Intramedullary Rodding of Distal Tibial Shaft Fractures with Intra-Articular Extension

My Name is Claude Sagi
CSOT Tampa, FL 2018

Disclosures:

• None, I am just a simple man.

This talk is about treating these fractures
And avoiding this problem

How big of a problem is this really?

- 79 patients with IM Rod of ANY tibia shaft fracture
- X-Rays and CT scan in all patients = 49% incidence of it extension
- Predictive Factors for Intra-articular Extension (88% incidence):
  - DISTAL THIRD location
  - SPIRAL fracture pattern
- NEITHER fibular fracture pattern nor location was predictive.
• 79 patients with IM Rod of ANY tibia shaft fracture
• X-Rays and CT scan in all patients
• Predictive Factors for Intra-articular Extension:
  • DISTAL THIRD location
  • SPIRAL fracture pattern
  • NEITHER fibular fracture pattern nor location was predictive.

• 193 DISTAL THIRD TIBIA SHAFT fractures
• X-ray and CT scan evaluation.
• Incidence of Intra-articular fracture:
  • SPIRAL FRACTURE pattern (n=25) = 92%
    • (50% not visible on plain films)
  • Non-Spiral fracture pattern (n=168) = 4%
25 pts with Spiral Distal 1/3 tibial fractures
• AP/lateral X-ray, CT Scan & MRI of ipsilateral ankle
• By CT - 56% found to have injury to ankle
• Negative CT = MRI – 64% with injury to ankle
• Total with ankle injury = 84%

Presence of ipsilateral ANKLE INJURY is the RULE with SPIRAL DISTAL SHAFT fractures

26% of fractures with extension to articular surface (only 38% of those were identified with X-ray)
• Predictors of extension into joint:
  • Spiral Pattern
  • Ratio of fracture length and distance to plafond > 0.255
26% of fractures with extension to articular surface (only 38% of those were identified with X-ray)

- Predictors of extension into joint:
  - Spiral Distal 1/3 close to joint
  - Fibular fracture and location NO correlation with involvement of the articular surface.

In other words, LONG SPIRAL FRACTURE CLOSE TO THE JOINT

The fibular fracture does NOT predict intra-articular involvement.
How should we best go about treating it?

- 1113 Tibial fractures treated with IM Rod at 3 Level 1 centers
- Incidence of ipsilateral Posterior Malleolus fracture = 9%
- MALLEOLUS ORIF FIRST = 2% mal-reduction at articular surface.
- IM ROD TIBIA FIRST = 44% mal-reduction at articular surface.

ORIF Malleolus PRIOR to IM rod of Tibia to prevent mal-reduction at the articular surface.
As an EXAMPLE...

AP looks really good
Mortise looks fine

WTF?

Let's look at the lateral of the ankle a little more closely...
Let's look at the lateral of the ankle a little more closely...

Let's look at the lateral of the ankle a little more closely...

What do you say we go back to the OR?

Yikes!
It’s definitely better, but it’s not perfect…

The Rod is in the way!

Does the Fibula need to be fixed?
Retrospective review of 72 patients with distal 1/3 tibial shaft fracture treated with IM Rod +/- fibular ORIF.

- 75% of mal-reductions occurred in group without fibular fixation.
- Loss of reduction during healing occurred in:
  - 4% with fibular ORIF
  - 13% without fibular ORIF

Conclusions: In this study, the proportion of fractures that lost alignment was smaller among those receiving stabilization of the fibula in conjunction with IM nailing compared with those receiving IM nailing alone. Adjunctive fibular stabilization was associated significantly with the ability to maintain fracture reduction beyond 6 weeks. At the present time, the authors recommend fibular plating whenever IM nailing is contemplated in the unstable distal tibial fibular fracture.

Retrospective Review
- 137 patients with distal 1/3 tibia shaft fracture with IM Rod
- None with Fibular fixation
- 3% mal-reduction and mal-union
- AND, 2 standard M-L locking screws are adequate!
But, this series did NOT include fractures with intra-articular or Posterior Malleolus extension
In Conclusion:

There is a very high incidence of intra-articular extension or involvement of the posterior malleolus with SPIRAL fractures of the DISTAL THIRD of the tibia that approaches 100% in many studies.
In Conclusion:
If you are treating a SPIRAL DISTAL THIRD tibial fracture, a CT SCAN is recommended in ALL cases to rule out intra-articular extension.

In Conclusion:
Reduction and Stabilization of the ARTICULAR component FIRST, PRIOR to intramedullary rodding of the shaft component appears to result in a LOWER mal-reduction and mal-union rate (of the joint).

In Conclusion:
While ORIF of the fibular fracture may not be required for all distal third tibial fractures, it does in help with rotational control of the distal segment and should be considered when intra-articular involvement is present.
Thank you very much for listening to me.