion while centralizing the ulnar row.

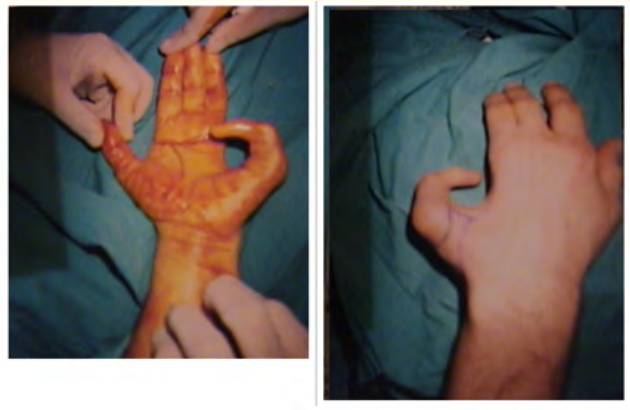

Figure 1: 12 years follow up Xray carbo-metacarpal fusion.

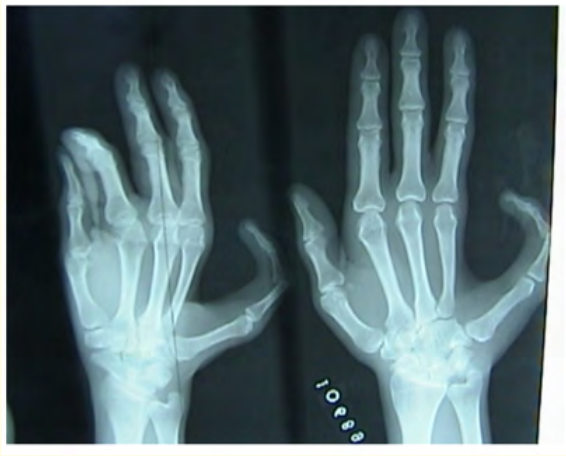

Figure 2: Preoperative Xray Oblique/AP.

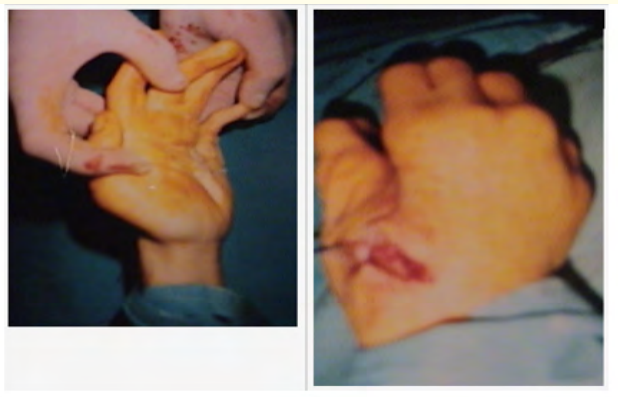

Figure 3: 12 years follow up Xray carbo-metacarpal fusion.

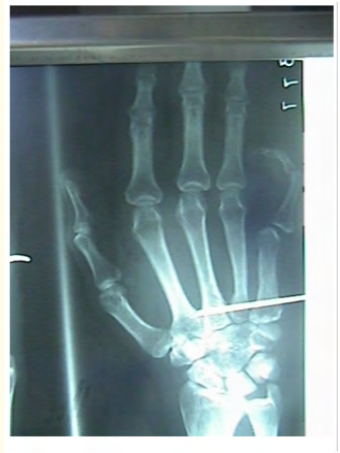

Figure 4: 12 years follow up Xray carbo-metacarpal fusion.

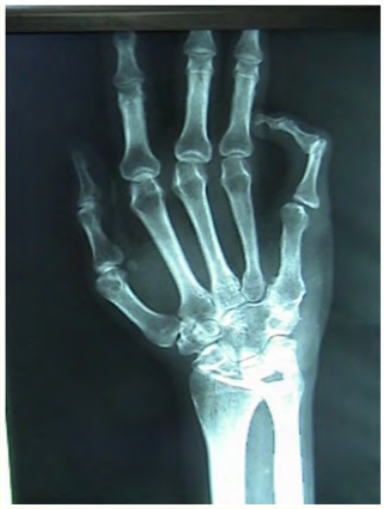

Figure 5: 12 years follow up Xray carbo-metacarpal fusion.

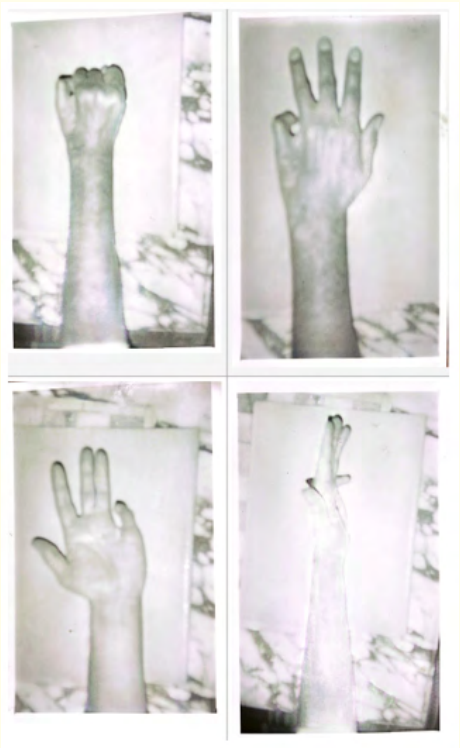

Figure 6: 12 years follow up Xray carbo-metacarpal fusion.

Conclusion

Developmental deformities of the ulnar side of the hand are the rarest conditions of hand anomalies. They are often concomitant with carpal coalition. In our patient, we found cleft hand in the fifth and fourth digits which extended to the ulnar hypothenar region and was not defined among the cleft hand and ulnar developmental deformities in the current classifications. We defined this deformity as ulnar cleft hand.

It is indisputable that treatment of congenital deformities before development ends will provide acceptable and more successful outcomes. At older ages, treatment of such rare hand deformities should be planned in stages with functional outcomes in mind according to patient's needs while cosmetic appearance should be tackled at the second stage.

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