Update on the Treatment of the Rheumatoid Forefoot

Current Concepts in Foot and Ankle Surgery
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Disclosures

- I have no disclosures to make

Purpose

- Review the pathophysiology of rheumatoid forefoot disease
- Discuss the changes initiated by modern medical therapy
- Surgical treatment options
- Decision making
RA Forefoot Pathophysiology
- MTPJ joint inflammation, synovitis
- Attritional damage to ligamentous, capsular supports
- Chondral damage
- Para-articular bone resorption

RA Forefoot Pathophysiology
- Hallux valgus
- Loss of first ray integrity
- MTPJ subluxation/dislocation
- Migration of plantar fat pad
- Fixed hammertoe deformity
- Plantar callosities
- Metatarsalgia

RA Forefoot Pathophysiology
RA Forefoot Pathophysiology

Prevalence

- Extremely common
- As many as 90% with forefoot deformities
- MTPJ pain often the presenting symptom
- 65% develop MTPJ involvement during first 3 years of disease
- 2/3 develop subluxation and dislocation
- Hallux valgus in later stages in 60-90%
- 5-22% ultimately require surgical tx

- 1,000 RA patients
  - 45% - Forefoot involved at start
  - 86% - Current forefoot problems
  - 71% - Difficulty in walking
  - 41% - Foot was the most important part causing reduced walking capacity
- Up to ¾ have not seen FA specialist

Roma et al (J Foot Ankle Res) 2009
History and Physical

- Pre-diagnosis
  - Vague forefoot pain (metatarsalgia) and nonspecific forefoot swelling
- Late
  - Severity, correctability of MTPJ's
  - Severity of hallux valgus
  - First ray hypermobility
  - Plantar callosity

Nonsurgical Treatment

- Wide deep shoes
- Orthotics (Triple density)
- Relief for MT heads
- Arch support

RA Forefoot Surgical History

- Hoffman (1911): Metatarsal head resection through single plantar incision
- Nissen (1937): Amputation of all toes with disarticulation of the MTP joints
- Fowler (1960): Parabolic resection of MT heads with anterior advancement of plantar fat pad
- Clayton (1963): More aggressive osseous resection; if 3+ MT require excision, all 5 should be performed
- Mann and Coughin (1980): Arthrodesis of 1st MTPJ with basal resection of proximal phalanges
- Modified Hoffman-Clayton: Resection of distal 1st MT and use of double stem hinged implant
Rheumatoid Forefoot Reconstruction

A LONG-TERM FOLLOW-UP STUDY

BY MICHAEL J. COUGHLIN, M.D., BOISE, IDAHO

Investigation performed at St. Alphonsus Regional Medical Center, Boise

JBJS, 2000

- Forefoot arthroplasty
- Clayton-Hoffman procedure
- 1st MTPJ fusion
- Resection arthroplasty for rigid hammertoes
- Resection of MT heads 2-5 in parabola
- K-wire fixation
32 patients, 47 feet
6 year follow-up
100% great toe fusions
7% residual lesser toe dislocations
Good or excellent results in 45/47
AOFAS = 69
Pain absent or mild in 43/47
30% reoperation (IPJ, HWR, toes)

1st MTPJ fusion restores stability and weightbearing to first ray
Protects lateral rays from further deformity
Prevents recurrence of plantar keratosis
Medical Treatment

- Significant evolution of medical treatment
- Prior to 2000
  - NSAIDs
  - Prednisone
  - DMARDs (MTX, etc.)
- After 2000 – Biologics (TNF inhibitors, IL-1)
  - Remicade
  - Embrel
  - Humira

Medical Treatment

- Nikiforou et Al (Arthritis Rheumatol) 2014
  - Rates of hand/foot surgery - consistent decline from 1986 to 2011
- Bowen et Al (J Foot Ankle Res) 2010
  - Significant difference in Manchester foot pain and disability index
Questions

- Does the improved efficacy of medical therapies change the surgical treatment?
- Should alternatives to forefoot arthroplasty be considered?

Alternatives - 1st MTPJ

- Joint preserving hallux valgus correction
  - Lapidus, other
- Resection arthroplasty
  - Keller

Alternatives – Lesser MTPJ’s

- Arthrolysis
- Shortening osteotomy
  - Weil
  - Maceira
1st MTP Fusion v. Resection

- Tada et al (Mod Rheumatol) 2014
  - No significant differences with the exception of HVA.

- Grondel et al (Foot Ankle Int) 2005
  - No recurrences of prominences or tenderness under the forefoot in either group and no recurrence of severe hallux valgus in the resection group.

- Rosenbaum et al (Foot Ankle Int) 2011
  - Prospective, 53 pts
  - Arthrodesis - better foot function during the dynamic roll-over process even though the resection arthroplasty patients were subjectively more satisfied.

  - Retrospective, 53 pts
  - 29 were re-examined after a mean of 72 months
  - Excellent patient satisfaction and a significant, lasting reduction of the Foot Function Index - both.

1st MTPJ Realignment

- Yano et al (Mod Rheumatol) 2013
  - 35 feet, First MT osteotomy
  - JSSF score - 52.6 to 68.7

- Popelka et al (BMC Musculoskelet Disord) 2012
  - 143 Lapidus procedures, 125 patients
  - AOFAS - 48.6 → 87.6

Complete Joint Preservation

- Bhavikatti et al (Foot [Edinb]) 2012
  - 49 patients, 66 Scarf plus Weil
  - AOFAS - 39.8 → 88.7
  - Excellent - (74%), good - 9 feet, fair - 7 feet and poor - 1 foot.

- Niki et al (J Bone Joint Surg Br) 2010
  - 35 patients (99 feet)
  - Lapidus, MT osteotomies
  - Most satisfactory walking ability

- Barouk et al (Foot Ankle Clin) 2007
  - Excellent correction of the hallux valgus deformity (scarf) – 92%
  - 86% of the lateral metatarsal heads can be preserved using Weil osteotomies.
15 patient
- All well preserved 1st MTPJ
- 8 distal chevron, 2 IP fusion, 1 chevron plus akin, 2 no first MTP surgery
- 11 had development of a valgus deformity or inflammatory erosions
- Average time to failure 24 months
Hybrid Surgery

- 1st MTPJ fusion
- Lesser MT preservation
- Central lesser MT resection only

Preservation of Lesser Metatarsophalangeal Joints in Rheumatoid Forefoot Reconstruction

- Traditional forefoot arthroplasty
- Hallux fusion and partial lesser MT head resection
- Hallux fusion and maintenance of all MT heads
- All groups significantly improved
- No difference between groups
- Less sagittal deformity with preservation of the MT heads
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Hybrid Surgery

- Bolland et al (J Foot Ankle Surg) 2008
  - First MTPJ fusion + Weil’s metatarsal osteotomies of lesser rays
  - Retrospective, 17 pts (26 feet)
  - FU - 26.2 mos
  - 88% excellent or good
  - 76% improvement in pain
  - 74% improvement in function
  - 70% improvement in footwear
  - AOFAS - 72
  - 12% rate of recurrent metatarsalgia and or callosities

Bottom Line

- Literature support for joint preserving techniques in the rheumatoid foot
- Ongoing concerns
  - Recurrence
  - Metatarsalgia
  - Deformity
- Disease severity should be primary determinant

Summary

- Forefoot pathology is very common
- It is often undertreated
- For nonresponders with significant forefoot destruction:
  - Classic forefoot arthroplasty remains the best option
- For patients with limited forefoot involvement with good medical control:
  - Standard joint preserving techniques are viable option
  - More complicated
- Further studies