INTRODUCTION

Diabetes mellitus and end-stage renal disease (ESRD) have both long been known to impede wound healing. Patients with both of these comorbidities have over 2X the frequency of foot complications and over 6X the rate of amputation compared to the general diabetic population (1). Research also suggests that wound healing in patients with both diabetes mellitus and ESRD is further complicated by a strong correlation between ESRD and failure of transepidermal ammonium to heal has been reported (2). One of the details of the processes and mechanisms used in treating a 58-year-old male patient with Type II diabetes, ESRD on hemodialysis, HLD, HTN, and CAD who presented to the Southern Arizona VA Emergency Department with a large gangrenous infection. Patient was placed on long-term IV antibiotic upon presentation. Patient underwent an initial incision and drainage procedure with subsequent open transmetatarsal amputation. Once the acute infection had resolved, a variety of advanced modalities and procedures were used to facilitate wound healing, including negative pressure wound therapy, placental products (Graft®), and an acellular dermal matrix (ADM) (Dermacell®). The course of approximately 6 months, complete healing of the wound occurred despite the size of the wound and the patient’s multiple comorbidities. Following complete healing of the wound, advanced treatment modalities were used to prevent and closely monitor the patient’s risk of reulceration.

RESULTS

Following complete healing of the wound, the next priority was preventing reulceration due to the new slope and function of the foot. Podiatry worked closely with the Prosthetics department to develop a custom shoe with a custom plastic insert to help prevent pressure to the bony prominences of the remaining mutilated stumps.

Standard non-invasive vascular imaging consists of Ankle-Brachial Index (ABI) and toe pressure. While helpful in evaluating healing potential, these modalities are sometimes inaccurate when a patient has significant arterial calcification. This results in falsely elevated ABI values. As such our patient had right ABI’s of 1.38, but exhibited significant vascular calcification on venography. The LUMA® Bursacence angiography system (Novadaq) allows for real-time visualization of perfusion to wound beds, providing a more accurate evaluation of healing potential. The imaging process utilizes iodine-doped green dye, which is non-toxic. Our patient exhibited adequate tissue perfusion to the amputation site.

CONCLUSIONS

Patients with multiple comorbidities present unique challenges in wound healing. Our case cannot be overlooked - one such patient. Once the acute infection has resolved and all necessity of nail have been cleared, the team was able to attempt all available modalities to both heal the wound and prevent reulceration from occurring. The SNAP® negative pressure wound therapy system has been shown to promote healing and provide an environment that promotes angiogenesis. Specifically, SNAP® has been shown to promote the growth of healthy granulation tissue. In our case, this modality effectively shrunk the wound depth and transmetatarsal amputation. chPIM products, such as Graft®, provide wound beds with a structural support of viable acellular dermal skin cells. With weekly use, the wound size steadily decreased in our patient. Dermacell® is an ADM that has shown increased cell infiltration, host in, and angiogenesis in comparison to other ADBMs. After 6 weeks of improvement, our patient’s wound had significantly decreased size.

Following complete healing of the wound, our attention turned to utilizing all available possible modalities to prevent recurrence. Custom shoe gear was developed to accommodate all bony prominences of the foot. The RTMS was used daily by the patient to allow remote monitoring of the patient’s limb to detect any risk of reulceration. Through these modalities, our patient has remained wound-free and ambulatory.

Our case demonstrates that even large wounds in patients with multiple comorbidities can heal and remain healed with appropriate use of the many advanced treatment modalities available.

REFERENCES


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