Case report

Acute middle finger radial collateral ligament rupture in an obstetrician during an obstructed labour: a case report and review of the literature

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Abstract

Introduction: Collateral ligaments (CL) injuries of the finger metacarpophalangeal (MCP) joints, other than the thumb, are not commonly encountered and most of the patients are underrecognized. They require prompt evaluation to ensure proper management and prevent long-term residual laxity, pain, loss of joint motion, stiffness, and finally permanent disability.
Case presentation: A 63-year-old male obstetrician was evaluated 3 months after an acute trauma at the radial aspect of the middle finger MCP joint, of his dominant right hand. The mechanism of injury, physical examination, conventional radiographs, and magnetic resonance imaging (MRI) revealed disruption of both (proper and accessory) radial collateral ligaments. A dorsolateral approach was used for surgical intervention and the direct repair of the ligamentous rupture.
Discussion: Collateral ligament tears of the MCP joints are more frequent than indicated in the literature and many times are underdiagnosed. If they do not receive the appropriate treatment could cause chronic pain and functional impairment, especially in highly demand patients. The anatomical restoration of the overlying structures significantly determines the postoperative functional results.

Keywords: Radial collateral ligaments; metacarpophalangeal joint; middle finger; rupture

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Introduction

Collateral ligaments (CL) injuries of the finger metacarpophalangeal (MCP) joints other than the thumb are relatively infrequent than in the thumb and most of the patients are underrecognized.[1] As far as there are little data in the literature about fingers' CL ruptures, it is difficult to determine specific diagnostic criteria and treatment guidelines and this commonly leads to untreated cases with long-term residual laxity, pain, swelling, loss of MCP joint equilibrium and finally arthritic lesions and stiffness.

The incidence of CL injuries of the MCP joints is approximately 1 in 1000 hand injuries with up to 39% involving the fingers other than the thumb and among them 33% the long finger.[2] These injuries are most common in the fourth decade of life in non-dominant hands of male patients and radial disruptions are more frequent in the ring and small fingers.[2] Isolate tears of the collateral ligaments are rare and may occur in many different anatomical patterns, within their substance or avulsion from their insertion, with or without fractures, and finally in the form of a Stener-like lesion.[3-6] The surgeon must always investigate for any concomitant lesion that could accompany the major injury such as the rupture of the deep transverse metacarpal ligament (DTML), the proximal interphalangeal joint collateral ligament of the same or an adjacent finger, the dorsal or palmar interosseous tendons and in some rare cases the sagittal bands.[7-9]

The MCP joints of the fingers are complex ginglymus joints.[10] They are stabilized in the frontal plane by the radial and ulnar CLs and the cam shape of the metacarpal head results in a tightening of the CLs, especially the proper portion, and thus in greater stability of the MCP joint during flexion.[11] The radial collateral ligaments are thicker, wider, stronger and more oblique the UCLs and are susceptible to injury from laterally and dorsally directed forces that enforce abduction over 40°. Understanding the basic anatomy of the ligaments of the hand, their functional peculiarities and the high degree of suspicion could replace the lack of a reliable clinical test in the diagnosis of CL ruptures of the MCP joints.

Case presentation

A 63-year-old male obstetrician was admitted to our department 3 months after an episode of acute trauma at the radial aspect of the middle finger MCP joint of his dominant, right hand. He described an extreme application of force, in a dorsal to volar and radial to ulnar direction on his long finger during an obstructed labour that led to localized pain, swelling and instability of his 3rd MCP joint. The patient reported that his symptoms were worsening while grasping objects or flexing his middle finger. Conventional radiographs (AP, oblique, Brewerton views) were requested without any sign of avulsion fracture, subluxation, or dislocation. Physical examination revealed MCP joint laxity in extension and full flexion without a clear end point and a negative cascade sign test (Figure 1). The patient was unable to hold his middle finger straight in extension and to abduct it towards the index finger. The integrity of the second intermetacarpal space (checking deep transverse metacarpal ligament-DTML- lesion) was detected with palpatory dorso-volar test. MRI imaging showed disruption of both (proper and accessory) without bone erosion or subchondral edema (Figure 2).

The patient was operated under axillary nerve block. Through a dorsolateral approach the extensor apparatus was incised longitudinally through the substance of the radial sagittal band. Once the capsule was exposed a capsulectomy was performed and a complete tear in the substance of the RCLs was revealed (Figure 3a). A careful inspection to diagnose any concomitant lesions of volar plate, deep transverse metacarpal ligament, intrinsic muscles or cartilage damage was ineffectual. Torn RCL were repaired with the use of interrupted 4-0 nylon sutures, with the MCP joint being positioned in about 45° of flexion in order to achieve ideal ligamentous tension during fixation, while the dorsal capsule and the extensor hood were closed in layers. (Figure 3b, c, d). Intraoperative clinical evaluation depicted complete joint stability.

The MCP joint was immobilized in a cast in 45° of flexion with IP joints in extension and a buddy splinting between index and middle finger was used for 3 weeks. Buddy splinting was maintained for 3 additional weeks. Physical therapy with active and passive joint mobilization and lymphatic drainage

Figure 1. *Physical examination revealed MCP joint laxity of the middle finger without a clear end point in passive ulnar deviation.*

Figure 2. *Preoperative coronal MRI image confirmed rupture of the RCL of the middle finger.*

started 3 weeks postoperatively to avoid edema, fibrosis, and stiffness. The patient achieved full range of motion without residual pain at the end of 10th week of rehabilitation and return to previous manual activities as obstetrician and to sports was allowed the 3rd month postop. At 24 months follow-up the patient regained full and painless ROM (Figure 4).

Discussion

Ruptures of the MCP collateral ligaments of the fingers are considered uncommon compared with thumb lesions and because of this fact, are often underdiagnosed. Although the dynamic support from the interossei muscles, the anatomy and protective action of the adjacent fingers from index to little finger, against the usual forces exerted on the hand justify this point of view, latest studies highlight a greater frequency of these injuries than previously believed.[1-2] The collateral ligaments injuries of the MCP joints, other than the thumb, refer to the middle finger in percentage of approximately 33% and may tear most commonly from their insertion, with or without an avulsion fracture.[2,4,12] Sometimes a Stener-like lesion has been described with the interposition of the sagittal band or interosseous tendon and rarely the extension hood between the torn parts of the CLs, that makes conservative treatment inappropriate due to inadequate healing perspective.[2,6,8,13]

Gaston and his colleagues have proposed for these types of injuries a grading system which supports a management algorithm according to the pattern of the MCP collateral ligaments lesion.[14] Grade I is referred to partial CL tear and unaffected joint stability. Grade II characterizes an incomplete tear that

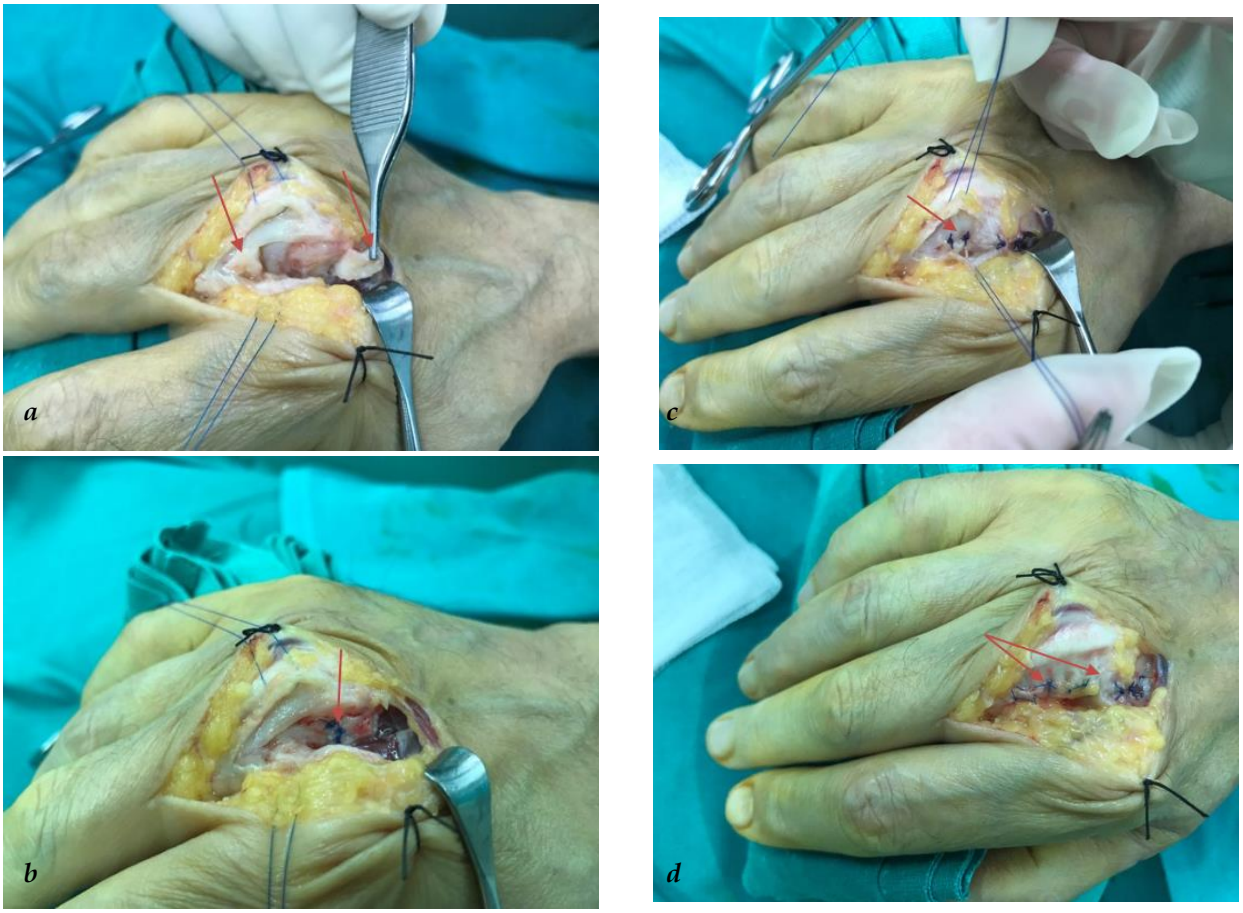

Figure 3(a, b, c, d). *Once the capsule was exposed and incised a complete tear in the substance of the RCL was revealed, 3b-c-d. Torn RCL was repaired with the use of interrupted 4-0 nylon sutures, with the MCP joint in about 45º of flexion to achieve ideal ligamentous tension during RCL repair, while the dorsal capsule and the extensor hood were closed in layers.*

causes laxity problems with a firm end point and Grade III describes a significant joint instability as a result of a complete tear of the MCP collateral ligament. Even though Gaston divided his patients into early stage presenting – acute or late stage – chronic using 4 weeks period as the crucial point, Kang et al. have classified their patients using 6 weeks period as a reference point.[15] Based on the above approximation our patient was obviously classified as a late stage – grade III type of injury. In agreement with most researchers, we categorized the lesion and established a definite surgical indication based mainly in clinical examination.[8,14,16] We believe that appropriate radiological views, MRI or arthrography could not modify our treatment or surgical indications but only our intraoperative options.

Generally, there is a consensus that surgical intervention is indicated in any Grade III injury which is characterized by a notable laxity with no end point and multiplanar joint instability regardless the cause of these clinical features (avulsion fracture, Stener-like lesion etc). Although, a conservative treatment for Grade I or II acute injuries with interdigital buddy taping, splinting or casting is broadly acceptable, we must have always in mind that an underestimated lower grade injury could lead to sub-optimal results. [8,14,17] We believe that Grade II injuries a) with late presentation and

Figure 4. ***Patient regained full and painless ROM (24 months follow-up clinical examination).***

residual, moderate or severe, symptoms and signs of pain and functional impairment, or b) patients who are not satisfied after any type of conservative treatment especially for the RCL of the index finger must undergo surgery.

In the literature many surgical techniques are well established according to the type of injury like direct repair, pull-out suturing through the bone, capsular shift dorsally, bone suture anchors and ligament reconstruction with a tendon graft like palmaris longus or extensor digiti quinti proprius (figure of eight or trapezoidal configuration).[14-15,17-20] Chronic radial collateral ligament injuries of the metacarpophalangeal joints with arthritic, degenerative pattern may require arthroplasty or MCP fusion.[14-15] Arthroscopic approaches to non-thumb MCP collateral ligament injuries have been recently studied but there is a need for more extended evaluation in the future for their functional results.[21] In our case, although we had to treat a late stage, grade III type of injury no degenerative lesions were present and a layered reconstruction was possible, leading to an optimal functional result.

In conclusion collateral ligament tears of the MCP joints are often misdiagnosed and if they don't receive the appropriate treatment could cause chronic pain and functional impairment. Clinical suspicion and standardized physical examination are necessary in order to provide the best treatment choice, especially in highly demand patients.

Conflict of Interest

The authors declared no conflicts of interest.

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