상과염(Tennis Elbow Tendinosis, Epicondylitis)

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Introduction

- "Tennis elbow" was popular term which was first described in 1883 as "Lawn tennis elbow".
  : to describe the variety of painful maladies that occur in & about the elbow.
- The traditional term "Tendinitis" have been used in the past,
  But, the alternative term "Angiofibroblastic tendinosis" have introduced
- "Tennis Elbow Tendinosis (Epicondylitis)" is currently thought to be caused by tendon overuse & failed tendon healing.

Classification

- Classification of Tennis Elbow Tendinosis
  - Lateral Tennis Elbow Tendinosis
    : Primary: ECRB, Secondary:EDC
  - Medial Tennis Elbow Tendinosis
    : Primary: PT, FCR, PL, Secondary:FCU, Flexor sublimis
  - Posterior Tennis Elbow Tendinosis
    : Primary: Triceps
  - Combined: Lateral & Medial Tennis Elbow Tendinosis

Etiologic Factors

- Age & Sex
  - characteristic age onset of classic uncomplicated tennis elbow; 35 ~ 50 years
  - varies from 12 to 80 years
  - Overall Male/ Female ratio is usually equal
- Overuse: most common cause of all tendinosis
  - Intrinsic muscular contraction, Tensile extrinsic overload
  - Lateral Tennis elbow: Tension(stress) ↑ of wrist & finger Extensor & possibly Supinator

- Medial Tennis elbow: Tension(stress) ↑ of wrist & finger Flexor and Pronator
- Posterior Tennis elbow: Sudden snap into elbow extension

<Risk Factors for tendon overuse>

: Patient age: ≥ 35, High activity level(sports & occupational),
Demanding activity technique, Inadequate fitness level

- Trauma: acute onset may be associated with Direct blow or Sudden extreme effort or activity
- Constitutional factors: Mesenchymal syndrome, Heritable

Associated pathologic problem

- Lateral Tennis elbow
  : symptomatic chondromalacia & synovitis of anterolateral compartment
  - relatively uncommon: 5%
- Medial Tennis elbow
  : Neuropraxia of ulnar nerve
  - the most common associated problem: 40%
  : Medial collateral ligament attritional strain and/or rupture(Valgus instability)
- Lateral and/ or Medial Tennis elbow
  : Chondromalacia, Synovitis, Osteophytic spurs, Loose fragments(in olecranon or lateral compartment)

Pathology

- Angiofibroblastic Tendinosis
  - It was thought Chronic "Tendinitis" (inflammatory reparative process after mechanical microtrauma)
  - But, Pathologic tendon tissue fails to reveal inflammatory cells
  - Angiofibroblastic tendinosis(by Nirschl)
    : Degenerative process that is probably secondary to Tensile overuse, Fatigue, Weakness, Possibly Avascular changes
  - The term "Tendinosis" is more appropriate than "Tendinitis"
- Characteristic Gross appearance of Chronic tendinosis
  - Dull, Gray, Friable, often Edematous
- Microscopic appearance of Chronic tendinosis
  - Normally orderly tendon fibers are disrupted by
    : a characteristic invasion pattern of Fibroblasts & Vascular, atypical, granulation-like tissues
  - Adjacent tendon: hypercellular, degenerated, & microfragmented
  - Degree of Angiofibroblastic infiltration correlates with the clinical phases of pain & Duration of symptom
- Pathologic Staging of Tendinosis

- Stage I: Temporary irritation (consider chemical inflammation)
- Stage II: Permanent tendinosis (< 50% tendon cross section)
- Stage III: Permanent tendinosis (> 50% tendon cross section)
- Stage IV: Partial or total rupture of tendon

Lateral Tennis Elbow Tendinosis (Lateral Epicondylitis, 외상과염)

〈Clinical Presentation〉

- Incidence: 1 ~3% of the population, Man & Women ratio: equal
- usually between age 35-50 years
- Dominant arm involvement: 75%
- 5 times more common than Medial Epicondylitis
- Symptom: Pain at the lateral elbow that radiates down the forearm, Weakened grip & Difficulty lifting objects.
- P/E: - Point tenderness medial & distal to the lateral epicondyle
  - Pain with wrist flexion extremes & resisted elbow extension
- Nirschl Classification of Phases of Lateral Epicondylitis

Phase	Description of Level of Pain
I	Mild pain after exercise, lasting less than 24 hours
II	Pain after exercise, lasting greater than 48 hours, resolves with warm-up
III	Pain with exercise, does not alter ability to exercise
IV	Pain with exercise that alters ability to exercise
V	Pain caused by heavy activities of daily living
VI	Pain caused by light activities of daily living; intermittent pain at rest that does not interfere with sleep
VII	Constant pain at rest, interferes with sleep

〈Diagnostic Evaluation〉

- X-rays: generally obtained
  - 20 %: demonstrate tendon calcification or Reactive exostosis at the tip of Epicondyle
  - important to rule out other pathologic problems (especially wtih medial & posterior elbow problems)
- Ultrasound: sensitivity of 64% to 82%

- MRI: sensitivity of 90% to 100%.

〈Differential Diagnosis〉

- Lateral collateral ligament sprain or insufficiency
- Radial tunnel syndrome
- Fracture
- Intra-articular pathology: Synovitis, Chodromalasia, Adolescent Osteochondritis Dissecans
- Triceps tendinitis
- Referred pain from cervical, shoulder, or wrist injuries.

〈Treatment〉

- The Treatment should enhance the Natural Biologic Healing Response after injury
  - Inflammatory exudation
  - Cellular invasion
  - Collagen & Ground substance production
  - Maturation & Strengthening

〈Nonsurgical Interventions〉

1) Relief of Pain & Control of Inflammatory Exudation and/or Hemorrhage
   - Rest
   - Ice
   - Elevation
   - Medication
   - Steroid injection
   - Physical therapy
     - Ultrasound & iontophoresis
     - Heat/ Cold
     - Deep friction massage
   - ESWT(extracorporal shock wave therapy)

2) Promotion of Specific Tissue Healing
   - accomplish with
     - Rehabilitative exercise (multiple-resistance systems in proper sequence)
     - High-voltage electrical stimulation
     - Central aerobics & General conditioning exercise

- Refraining from abuse

• To promote healing, it is important
- to enhance Proliferative invasion of Vascular components & Fibroblasts, follwed by Collagen deposition & Ultimate maturation

• after adverse inflammation & pain are controlled(usually 1 to 2 weeks for tennis elbow)

3) Control of Force Load
• Excessive loading of tendon should be minimized or eliminated during Rehabilitation
- at the time of return to Sports activity
- during Activities of Daily Living(ADL)

• Counterforce Bracing
• Improved performance technique
• Control of intensity & Duration of activity

4) Other treatment
• Low-intensity Laser therapy
• Topical Nitric oxide, Topical diclofenac
• Acupuncture

〈Surgical Interventions〉

• Results in the literature note fair to good results for many of these procedures, giving the surgeon many options for treatment, but no definite understanding of the mechanism of a good result.
• The Criterion for surgery for any chronic tendinosis
- basically an inability to heal and/or to mature the pathologic tissue
• The Clinical guidelines indicative Failed healing by Nonsurgical methods
- Chronic symptom with tendinosis pain(ㅁ phase IV) exceed a duration of 1 year
- Fail to respond to a goog quality rehabilitation program
- Persistent tendinosis pain(ㅁ phase IV) with history, symptom, sign of
: Mesenchymal syndrome, Atrophy & Weakness
: 3 or more failed steroid injections, Iatrogenic cortisone atrophy
- Quality of life is unacceptable by patient

〈Various Operative methods〉

1. Open Release or Lengthening of the Extensor Origin
2. Percutaneous Release of the Extensor Origin
3. Debridement of the Extensor Origin

4. Anconeus Rotation for Lateral Epicondylitis
5. Denervation of the Lateral Epicondyle
6. Arthroscopic Treatment

Medial Tennis Elbow Tendinosis (Medial Epicondylitis, 내상과염)

〈Clinical Presentation〉

- The most common cause of medial elbow pain
- Only 15 ~ 20 % as common as lateral epicondylitis
- Man /Women ratio = 2:1
- Peak incidence in 30^{th} ~ 50^{th} decade
- Symptom: Medial elbow pain, activity-related, especially repetitive or forceful
- Dominant arm involvement: 60%
- Acute injury (direct or indirect): 30 %, Insidious onset: 70%
- P/E: - Direct tenderness over the ant. aspect of medial condyle; essentially all cases
  - Indirect tenderness on resisted pronation: 90%
  - Resisted wrist palmar flexion tenderness: 70%
  - Valgus stress test for instability
  - Occasional loss of terminal extension(up to 15°)

〈Classification of Medial Epicondylitis〉

- Type IA: No associated Ulnar nerve Sx.
- Type IB: Mild ulnar nerve signs or symptoms
- Type II: Moderate or Severe ulnar neuropathy with Objective deficits on P/E or denervation on EMG

〈Diagnostic Evaluation〉

- X-rays: to rule out associated lesions (ex, osteoarthritis, etc.)
  - Medial calcification ;10-20%, but, not prognostic
- Valgus stress radiographs: If medial instability is suspected
- Ulnar Nerve examination (ex, EMG & NCV test, etc.)
- MRI: High sensitivity & specificity
  - allow MCL & Ulnar nerve assessment

〈Differential Diagnosis〉

- Proximal neurogenic sources(cervical radiculopathy, thoracic outlet syndrome)
- Shoulder level musculoskeletal sources(ex, RCD)
- MCL deficiency

- Tendon & Nerve subluxation
- Isolated ulnar neuropathy

〈Nonsurgical Interventions〉

: Generally similar with those of Lateral Tennis Elbow

- Steroid injection
  - into the maximum tender point, deep to the fascia,
  - on ant. aspect of medial epicondyle
  - if ulnar nerve subluxation is present,
    : Elbow extension to minimize ulnar nerve injury
- Medial counterforce Brace
  - Ulnar nerve sign(+): discontinued
- Concomitant ulnar neuropathy
  - Avoidance of repetitive or prolonged elbow flexion & leaning on the elbow
  - Night time extension splinting may be useful
- Other modalities: Ultrasound, Iontophoresis, Acupuncture, Laser, ESWT
  - less appropriate
  - proximity & pathologic condition of ulnar nerve

〈Surgical Interventions〉

- The Surgical Indications
  - Fail to respond to conservative management
    : 1 ~2 injections over 6 ~9 months
  - Progression of ulnar neuropathy

- Surgical Approaches
  - Open technique
  - Percutaneous technique

Surgical management guided by the classification〉

- Type IA: Epicondylar debridement
- Type IB: Epicondylar debridement with / without Cubital Tunnel Decompression or Transposition
- Type II: Epicondylar debridement with submuscular transposition

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