Diabetic Foot Infection: Outcomes in Surgical Management using an Antibiotic Loaded Hydroxyapatite and Calcium Sulfate Void Filler, in a Cohort with Significant Levels of Vascular Disease

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INTRODUCTION: Diabetic foot infections (DFI) are a serious complication, associated with high levels of morbidity and mortality and involves costly, prolonged management. The incidence of diabetic foot ulcers is 10%, which can become detrimental through the introduction of pathogens, causing soft tissue infections or osteomyelitis. DFI is now the most common cause of atraumatic limb amputation in the United Kingdom. Surgical management can be difficult due to associated vascular disease, resulting in poor perfusion and delivery of systemic antibiotics, as well as the formation of biofilm, multi-resistant organisms and the need for multiple debridements, without destabilizing the structure of the foot. This study aims to review surgical outcomes of DFI, with local application of an antibiotic loaded hydroxyapatite and calcium sulfate bio-composite void filler, in a cohort with significant levels of vascular disease.

METHODS:

A retrospective review of surgically managed diabetic foot infections, in a tertiary referral multidisciplinary diabetic foot unit, was carried out between 2020 and 2023. The inclusion criteria was: diabetic ulcers, osteomyelitis, intraoperative intraosseous, and soft tissue application of an antibiotic loaded hydroxyapatite and calcium sulfate bio-composite void filler. Electronic patient records were reviewed for data collection.

RESULTS:

Twenty-two operations in 20 patients were included, with an average age of 57 years. The average HbA1c was 68 (IQR 54-78). Diabetic ulcers were present in 91% and 100% had osteomyelitis (Cierney-Mader class B hosts). Average time to ulcer healing was 19 weeks (10-28), with forefoot ulcers healing quicker than midfoot/hindfoot (100 vs. 194 days, p=0.05) and grade 1&2 ulcers healing more than 50% faster than grade 3 (79 vs. 166 days, p=0.099). Of the survived patients, 82% ulcers fully healed. Only 3 patients (15%) required a second debridement and 2 re-ulcered requiring surgery (10%). Limb salvage rate was 95%, with only 1 patient (5%) requiring a BKA, secondary to vascular complications.

In total, 100% had peripheral vascular disease with 50% of patients having undergone ipsilateral angioplasty or bypass operations. Those requiring vascular intervention took 57% longer (63 more days, p=0.21) to heal. Some 77% had previous ipsilateral amputations or debridement for infection control, with 65% of these being in the 6 months preceding our intervention.

DISCUSSION AND CONCLUSION:

Our cohort has a higher level of vascular disease (100% PVD) and preoperative revascularization (50%) compared to previously published literature. Despite, this, our management of diabetic foot infections has shown comparable results with a 95% limb salvage rate and an 82% ulcer healing rate, highlighting the importance of local antibiotic loaded hydroxyapatite and calcium sulfate bio-composite void filler, in the surgical management of diabetic foot infections.