Guest editorial

Total ankle replacement

This issue of Acta Orthopaedica includes 3 articles on total ankle replacement (TAR), motivating this Guest Editorial (Nieuwe Weme et al. 2015, Kamrad et al. 2015, Horisberger et al. 2015).

Patients with painful degenerative ankle disease often ask me: "Doctor, what would your own choice be, prosthesis or fusion?". 10 years ago, with quite rough physical pursuits and as a surgeon encountering the considerable complications and reoperations after TAR, I would have chosen a fusion. After successful fusion, I would have less risk of persistent pain and no worry about loosening or additional surgical procedures. A risk of degenerative changes in the adjacent joints (Morrey and Wiedeman 1980, Coester et al. 2001, Fuchs et al. 2003) is—in my opinion—over-rated, and the association between degenerative changes in adjacent joints and clinical symptoms is uncertain (Morgan et al. 1985, Fuchs et al. 2003).

Today, at almost 60 years of age, being a cyclist and not a runner any more (as I do have an ankle problem) and with myself today, as ankle surgeon, achieving correct placement, proper alignment, stability, and hardly any early perioperative complications in a high proportion of TAR cases, I would consider replacement performed in a highly specialized unit.

Improving surgical techniques and expanding the indication for TAR

There is no doubt that from a surgical, technical point of view progress is being made. Not so long ago, a preoperative frontal plane deformity would have been considered a risk for failure of TAR (Doets et al. 2006, Henricson and Ågren 2007, Wood et al. 2008). However, after correcting hindfoot deformity peroperatively, or before or after the index procedure, Hobson et al (2009) found similar survival, postoperative motion, and complications between a preoperative hindfoot deformity of up to 10° (91 ankles) and a deformity group of 11° to 30° (32 ankles). Nieuve Weme et al. (2015) compared the medium-term results of TAR between a group of 50 patients with arthritis secondary to an intra- or juxta-articular fracture and a group of 40 patients with ligamentous posttraumatic arthritis secondary to a severe ankle sprain or chronic lateral instability. The latter group was characterized by instability and a varus deformity, addressed by medial soft tissue release or medial malleolar osteotomy. Contrary to expectations, survival rate, complications, reoperations, and clinical and radiographic outcomes were similar in both groups. Thus, with improved balancing techniques (lateral ligament reconstruction, realignment, and stabilizing osteotomies and fusions, not applied in this study, might also be used), a preoperative frontal plane deformity does not impair outcome after TAR.

Survival rate and complications of TAR; still a long way to go

Nieuwe Weme et al. (2015) reported a survival rate of 87% in the postfracture group and 79% in the instability group at 6 years. Kamrad et al. (2015), using the failure criteria for TAR as defined by Henricson et al. (2011), found a survival rate of 84% for primary TARs after 5 years and 74% after 10 years in the Swedish Ankle Registry. The survival rates after hip and knee replacement are considerably higher. Why perform TAR with a risk of reoperations, and major revision surgery considerably higher than that after a successful fusion (which is certainly not always obtained) (SooHoo et al. 2007, Saltzman et al. 2009). However, a successful TAR means a stable, painless, and also mobile joint.

One of the major concerns after TAR is development of periprosthetic osteolytic lesions. These were identified in a quarter of the ankles by Nieuve Weme et al. and they were the reason for salvage fusion in half of the failures. This problem has been described with most types of TAR designs (incidence in the literature varies from 0% to 95%) and it is a risk factor for later mechanical failure (Yoon et al. 2014). Early micromotion before bone ingrowth, high interfacial shear stress, high fluid pressure, damage to blood vessels of the talus, and host response to particulate debris have all been reported, but so far the exact pathophysiology of the osteolytic cysts remains an enigma (Yoon et al. 2014, Dalat et al. 2013). CT evaluation and grafting with spongiosa is generally advised in cases of progressive osteolysis.

Disappointing results after component exchange of TAR

What does one do when the prosthesis fails with deficient bone stock? As an alternative to revision arthrodesis as salvage procedure, Horisberger et al. (2015), explored the possibility of performing a 1-stage (6 patients) or 2-stage (4 patients) revision, reconstructing bone defects with structural iliac autograft and iliac crest spongiosa, stabilized as needed with screws and plates and using revision implants. Bone stock was successfully restored in all cases, but after an average follow-up of 4 years, 2 of the 10 cases had to be converted to tibiotalocalcaneal arthrodesis because of persistent pain. Of the remaining 8 patients, half had no pain.

DOI 10.3109/17453674.2015.1056701

It is important to realize that the results after revision TAR, as in the above-mentioned study, or the results of ankle fusion as salvage procedure for a failed TAR, are inferior to the results after a primary TAR or primary fusion. Kamrad et al. (2015) analyzed prosthetic survival, self-reported function, and patient satisfaction after component exchange in 69 cases in the Swedish Ankle Registry. 24 of these patients had a new failure after a median of 2 years. The survival rate of the revision TAR was 76% at 5 years and 55% at 10 years. The functional scores were found to be low, and only about half of the patients were satisfied. 47 additional surgical procedures (34 of them major) were performed in 28 of these 69 patients.

Discussion

It is obvious that we should, as emphasized by Kamrad et al., inform our patients when considering a primary TAR that there is a substantial risk that the procedure will be followed by additional surgeries The high value of their study is that the outcome of nationwide revision TAR surgery was determined. We learn that the orthopaedic surgeons in Sweden—who are responsible for all or almost all TAR surgery and who have a high degree of competence—do not have the same results after revision TAR as some highly specialized surgeons. Hintermann et al. (2013) achieved a 9-year survival rate for revision TARs of 83%, similar to their outcome after primary TAR. Kamrad's report comforts me that I am not the only surgeon being confronted with a serious amount of problems after TAR, and affirms my doubts about performing a revision TAR in case of failure.

Our goal should be to improve results and to establish as good results after TAR as after hip and knee replacement. In many specialized units, TAR has become a more or less routine operation in most but not all patients. We should continuously strive to identify the patients who are better off with a TAR than a fusion, to improve our surgical technique, to perform prospective studies, and provide data to the national registries. The low numbers of TARs being performed relative to the numbers of hip and knee replacements seem to have caused a reduced degree of interest from the industry. However, we need industry to improve designs and instrumentation.

Providing our patients with correct information regarding the results and the complications of TAR, discussing the pro's and the con's of TAR and ankle fusion, and somehow at the same time selecting patients for one or the other procedure is still a rather complex task.

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