ORIGINAL RESEARCH PAPER

Surgery

KEY WORDS: Clinodactyly, C shaped epiphysis, Reverse wedge osteotomy,

CASE REPORT: RARE CASE OF NEGLECTED CLINODACTYLY: MANAGED SATISFACTORILY WITH REVERSE WEDGE OSTEOTOMY

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ABSTRACT

Clinodactyly is defined as curvature of a digit in a radioulnar plane. We present a rare case of Clinodactyly of Index finger and little finger in Right hand of 18 years old boy. This was a neglected case with radial angulation of 35^0 at proximal phalanx level in Index finger and 10^0 radial angulation at middle phalanx level in little finger. He had gross functional limitations in Right hand like inabilty to hold a pen, eat food and weak grip. Since surgery was not performed at prescribed age of 5-6 years of age, he had developed negative personality traits socially with low self esteem. Reverse wedge osteotomy and fixation with two hole plate corrected the deformity satisfactorily. Patient regained his self esteem and also started writing with his right hand. Findings of comparison of childhood X rays with adult X rays could be used for counselling of patients in future.

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INTRODUCTION

Clinodactyly is defined as curvature of a digit in a radioulnar plane. The most common form is radial deviation of the little finger at the distal interphalangeal (DIP) joint. It occurs as a result of the presence of a *delta phalanx*, a trapezoid shaped middle phalanx resulting from an abnormal epiphysis. Clinodactyly rarely interferes with function, and treatment is not indicated for aesthetic reasons. In cases of severe angulation with functional problems, a wedge osteotomy can be performed to correct the deformity, but not before 5 to 6 years of age, when the bones are reasonable in size.[1]

The aim of reporting this case was firstly that clinodactyly of Index finger due to deformed proximal phalanx was relatively rare entity and secondly with timely treatment of clinodactyly adverse effects in personality development of an individual can be prevented. There was definite improvement in quality of life of the patient with the surgical procedure. Childhood and adult X rays of clinodactyly of this patient can be used for counseling of patients in future.

CASE REPORT

18 year old boy was brought with complaints of deformed Index finger and little finger of Right hand since childhood, with more angulation deformity in Index finger (Fig 1,2). There was proportionate growth of the deformity along with general body growth. There was no other abnormality. He was more disturbed because of Index finger deformity. He was hesitant to show his hand for examination in OPD, unable to hold a pen in his right hand (Fig 3). He was unable to write, eat with his Right hand, shy away from shaking hands and had very low self esteem. He hardly used to play with his friends or relatives both at home as well as in school or college. There was no history of such deformity in the family.

Pt was averagely built and nourished. There was radial angulation deformity of 35^0 at proximal phalanx level in Index finger and of 10^0 at middle phalanx level little finger. He was unable to hold pen and write with his Right hand. He had pulp to pulp pinch but only after radial abduction of thumb. He was able to form a fist but had poor grip strength. Childhood X ray (Fig 4) showed evidence of C shaped epiphysis of proximal phalanx of Index finger with long ulnar cortex of 24mm and short radial cortex of 20mm, C shaped epiphysis of little finger was not very discernable. Adult X ray (Fig 5) taken almost after 13 years showed C shaped epiphysis had ossified completely giving trapezoid shape to proximal phalanx in index finger with long cortex of 52 mm and short cortex of 43 mm, with resultant angulation of 35^0 in Index finger. Similar findings in X rays for middle phalanx of little finger resulted in angulation of 10^0.

He did not give consent for correction of little finger deformity. Pre op planning revealed length of elongated cortex was 52 mm and of short cortex was 43mm. Plan was to excise a wedge of bone with 9mm wide wedge on broader side. Surgery was done under brachial block under tourniquet control. Dorsolateral incision was given, extensor apparatus was divided in midline, periosteum was raised. Osteotomy cuts were made with side cutting burr from a common point on shorter radial aspect and they reached on opposite ulnar side 9 mm apart. Resultant wedge which was carved out had only 2mm height left, rest of the bone stock was lost in making osteotomy cuts, bone being brittle than usual. Angulation was corrected, wedge was reversed and fixed with a two hole plate (Fig 6). Primary closure was done with excess skin excised on the elongated ulnar side safeguarding neurovascular pedicle. Post operative result was very satisfactory. He had normal pulp to pulp pinch, precision pinch, was able to hold pen, started writing, eating with his right hand gradually over next two months (Fig 7, 8, 9). He was able to form fist completely and grip strength was satisfactory. He had regained his lost self esteem. There was tremendous improvement in quality of his life with this procedure.

DISCUSSION

Clinodactyly is an autosomal dominant condition of variable penetrance classically affecting small finger, bilaterally. Incidence ranges between 1% to 20%[2,3]. Angulation occurs because of an abnormal physeal plate extending along one side of the bone, a bracket epiphysis. It restricts longitudinal growth by tethering growth on what becomes the short side of the digit.[4,5] Radiographs show the bracket epiphysis (also termed as C-shaped physeal plate, delta phalanx, or longitudinally bracketed diaphysis) only when the patient is sufficiently skeletally mature. Children presenting in infancy will not demonstrate a continuous epiphysis on their radiographs as it has not yet ossified, but shape of the phalanx is indicative of this abnormality[6]

Burke and Flatt in 1979 classified 3 types of clinodactyly: (1) familial clinodactyly, usually not associated with other congenital anomalies; (2) clinodactyly in association with other syndromes; (3) clinodactyly secondary to epiphyseal injury such as fracture or frostbite.[7]

Another classification classified patients in 4 groups from 1 to 4 according to severity of angular deformity. Physiologic angulation <5° (group 1) and those with mild angulation between 5° and 10° (group 2). It recommended surgical treatment for patients with moderate (15° to 30°) and severe (>30°) deformities (groups 3 and 4).[8]

Most common site of occurrence is little finger, followed by thumb and then ring finger.[9] Involvement of middle and index fingers is relatively uncommon. "Congenital sporadic clinodactyly of the index finger is a unique entity as specifically reported by MM al Qattan [10]

Firstly, it is unilateral, with male predominance whereas little finger and thumb is usually a bilateral presentation. Secondly, it is commonly associated with brachydactyly of digits of ipsilateral hand. Thirdly, it is not associated with systemic anomalies or mental retardation whereas clinodactyly of little finger often indicates mental retardation. Finally, side of angulation in sporadic clinodactyly of index finger is consistently to radial side.[10]

Our patient had rare combination of clinodactyly of right index and little finger both, at proximal and middle phalanx level respectively. Left hand fingers were normal. There was no mental retardation.

Various surgical operations are described for clinodactyly. Closing wedge osteotomy is relatively simple, gives predictable results, but causes shortening of the digit and may slacken the extensor mechanism.[11] An opening wedge osteotomy requires use of a bone graft and lengthening of the soft tissues on short side of digit.[12]Reverse wedge osteotomy,[13] preserves length, but it is complicated, technically demanding, and also requires lengthening of the soft tissues on the short side of the digit. Carstam and Theander only resected abnormal part of C-shaped physis, without performing an osteotomy.[13] This technique is probably the simplest surgical procedure but it is only suitable for mild cases in young children. Vicker later modified this technique with interposition of a fat graft[6], known as Vickers "physiolysis" and gave better results than original technique.[6]

We did reverse wedge osteotomy and fixation with two hole titanium mini plate. Major advantage of miniplate was early post op mobilization. Patient had an excellent functional and aesthetic outcome. Psychological scar could have been avoided had this procedure been done at recommended age of 5-6 years.

CONCLUSION

Clinodactyly is a relatively common entity with index finger involvement not so common occurrence. Surgery is required generally for severe angulation with functional limitation. We advocate timely surgical intervention for clinodactyly at the age of 5-6 years to avoid adjustment problems in the child psyche later on. We also recommend use of miniplates in older patients for achieving good functional outcome.

Fig 1: Pre operative dorsal view

Pre operative volar aspect

Pre operative Pen grip

Fig 2a: Childhood X ray showing C shaped epiphysis.

Fig 2b: Adult X ray showing ossified C shaped epiphysis

Fig 2c : Post op X ray with 2 hole plate in situ

Fig 3: Post op dorsal view

Post op volar aspect

Post op Pen grip

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