Gutter impingement is a frequent complication following total ankle replacement. The talar and tibial metaphyseal residuals are not routinely resected during the primary procedure. Impingement is evident on plain radiographs when due to heterotopic ossification or osteophyte formation. Single-Photon Emission Computed Tomography (SPECT CT) is often necessary to identify non-osseous etiologies. This case series identifies the incidence and type of gutter impingement in all primary TARs at our institution and details the diagnosis and treatment of the disease.

Methodology and Study Design

A retrospective chart review was performed of all primary TAR cases at our institution performed from 2008-2014. A total of 191 TARs were performed by a single surgeon. Follow up ranged from one to seven years following TAR. Cases requiring surgical intervention for gutter disease were identified. Operative reports, patient charts, and diagnostic imaging was reviewed to elucidate the type and incidence of gutter impingement as well as the treatment.

Procedures

Gutter impingement was treated surgically either through open medial and lateral ankle arthroscopy in 12 cases (32.4%) or through an anterior ankle arthrotomy in 25 cases (67.6%) (Figures 2-3). Ancillary procedures often included lateral ankle stabilization with peroneus brevis, Brostrom lateral ankle stabilization, curettage and grafting of bone cysts, polyethylene exchange, and release of osteoblasts and mesenchymal stem cells initiating ossification. Additionally, oversizing the talar component can lead to gutter impingement.

Out of 191 TARs there were 37 that required debridement for gutter impingement making the overall incidence of gutter disease 19.4%. Thirty-five of the TARs that required debridement were mobile bearing TARs. The incidence of gutter disease following TAR was 2.5 years (range 7 months to 4.3 years). In a study of 489 TARs by Schuberth et al., there was a 7% incidence of gutter impingement. However, they found that when they excluded a semi-constrained implant requiring synovectomy fusion, 18% required a subsequent gutter resection compared to only 2% who had gutter resection performed during the index procedure. In a study by Krause et al., 12 of 114 (10.5%) TARs had medial or lateral gutter impingement. In our study where patients did not have prophylactic gutter resection, the rate of secondary gutter resection was 19.4% compared to the study by Schuberth et al., but higher than in the study by Krause et al.

Patients with traumatic end stage arthritis likely have gutter impingement as a source of pain prior to initial TAR. Total ankle replacements are designed for preservation of at least a portion of the talomalleolar facets. Heterotopic ossification may occur in the medial ankle causing medial gutter impingement due to overgrowth of the deltoid ligament or due to components not adequately covering the resected portion of bone. Medial gutter impingement was more common than lateral in our study, but both were usually deformed. Disturbing the cortex and peristeme with bone resection causes release of osteoblasts and mesenchymal stem cells initiating ossification. Additionally, oversizing the talar component can lead to gutter impingement.

Clinically gutter pain may be vague and difficult to localize with direct palpation. Caution should be taken with the use of diagnostic injections due to risk of periprosthetic infection. Gutter disease etiology could be classified in our study as fibrous or osteophytic, sometimes mixed. This distinction has previously been described in the literature. Though purely osteophytic disease was easily identified on plain radiographs, advanced imaging, especially SPECT CT, was helpful in identifying fibrous or mixed disease (Figures 1-3). Given the appearance on SPECT CT, this fibrous disease was able to represent an inflammatory type of impingement which may be initially overlooked on a benign appearing plain radiograph. This difference in appearance was also noted intraoperatively.

While preemptive gutter resection may be indicated, complications can occur with overzealous gutter resection. The rate of intraoperative medial malleolar fractures during TAR may be as high as 20% and prophylactic pinning has been recommended. In a study by Schimmel et al., 134 mobile bearing TARs were reviewed comparing the complications in the first 50 compared to the last 50. There were three gutter impingements in both the first and last 50 patients, suggesting that even with experience it is difficult to gauge the adequate amount of gutter resection necessary. Ultimately determining the right balance of gutter resection intraoperatively is paramount in reducing revisional procedures and complications.

References