The Journal of Foot & Ankle Surgery 54 (2015) 663–670

Contents lists available at ScienceDirect

The Journal of Foot & Ankle Surgery

journal homepage: www.jfas.org

Absorbable Screws Versus Metallic Screws for Distal Tibiofibular Syndesmosis Injuries: A Meta-Analysis

Yuanlong Xie, MCM [1], Lin Cai, MD [2], Zhouming Deng, MD [3], Bing Ran, MM [1], Chao Hu, MD [3]

[1] Master of Medicine, Department of Orthopedics, Zhongnan Hospital of Wuhan University, Wuhan, People's Republic of China
[2] Professor, Department of Orthopedics, Zhongnan Hospital of Wuhan University, Wuhan, People's Republic of China
[3] Orthopedist, Department of Orthopedics, Zhongnan Hospital of Wuhan University, Wuhan, People's Republic of China

ARTICLE INFO

Level of Clinical Evidence: 1

Keywords:
absorbable screw
foreign body reaction
metallic screw
meta-analysis
reoperation
syndesmosis injuries

ABSTRACT

A meta-analysis was performed to investigate the outcomes between absorbable screw (AS) and metallic screw (MS) fixation for distal tibiofibular syndesmosis injuries (DTSIs). Randomized controlled trials comparing AS versus MS fixation in DTSIs were searched systematically, and the outcomes were analyzed using Review Manager Software, version 5.2. The risk ratio (RR) or mean difference with the 95% confidence interval (CI) was calculated using the fixed effects or random effects model. A total of 16 studies were included in the meta-analysis. No statistically significant difference was found between AS and MS fixation in excellent and good functional recovery rate (RR 1.11, 95% CI 1.00 to 1.23, $I^2 = 60\%$, $p = .06$), infection (RR 1.66, 95% CI 0.73 to 3.79, $I^2 = 0\%$, $p = .23$), incidence of pain (RR 0.68, 95% CI 0.24 to 1.92, $I^2 = 12\%$, $p = .47$), screw broken (RR 0.31, 95% CI 0.03 to 2.93, $I^2 = \%$, $p = .31$), heterotopic ossification (RR 1.93, 95% CI 0.21 to 17.62, $I^2 = 51\%$, $p = .56$; 472 cases in 4 studies), fracture healing time (mean difference −1.88, 95% CI −3.51 to −0.26, $I^2 = 93\%$, $p = .02$,), duration of operation time (mean difference 7.64, 95% CI −3.80 to 19.09, $I^2 = 98\%$, $p = .19$). The incidence of foreign body reaction was higher with AS fixation (RR 6.07, 95% CI 2.54 to 14.50, $I^2 = 0\%$, $p < .001$). The reoperation rate was higher with MS fixation (RR 0.08, 95% CI 0.03 to 0.18, $I^2 = 77\%$, $p < .01$). The functional outcomes of AS were as good as those with MS for DTSIs. Other than the foreign body reaction, the complications occurring after AS fixation were not as serious as those with MS fixation. AS fixation might be a preferable alternative for reconstruction of DTSIs.

The distal tibiofibular syndesmosis is composed of the anterior and posterior inferior tibiofibular ligaments, interosseous ligament, interosseous membrane, and medial deltoid ligament (1). Disruption of the distal tibiofibular syndesmosis to any degree is regarded as an important cause of ankle instability and can result in prolonged disability after an ankle fracture (2,3). It is estimated that almost 10% of all ankle fractures and 20% of ankle fractures requiring fixation are accompanied by distal tibiofibular syndesmotic injuries (DTSIs) (4).

Operative stabilization is thought to be important for the treatment of syndesmotic injuries (5). Although metallic screw (MS) fixation is considered the reference standard, several different methods, such as absorbable screws (ASs), bolt fixation, syndesmotic hook, integrated syndesmotic fixation with a nail, and staples, are available substitutions (6,7). The choice of the best implant is controversial. Good results have been reported after application of polyglycolide or polylactide (PLLA) ASs for fixation of the syndesmosis. The primary advantage of ASs is that they do not require removal; however, the placement of a metallic syndesmotic screw often requires reoperation (8). Whether ASs can be a good alternative to MSs for DTSIs is in dispute.

We hypothesized that AS fixation would provide as much patient satisfaction as MSs. The primary aim of our study was to evaluate the clinical outcomes, efficiency, and complications of AS fixation in the distal tibiofibular syndesmosis. Our secondary aim was to determine whether ASs can be a good alternative to MSs. We undertook a meta-analysis of randomized controlled trials (RCTs) to compare the outcomes of patients who had undergone AS fixation with the outcomes of those who had undergone MS fixation.

Materials and Methods

Study Identification and Search Strategy

The present study was conducted with institutional review board approval and was approved by the medical ethical committee of Zhongnan Hospital of Wuhan University.

Financial Disclosure: Wuhan Science and Technology Bureau Programs for Science and Technology Development (grant 230100035); Major Program of Natural Science Foundation of Hubei Province of China (grant 2014CFA063).

Conflict of Interest: None reported.

Address correspondence to: Lin Cai, MD, Department of Orthopedics, Zhongnan Hospital of Wuhan University, 169 Donghu Road, Wuhan, Hubei 430071, People's Republic of China.

E-mail address: guke3559@aliyun.com (L. Cai).

1067-2516/$ - see front matter © 2015 by the American College of Foot and Ankle Surgeons. All rights reserved.
http://dx.doi.org/10.1053/j.jfas.2015.03.010

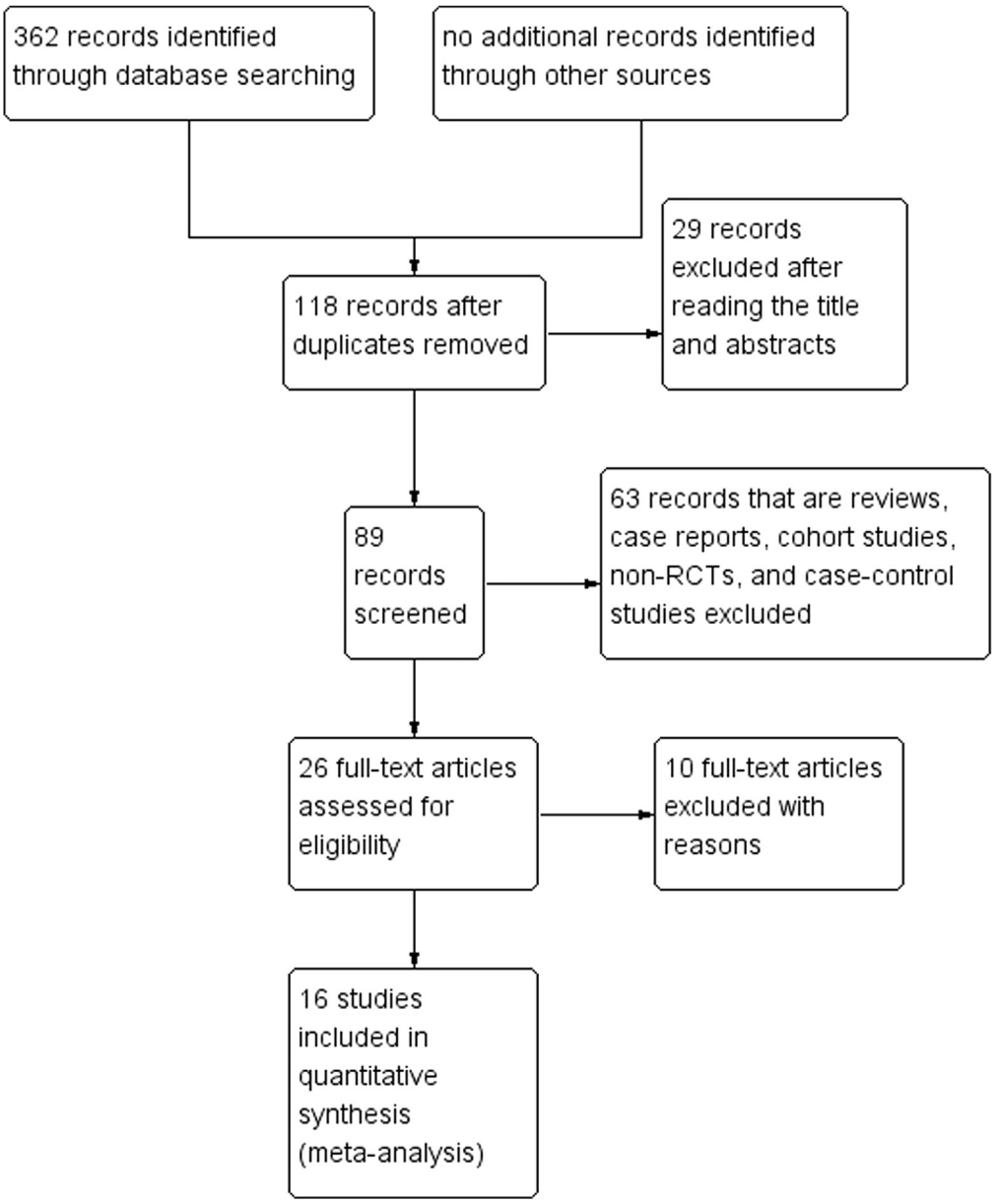

Fig. 1. Flow diagram of study selection. RCTs, randomized controlled trials.

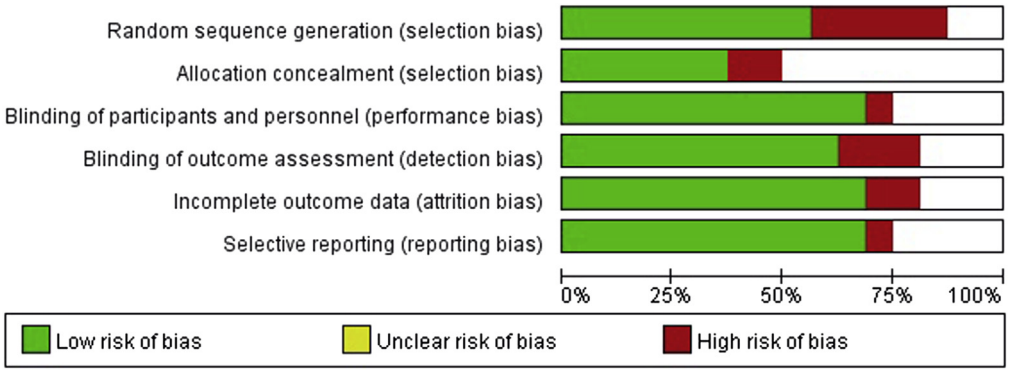

Fig. 2. Risk of bias graph showing a review of our judgments about each risk of bias item presented as percentages across all included studies.