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Outcome of Boyd-McLeod procedure for recalcitrant lateral epicondylitis of elbow

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Abstract

Various surgical procedures including percutaneous and open release, arthroscopic procedures have been described to treat recalcitrant tennis elbow. We present the outcome of Boyd-McLeod surgical procedure for tennis elbow resistant to non-operative treatment in twenty-seven patients (twenty-nine limbs). Boyd McLeod procedure involves excision of the proximal portion of the annular ligament, release of the origin of the extensor muscles, excision of the bursa if present, and excision of the synovial fringe. The average time interval from the onset of symptoms of tennis elbow until surgery was 28 months (range: 8 -72 months). 91% of the patients reported complete relief of symptoms with return to full normal activities including sports. Average post-op time for return to professional / recreational activity was five weeks. One case developed pain secondary to ectopic bone formation after surgery, which settled after excision and in another; there was no pain relief with Boyd McLeod procedure. Two patients had scar tenderness that did not affect the final outcome. We conclude that Boyd-McLeod procedure is an effective treatment option in patients with resistant lateral epicondylitis.

Key words

Tennis elbow, surgical release, Boyd McLeod procedure.

Introduction

Tennis elbow is a common orthopaedic problem that usually responds to non-operative treatment. Less than 5% are resistant or recur following conservative management. Several theories have been proposed with regards to its aetiopathogenesis. Various surgical procedures have been described to treat recalcitrant tennis elbow. Systematic reviews have not established the superiority of one treatment over the other. Our study was undertaken to assess the clinical outcome of Boyd McLeod procedure in the management of resistant tennis elbow that has not responded to non-operative measures.

Material and Methods

Twenty-seven patients (Twenty nine limbs) with resistant lateral epicondylitis were reviewed after surgical management with Boyd-McLeod procedure. There were thirteen male, and fourteen female patients of which two had bilateral surgery. Average age of the patient was 47 years (range: 34-65). 93% were manual workers. 55.2% of the patients has bilateral tennis elbow. Dominant elbow involvement was present in 64% cases) odds ratio: 3.2). 25% of the patients waited for more than 12 months before presenting to their family doctor (range: 1-36 months, median: 6 months). All patients had an unsuccessful trial of conservative management including rest, splints, analgesia, physiotherapy and steroid injections. The mean number of local steroid injections given was 3(range: 1-10) resulting in an average pain free interval of 4.2 months (range: 0-18 months) before recurrence of symptoms. 89.7% used NSAIDS regularly for a defined period before surgery and 83% of the patients had physiotherapy prior to surgery. One patient had a failed open release of common extensor origin elsewhere.

The average time interval from the onset of symptoms of tennis elbow until surgery was 28 months (range: 8-72 months). Boyd McLeod procedure was done under general anaesthetic and tourniquet control as a day case procedure in all cases. Average tourniquet time for the surgical procedure was 32 minutes (range: 18-59 minutes). A 5 cm longitudinal incision is made 2 cm proximal to the lateral epicondyle extending distally. The common extensor origin is sharply dissected and reflected distally from the underlying bone and soft tissues. Adequate precautions are taken to protect the radial collateral ligament, and annular ligament. A small flap of the proximal portion of the annular ligament along with the synovial fold of the radio humeral joint is removed. Debridement of the ECRB tendon is carried out. The superior cortx of the lateral condyle is excised with a sharp osteotome and the bone decompressed with 2-3 drill holes. Finally, the common extensor tendon is sutured back to the lateral epicondyle. Post-operatively, asling is worn for 4-48 hours and then the elbos is mobilised. Wound healing is checked at 10-14 days and physiotherapy is initiated if range of movement appears restricted.

The mean post-op follow up time was 16 months (range: 6-32 months) until discharge. Surgical outcome was evaluated by a telephone questionnaire and a review of the case notes following the discharge of the patient.

Results

91% of the patients reported complete relief of symptoms with return to full normal activities including sports. Average post-op time for return to professional/recreational activity was five weeks. The number of steroid injections and its effectiveness did not

have any bearing on the outcome of surgery. Two cases had poor results with no relief of pain post-operatively. One case developed pain secondary to ectopic bone formation after surgery, which settled after excision. Another patient, who had primary open release of tennis elbow elsewhere, did not have any pain relief with Boyd McLeod procedure. Two patients had scar tenderness, which did not affect elbow function. Intra-operative findings included early osteoarthritis of the radial head in one case who reported an excellent outcome after surgery. None of the patients suffered from significant complications or loss of limb function. The results in our study were comparable to other open releases published in the literature.

Discussion

Tennis elbow is a common orthopaedic problem of the upper limb characterised by symptoms of increased lateral elbow pain with resisted wrist extension, particularly when the elbow is straight [1]. Contracture of the anterolateral elbow capsule explains the pain in extension.

The commonly accepted theory for aetiology of tennis elbow is due to repeated contraction of the wrist extensor muscles, especially ECRB, causing microscopic tendon tears that progress to degenerative tendinosis [2-5]. Bunata et al studied the bone structure and musculotendinous origin details in cadaveric elbows and concluded that the ECRB tendon has a unique anatomic location that makes its undersurface vulnerable to contact and abrasion against the lateral edge of capitellum during elbow motion [2]. Pathoanatomy is non-inflammatory angiofibrobalstic tendinosis ECRB-RDC complex [4].

Several other pathological processes can cause lateral elbow pain including periostitis, bursitis, synovial fringe of the radio humeral joint and, degenerative changes in the annular ligament [6]. Cyriax identified twenty-nine different pathological processes responsible for tenniselbow syndrome [7]. Ruch et al suggested synovial plicae of the elbow as a cause of the elbow as a cause of lateral elbow pain in patients with vague clinical symptoms simulating tennis elbow that does not respond to conservative management [8]. The site of maximal tenderness is posterior to the lateral epicondyle and centered at the posterior radiocapitellar joint. Mullett et al observed a collar like band radiocapitellar capsular complex impinging on the radial head and subluxating into the radiocapitellar joint with manipulation under direct vision [9]. Based on arthroscopic findings, they calssified this degenerative capsular fold relationship to the radial head into four types: Type I: radial head is completely exposed' Type II: partial coverage of the radial head by capsuloligamentous complex without interposition into the joint in any position, Type III: subluxation of the capsular edge into the joint and, Type IV: radial head completely obscured by capsuloligamentous complex throughout the range of motion. Bosworth suggested chronic inflammation of annular ligament due to repeated rotation of an eccentrically placed aymmetric radial head in certain position as a cause of tennis elbow and reported good results with partial excision of the annular ligament [10].

Non-operative management usually resolves all symptoms with restoration of normal elbow function. Calvert et al reported 92% success with complete relief of symptoms following 1 or 2 steroid injections and that repeated injections were not helpful [11]. Less than 5% cases are resistant or recur following non-operative management. Infrequently, surgery is required for patients suffering from recalcitrant tennis elbow that has recurred

or failed to respond to conservative measures [1]. Bankes et al were of the opinion that day-case lateral release for resistant tennis elbow should be offered at an earlier stage in view of the simple and effective nature of the operation with little justification in pursuing with conservative treatment [12].

Percutaneous extensor tenotomy for chronic tennis elbow preformed as an office procedure under local or general anaesthesis is a simple procedure resulting in good result, quick recovery and minimal complications [13-15]. Dunkow et al reported better results and quicker recovery with precutaneous release in a radomised comparative trial between percutaneous and open releases [14]. Difficulty in visualisation and isolating ECRB tendon from common extensor origin is a drawback with percutaneous tenotomy [16]. Also, this procedure does not deal with soft tissues like capsule, synovial fringe that may be the cause of lateral elbow pain, or prominent lateral epicondyle process that may be responsible for ECRB abrasion.

Ruch et al successfully treated ten cases with arthroscopic synovial plica excision in which conservative management was unsuccessful [8]. Arthroscopic tennis elbow releaes has the advantages of minimal morbidity, allows intra-articular assessment and quicker rehabilitation [9,17]. It allows resection of degenerative capsuloligamnetous complex of the radiocapitellar joint without extensive dissection. However, arthroscopic surgery is very expensive, technically demanding and therefore requires a long learning curve for beginner surgeons. Rubenthaler et al observed similar results with endoscopic technique as compared to the open technique for lateral epicondylitis [18].

Different techniques of open releases have been described in the literature with varying results. Carroll et al reported 50% success with ECRB tenotomy [19] where as other authors have reported 87-95% symptomatic relief with simple open release of the extensors [1,20-23]. Heyse-Moore observed similar results following lengthening of ECRB tendon and decompression of radial tunnel which could be due to the relief of tension on the lateral epicondyle and its adjacent structures following surgical division of the fibrous arch of the superficial leaf of the supinator independently of radial or posterior interosseous nerve decompression per se [20]. Wilhelm et al obtained 90% success by denervation of radial nerve branches supplying the lateral epicondylar region by careful exposure or blind deneravtion through disinsertion of certain muscles. Additional direct radial nerve release did not improve the results of denervation [24].

Boyd-McLeod procedure, a modification of Bosworth III procedure, was originally described in 1973 [6]. It is done as a day case procedure through a lateral approach of the elbow that involves excision of all the pathological tissues at the elbow that can produce symptoms attributable to tennis elbow including degenerative tissue from common extensor origin, decortication and decompression of lateral epicondyle, excision of synovium fringe and partial release of annular ligament and capsule. This procedure also enables the surgeon to evaluate radio humeral joint intra-operatively. There are few studies regarding the outcome of Boyd-McLeod procedure [6]. Our study revealed a high success rate and a low complication rate that were comparable wit hthe wide spectrum of surgical procedures described in the literature. Pain relief and restoration of elbow function can be reliably achieved with minimal morbidity and high rate of patient satisfaction. We conclude that Boyd-McLeod procedure is an effective treatment option

in patients with resistant lateral epicondylitis that has recurred or not responded to non-operative management.

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