Treatment of Anteroinferior Tibiofibular Ligament Avulsion Fracture Accompanied with Ankle Fracture

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My disclosure is in the Final AOFAS Program Book. I have no potential conflicts with this presentation.
Introduction

Anterior inferior tibiofibular ligament avulsion fracture

- A part of syndesmosis injury
- Rotational injury
- May not be apparent on plain X-rays
- Nonunion, Malunion; pain, impingement, arthrosis

Classification (modified Wagstaffe’s classification)

Type 1; displaced avulsion fracture of the distal end of the fibula
Type 2; fracture of the anterior spike of the proximal fibular fragment
Type 3; avulsion fracture from the tibia by AITFL (Chaput fracture)
Type 4; fracture of the anterior tubercles from both of the tibia and fibula

Purpose: To evaluate the clinical results of anteroinferior tibiofibular ligament avulsion (Wagstaffe) fracture accompanied ankle fractures treated with anatomical reduction and internal fixation
From Jan. 2007 to April 2010

31 cases / 249 cases of total ankle fracture

All cases: AITFL avulsion fractures

Male / Female: 11 / 20

Age: average 53 Y.

Follow-up: average 26 M.

Cause: Slip(29), Traffic Accident(1), Fall down(1)
Diagnosis

- **Preoperative X-ray**
  1. AITFL Avulsion Fx.
  2. Distal TF diastasis
     - TF Overlap, TF Clear space, Medial clear space

- **Preoperative CT**
  - Suspected in simple X-ray

- **Intraoperative check**

Operative Techniques

- **Ankle Fracture** ➤ ORIF

- **Ant. Inf. TF lig. Avulsion Fracture** ➤ Fixation or Repair

  - Mini Screw; 12 cases
  - K-wire; 10 cases
  - Mini Screw + K-wire; 3 cases
  - Ligament repair (pull-out suture); 6 cases
Results

Total Ankle Fracture ; 249 cases

- Supination - Ext. Rotation ; 192 cases (77.1 %)
- Supination - Adduction ; 16 cases
- Pronation - Ext. Rotation ; 24 cases
- Pronation - Abduction ; 17 cases

31 cases of AITFL Fx. (12.4%) / 249 cases of Total Ankle Fracture

- Fracture / Dislocation ; 2 cases
- Maisonneuve Fx. ; 1 case
- Supination – ER type ; 28 cases
  (Stage II 8 cases, Stage III 3 cases, Stage IV 17 cases)
### AITFL Avulsion Fracture Classification

- **Type 1**: 1 case
- **Type 2**: 23 cases
- **Type 3**: 5 cases
- **Type 4**: 2 cases

### Radiologic Findings

- **AITFL avulsion Fracture Union**: all cases
- **Distal TF diastasis**
  
  **Preoperative** \( \Rightarrow \) **Postoperative**
  - TF clear space \( ; \) 2.5 \( \Rightarrow \) 2.4
  - TF overlap \( ; \) 6.3 \( \Rightarrow \) 6.8
  - MCS \( ; \) 4.0 \( \Rightarrow \) 3.2

### AOFAS Score

- **Excellent** (90 ~ ): 23 cases
- **Good** (80 ~ ): 6 cases
- **Fair** (70 ~ ): 2 cases
- **Poor** (~60): 0 case

### Complications

- **ROM limitation**: 7 cases
  - Fracture-Dislocation: 1 case
  - Trimalleolar Fracture: 4 cases
  - Bimalleolar Fracture: 2 cases
- **Pain**: 2 cases
  - SPN Irritation / Hardware Irritation
Anteroinferior Tibiofibular Ligament Avulsion Fracture

(Park et al. JOT, 2002)

- 13 cases of AITFL avulsion Fx. / 93 cases of Ankle Fractures (14 %)
- All cases of AITFL avulsion Fx.
  - in Weber B type
  - Wagstaffe type 2
- TF Diastasis ; 11 / 13 (84.6%)
- 1 cases of Fair Result ; Nonunion & Impingement

Our Study

- 31 cases / 249 cases of Total Ankle Fracture (12.4%)
- Supination – ER type ; 28 / 31 cases (90.3%)
- Wagstaffe Classification
  - Type 2 ; 23 cases (74.1 %)
AITFL Avulsion Fx.

- **Incidence**; 12.4% of Ankle Fracture
  - Most common at **SER type** (90.3%)
  - **Wagstaffe Type 2**; most common (74.1%)

- **Diagnosis**
  - Preoperative X-ray ± CT
  - Intraoperative Check

- **Treatment**
  - Anatomical Reduction & Fixation

Anteroinferior tibiofibular ligament avulsion fracture accompanied with ankle fracture is a **good clinical outcome with internal fixation**.

We should not miss out the anteroinferior tibiofibular ligament avulsion fracture in preoperative and intraoperative evaluation.


