The Effect of Obesity on Total Ankle Arthroplasty Post-Operative Complications: A Systematic Review
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Statement of Purpose and Literature Review

Total ankle arthroplasty (TAA) has become an increasingly utilized alternative to ankle arthrodesis for the treatment of end-stage ankle arthritis [1,2]. However, despite progressive technological advances and the advent of multiple commercial implant systems, some concern remains for relatively high complication and failure rates associated with the procedure [3,4]. These rates are likely attributable to both implant- and patient-specific factors. Several patient-specific relative contraindications to TAA include, but are not limited to, the presence of diabetes, peripheral vascular disease, neurologic conditions, and tobacco use [5-7].

Another potential consideration might be patient body mass index (BMI), particularly when considering its impact on the development of post-operative complications, the longevity of the implant, and functional outcomes. Most of the contemporary orthopedic literature related to prosthesis complications associated with elevated BMI are focused on patients undergoing total hip and knee arthroplasty [8-10]. This literature provides evidence which suggests that there is a higher incidence of revision and infection, decreased implant survival, and decreased functional outcomes in those patients with a BMI greater than 30 kg/m2.

However, it remains unclear whether these conclusions are universal to all joint arthroplasties of the lower extremity as there is a relative paucity of literature specific to the relationship between elevated BMI and outcomes following TAA. Therefore, the objective of this investigation was to perform a systematic review of the incidence of post-operative complications in obese patients undergoing total ankle arthroplasty.

Methodology

We performed a systematic review of medical literature including PubMed and Ovid through Medline®, Embase, and the Cochrane Database of Systematic Reviews. Additionally, we performed a manual search of the references of any article we identified as meeting our inclusion criteria. The search was performed 07-2016 with no restriction on publication date and with the word query: ("total ankle arthroplasty" OR "total ankle replacement" OR "total ankle OR "TAR" OR "TAA" OR "ankle replacement") AND ("obesity" OR "obese" OR "body mass index"). The abstracts returned from these searches were initially reviewed by a single author (AJM) for relevance. Each potentially relevant report was then reviewed by two authors (LES and JCV) for our specific inclusion/exclusion criteria. Complete agreement between these reviewers was necessary for finalization, with the corresponding author (ASM) considered the final arbiter.

Inclusion criteria consisted of retrospective case series, randomized controlled trials, and prospective clinical trials with a ≥ 12 months, at least one defined cohort with a body mass index ≥30 kg/m², and a reported incidence rate of complications requiring revisional surgery at final follow-up. Only full-text reports were considered, and studies published in the English language were excluded.

Results

The searches for potentially relevant articles yielded 19 unique studies. We then obtained and reviewed each of those for our specific inclusion/exclusion criteria, and this resulted in the final inclusion of 4 published reports [11-14] (Table 1). Ten studies were excluded for not specifically examining a cohort of obese patients, three studies were excluded for having mean follow-up less than 12 months, 1 study was excluded for a lack of detailed description of post-operative complications, and 1 study was excluded for having a sample cohort < 15 subjects. Three of the included studies were Level-3 retrospective cohort analyses comparing a normal BMI population to an obese population, with one Level-4 retrospective case series of obese patients.

In total, these 4 studies included analysis of 400 implants, and of these, at least 71 (17.8%) developed a complication requiring a revisional surgical procedure. This included a specific description of subsequent surgeries for revision of metallic components (n=33), open or arthroscopich gutter debridements (n=29), tendon lengthenings, fascial releases and/or tenolysis procedures (n=15), incisional wound dehiscences (n=5), reconstructive realignment foot surgeries (n=5), excisional debridements for deep space infection (n=5), conversion to ankle arthrodesis (n=4), replacement of implant liners (n=3), and peri-prosthetic osteous cleft debridements (n=2). This is a description of 101 revisional procedures performed.

Discussion

The objective of this systematic review was to evaluate the incidence of complications requiring revisional surgery in obese patients undergoing total ankle arthroplasty. Therefore, we observed an incidence rate of complications requiring revisional surgery of at least 17.8% (71/400). The most commonly reported revisional surgeries were revision of the metallic components (32.7% / 33/101) and ankle gutter dehiscences (28.7% / 29/101). It is our hope that this investigation has added to the body of knowledge with respect to total ankle arthroplasty, and further investigations on the topic, provides foot and ankle surgeons with an objective measure of the perioperative risk associated with the procedure, and allows foot and ankle surgeons to more effectively communicate these risks to their patients during the education and consent process.

References

Authors Total Number of Implants in Participants with BMI ≥30 Type(s) of Implant Complications/ rate

Schupper et al 2016 N=49 implants Agility INBONE Salto Talaris N=21 implants requiring revisional surgery (42.9%)

Barg et al 2011 N=123 implants HINTEGRA N=23 implants requiring revisional surgery (18.7%)

Gross et al 2016 N=189 implants INBONE S.T.A.R. N=20 implants requiring revisional surgery (10.6%)

Bouchard et al 2015 N=39 implants Mobility HINTEGRA S.T.A.R. N=7 implants requiring revisional surgery (17.9%)

TOTAL N=400 implants

N=71 implants requiring revisional surgery (17.8%)

*Please don’t hesitate to contact AJM with any questions/concerns. He’s happy to provide you with a.