Catastrophic Polyethylene Failure in the Scandinavian Total Ankle Replacement (STAR): An Analysis of Patient and Implant-Related Factors

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Introduction
The STAR (Waldemar-Link, Hamburg) is an uncemented, three-component, mobile-bearing fully conforming and minimally constrained total ankle replacement design. Early catastrophic failure of the polyethylene has recently been reported by some authors with this implant. Since the STAR is a newcomer on the US market, one can certainly expect an increase in the use of this device in North America in the next decade. Therefore, a closer look for the etiologies behind this particular complication is needed.

Methods
A consecutive series of 50 STAR total ankle replacements in 45 patients has been followed prospectively with respect to demographics and subjective patient-based outcomes. A subgroup of 9 patients (12 STAR) who underwent revision for catastrophic polyethylene failure was compared to the group of patients without this complication to try to determine independent variables of early polyethylene failure based on total hip, knee and ankle replacement literature. A retrospective radiologic evaluation was also conducted.

Results
The mean time from implantation to failure was 52.6 months. No significant trauma was related to these failures. The mean age for the patients with catastrophic failure was 64 years old compared to 61.1 for the control group. In the catastrophic failure group, there were more men relative to female, and the majority had a diagnosis of either post-traumatic or primary osteoarthritis of the ankle. Mean BMI were 27.0 and 29.5 for the control group and the polyethylene failure group respectively. Our data also revealed that the failure group had better outcomes score. There was no difference noted in the size or thickness of the implants used between the two groups, as was the rate of additional procedures performed. Surgeon's experience in STAR implantation or total ankle replacement in general did not seem to play a role either.

Conclusion
This study supports the fact that patients with better outcomes from their total ankle replacement tend to be more active and are therefore more at risk of early catastrophic failure. No other implant or patients-related factors were identified as significant. In addition, the design of the STAR might also play an important role in these early failures. Orthopaedic surgeons should be more cautious in the selection of their patients undergoing STAR total ankle replacement.