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STENER-LIKE LESIONS: AN INTERESTING CASE OF A STENER-LIKE LESION OF THE ULNAR COLLATERAL LIGAMENT (UCL) OF THE PROXIMAL INTERPHALANGEAL JOINT OF THE INDEX FINGER AFTER A PROXIMAL INTERPHALANGEAL JOINT TRAUMATIC DISLOCATION: CLINICAL AND RADIOLOGICAL FINDINGS, TREATMENT AND FOLLOW UP. A CASE REPORT

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Summary

The Stener lesion of the ulnar collateral ligament of the metacarpophalangeal (MP) joint of the thumb is characterized by an interposition of the adductor aponeurosis between a distally avulsed ligament and its insertion into the base of the proximal phalanx. Other cases of Stener-like lesions have been described and are always identified by the interposition of a tendon or parts of it between the two ends of the injured ligament, which would restrain its healing. Surgical management of these injuries is indicated to avoid the poor long-term outcomes of the conservative management.

We hereby report the case of a 42 years old male patient who attended our outpatient clinic in may 2019. He had sustained a traumatic injury during an altercation 20 days earlier which had resulted in a proximal interphalangeal joint (PIPJ) dislocation which was reduced by the patient himself. The US scan showed a lesion of the transverse retinaculum of the extensor tendon. This lesion had caused a diastasis between the central slip and the ulnar lateral band. The ulnar lateral band was blocked between the two ends of the ulnar collateral ligament, delaying the healing of the ulnar collateral ligament.

Surgery was performed based on the Stener-like lesion found on the ultrasonography scan. The patient was followed up after surgery, underwent physiotherapy and his range of motion and function improved. Our experience shows that timely recognition of a Stener or Stener -like lesion allows early surgical treatment and provides healing and better functional outcomes on the long term compared to conservative treatment. Also, osteoarticular ultrasonography is an invaluable tool for early recognition of Stener or Stener-like lesions in the emergency setting.

Key words: Stener, Stener-like, effect, ulnar collateral ligament, osteo-articular, ultrasonography

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INTRODUCTION

The Acute injury to the ulnar collateral ligament of the metacarpophalangeal joint of the thumb is a common finding in our practice. This injury was initially described by Stener et al. [1] and it is commonly referred to as the "Gamekeeper's thumb".

The Stener effect: the tendon interposition phaenomenon

Normally, the ulnar collateral ligament of the metacarpophalangeal joint of the thumb lies deep to the adductor pollicis tendon. A Stener lesion [2] is a common phaenomenon characterised by the slippage of the torn distal end of the ulnar collateral ligament superficial to the adductor pollicis tendon or muscle. The interposition of the adductor pollicis muscle or its tendon between the ulnar collateral ligament and the MCP joint prevents the ligament from healing and is an indication for surgical repair. Most ulnar collateral ligament lesions of the MCP joint of the thumb can be managed conservatively but when a Stener lesion is diagnosed surgical treatment is required. Stener lesions are difficult to identify on clinical examination.

Radiological features

The assessment of a Stener lesion usually requires MRI [3] or high-frequency ultrasound [4]. A Stener lesion presents with a proximal retraction of the ligament fibres which look like a small displaced mass superficial to the adductor aponeurosis. This gives the typical "yo-yo on a string" appearance both on ultrasonography and MRI scans [5,6]. Passive flexion of the interphalangeal joint of the thumb during dynamic ultrasound imaging of the ulnar collateral ligament (UCL) allows the radiologist to distinguish a non-displaced UCL tear from a true Stener lesion [7-9]. Magnetic resonance imaging should always be requested to investigate a non-displaced Stener or Stener-like lesion diagnosed by ultrasonography before conservative therapy is carried out. In our case, ultrasonography was sufficient to establish the surgical indication (displaced stener-like lesion). Displaced Stener and stener-like lesions are a clear surgical indication.

Diagnostic work-up

If an injury is suspected, a plain radiograph (anteroposterior and lateral views) is requested in the first place. Radiography is useful to identify avulsion fractures. A clear radiological sign of true Stener lesions (UCL tears) on lateral X-ray views ("sag sign") refers to a volar subluxation of the proximal phalanx at the metacarpophalangeal joint. The use of stress radiography is controversial. There is a concern that this maneuver can displace previously nondisplaced ligaments or fractures.

Ultrasonography is an invaluable tool for collateral ligament tear diagnosis providing direct visualization of the collateral ligament and the surrounding structures. The torn end of the ligament is located in nearly 90% of cases. Ultrasonography scans (performed shortly after the injury) are a valuable adjunct to clinical examination and help differentiate displaced ligament tears from non-displaced tears. Ultrasonography is a dynamic, safe and quick tool. Also it is easily available in an emergency setting. Ultrasonography disadvantages include patient discomfort in acute cases and difficulty to locate the torn collateral ligament when it is thin or when the injury is more than one week old because of ligament shrinkage and retraction and increased scar tissue.

MRI is the most accurate and reliable technique for acute collateral ligament ruptures diagnosis. MRI allows the direct visualization of collateral ligaments and surrounding structures. Also, it is safe and non-invasive; however, it is not readily available and it is expensive. MRI is highly sensitive and specific for collateral ligament tears detection and it is also useful for postoperative evaluation when necessary [10-16].

Stener-like lesions: the analogy with the UCL tear at the MCP joint (adductor pollicis tendon interposition delaying healing)

Other cases of Stener-like lesions have been described and are always identified by the interposition of a tendon or parts of it between the two ends of the injured ligament, which would restrain its healing. Surgical management of these injuries is indicated to avoid the poor long term outcomes of the conservative management**.** Masafumi Ishizuki et al. [17] reported six cases of Stener-like lesions of the MP joint of the long fingers (other than the thumb). In all cases, the avulsed collateral ligament was trapped by the ruptured sagittal band. Surgical treatment was indicated in all cases. Also, Ishizuki et al .reported one Stener-like lesion in a collateral ligament injury of the MP joint of the ring finger [17].

CASE DESCRIPTION

Clinical findings

On may 2019, a 42 years old male patient attended our outpatient clinic referred by his general practitioner. He was right hand dominant and worked as an enterprise Director (smart-worker). He presented to our clinic with pain occurring at rest and during mobilisation and swelling of the proximal interphalangeal joint of the right index finger. 3 weeks earlier, he had sustained a traumatic injury to his right index finger during an altercation

which had resulted in a proximal interphalangeal joint dislocation, reduced by the patient himself. On clinical examination, the sensitivity of the digit was preserved, the flexion of the PIPJ was limited to a 30° angle and he presented an extension lag of the interphalangeal joint of 15°. The ulnar collateral ligament showed slight laxity when tested. Although the dislocation was a closed injury, he presented with a small superficial scar on the ulnar side of the PIPJ. The index finger was buddy-strapped to the middle finger and the patient was instructed to start mobilisation and physiotherapy. An ultrasonography scan of the proximal interphalangeal joint was requested.

Radiological findings

On the X-ray, a slight radial subluxation persisted but no avulsion fractures were reported. The ultrasonography scan showed a lesion of the transverse retinaculum which connects the three components of the extensor tendon of the digit on the proximal interphalangeal joint (central slip, radial lateral band, ulnar lateral band). This lesion caused a diastasis between the central slip and the ulnar lateral band (the latter was moderately thickened). Between these two structures an hypoechogenous nodule was identified which looked like a Stener-Like lesion of the ulnar collateral ligament of the PIPJ. The radial collateral ligament appeared continuous and intact (Fig. 1).

Surgical indication

The patient was subsequently seen in clinic after 3 days. On clinical examination, the extension lag of 15° of the proximal interphalangeal joint persisted and the flexion had improved with physiotherapy to a 65°angle. The following day the decision to operate was confirmed based on the ultrasonography findings.

RESULTS

Intraoperative findings

The surgical incision was performed on the ulnar side of the PIP joint. The ulnar collateral ligament was then accurately dissected and exposed. It appeared removed from its proximal insertion and blocked between the ulnar extensor lateral band and the central slip which looked separated from each other (Stener-Like effect). Also, the ulnar extensor lateral band appeared dislocated volarly (Fig. 2).

Procedure

The extensor tendon components and the proximal interphalangeal joint components were carefully dissected and separated from the residual fibrosis which

Figure 1. Ultrasonography findings. The US scan shows a lesion of the transverse retinaculum which connects the three components of the extensor tendon of the digit on the PIPJ (central slip, radial lateral band, ulnar lateral band). This lesion caused a diastasis between the central slip an the ulnar lateral band. Between these two structures a hypoechogenous nodule is identified which is a Stener-Like lesion of the ulnar collateral ligament of the PIPJ. The radial collateral ligament appears continuous and intact.

Figure 2. Intraoperative views. The ulnar collateral ligament appears avulsed from its proximal insertion and blocked between the ulnar extensor lateral band and the central slip which look separated from each other (Stener-Like effect). Also, the ulnar extensor lateral band appears dislocated volarly.

was debrided and excised. The ulnar collateral ligament was carefully reinserted on its original proximal insertion through an absorbable mini-anchor and 4/0 absorbable sutures. The stability of the joint, the range of motion in flexion and extension were tested. Tension was absent along the suture and deviation or scissoring of the digit were not noted. The central slip and the lateral ulnar band of the extensor were reconnected by repairing the transverse retinaculum through a 4/0 absorbable

suture. The range of motion in flexion was tested again and was satisfactory. A tailored thermoplastic splint was made and the patient was started on an early gentle mobilisation protocol of physiotherapy 2 days after the operation. The patient was instructed to wear the splint for 6 weeks after surgery.

Follow-up

The patient attended multiple follow up appointments in outpatient clinic. On the first follow up appointment (one week postoperatively) the scar had completely healed. The sensitivity of the digit was preserved. The proximal interphalangeal joint was stable and showed no laxity on mobilisation, the range of motion was still limited but improved (flexion PIPJ 65°, extension lag 15°). Pain was reported as 3/10 (based on the analogical score for the assessment of pain, EVA). The DASH was assessed through the quick DASH questionnaire. The patient did not report functional limitations or disconfort in his daily activities and as a result the score was below 5. LL and PA radiographic views were taken, no avulsion fracture fragments were noted and the articular surfaces were normal (no signs of arthrosis). No deviation, scissoring or residual deformity were noted on clinical examination. The patient was instructed to continue physiotherapy and to wear a protective thermoplastic finger splint allowing flexion and blocking extension.

The patient was subsequently seen 6 weeks postoperatively in clinic. On clinical examination the scar was slightly adherent (the patient was instructed to pursue the massages). The sensitivity of the index finger was normal, the joint was stable and no laxity was noted on examination, pain was reported as 2/10 (analogical score of pain EVA). The extension lag at the PIPJ persisted (15° angle), the flexion of the PIPJ reached a 60° angle.

LL and PA radiographic views were taken, no avulsion fracture fragments were noted and the articular surfaces were normal (no signs of arthrosis). The patient was instructed to pursue physiotherapy and to wear a soft dynamic extension splint and a dynamic flexion splint to improve the range of motion in extension and flexion.

The patient was lost to follow up for several months for personal reasons and subsequently attended a follow up clinic appointment 12 months after surgery. On clinical examination, the scar appeared healed and non adherent, the sensitivity was normal. The joint was stable and showed no laxity on mobilisation. He had deliberately stopped physiotherapy after 2 months. The DASH score was assessed through the quick DASH questionnaire. The Quick DASH was below 5 proving no discomfort during daily activities. The patient had resumed all his normal activities including the piano and reported no pain at rest nor during mobilisation. LL and PA radiographic views were taken, no avulsion fracture fragments were noted and the articular surfaces were normal (no signs of arthrosis). No deviation, scissoring or residual deformity were noted on clinical examination. The clinical examination of the injured proximal interphalangeal joint showed a slight persistent extensor lag of 15°.He had recovered to an active flexion of 105° and his strength had improved(Jamar: right 56 kg, left 54 kg). He was instructed to continue wearing a soft dynamic extension splint and a dynamic flexion splint to improve the range of motion in extension and flexion.

DISCUSSION

Our experience shows that early recognition and timely treatment of Stener-like lesions allows the clinician to give the best chance to the patient of recovering from such injury. If the ultrasonography scan had not been performed, timely diagnosis would not have been possible and the patient would have been left with permanent functional deficit in the index finger of his right hand (his dominant hand). Gherissi et al. believe the US scan is an invaluable tool for Stener effect diagnosis, since its sensitivity and specificity are very high [18]. Moreover, Ultrasonography is usually available and easy to use in the emergency setting and not expensive. However, we strongly believe that the radiologist performing the exam must be fully trained and experienced to avoid any false negatives [18,19]. A thin ultrasound probe is also required. Faivre at al. don't recommend the use of arthrography when studying Stener-like lesions of the metacarpophalangeal joint but strongly indicate the use of a plain X-ray with PA, oblique and a "Brewerton" view [20-22].

We believe that a structured approach combining clinical examination and radiological findings could lead to an appropriate management. Ultrasonography should be performed systematically on closed dislocation injuries of the proximal interphalangeal joint and metacarpo-phalageal joints of the fingers when suspecting a true Stener or a Stener-like lesion to avoid the over-indication of conservative management and subsequent poor outcomes in the long-term (reduced ROM, arthrosis, extension lag, reduced flexion, chronical pain). The range of motion and daily function (assessed through the QUICK DASH questionnaire) can be improved by early surgical management and correction of the interposition of the ulnar lateral band and early repair of the ulnar collateral ligament. An unhealed injury leads to instability and increases the risk of poor outcomes in the short-term and long-term (reduced ROM, arthrosis, persistent extension lag, reduced flexion, chronical pain)

CONCLUSIONS

The acute management protocol of suspect Stener and Stener-like lesions should ideally include a thorough clinical examination and a radiological study to ensure an accurate study of the injury. Unfortunately, the specialist hand surgeon and a osteoarticular ultrasonography specialist are not always available in the emergency room and the majority of these injuries are misdiagnosed and left untreated.

Moreover, the majority of these injuries are overlooked and misdiagnosed by the general practitioner who does not always refer the patient to the hand surgery specialist. This phaenomenon could lead to untreated injuries and chronical morbidity.

In conclusion, considering the remarkable impact of a timely diagnosis and acute surgical management on short-term and long-term outcomes of such lesions, early triage and examination performed by an expert clinician should be promoted.

Also, the standard diagnostic algorithm should ideally include an ultrasound scan whenever a Stener or Stener-Like lesion is suspected.

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Conflict of interest statement

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Author contributions

CP, MG: A
CP: D
MG, GC, SLP: DT
CP, MG, GC: S
CP, MG, GC: W
SLP, RP: O (revisions)

Abbreviations

A: conceived and designed the analysis
D: collected the data
DT: contributed data or analysis tool
S: performed the analysis
W: wrote the paper
O: other contribution (specify contribution in more detail)

Ethical consideration

The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

Data and photographs were obtained and published with patient's informed consent.

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