Use of Antibiotic Beads as Adjunctive Therapy in Managing Diabetic Foot Infections.

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Statement of purpose

Diabetic foot complications are an increasingly occurring problem worldwide creating burdens on already strained health care systems [1]. Hospitalizations for diabetic foot infections (DFI) can be particularly costly as these are commonly treated in a staged surgical manner. The initial surgery is to remove all infected or necrotic tissue and leaving the wound open to allow drainage while the infection clinically resolves. This can take several days in the hospital. After clinical resolution, a 2nd surgery is performed to close the wound either directly or through grafts or flaps.

The time in the hospital can be particularly costly both directly as well as labor such as dressing changes. In this study we present our protocol of applying antibiotic impregnated antibiotic beads to the DFI site. This is to allow quicker resolution of infection via localized antibiotic delivery, and to simplify dressing changes as these do not need to be changed unlike packing gauze.

Case Presentation

A 72M with PMH of DM CKD, CAD, HTN, HLD was treated for chronic foot ulcer by local wound care presented to the ED out of concern of fever and worsening appearance to the wound (Figure 1). Exam showed significant purulent drainage and erythema. X-ray showed concern of multifocal osteomyelitis.

An Incision and drainage and removal of infected bone with performed and all infected tissue removed (Figure 2). The wound was packed with Calcium Sulfate beads (Stimulan) impregnated with Vancomycin and Gentamicin (Figure 3). These beads are secured with non adherent gauze overlay to allow for continued drainage and filling of dead space. The outer dressing is sterile gauze with kerlix and compression wrap.

Treatment and Follow up

The antibiotic beads are left undisturbed while infection is resolving. Dressing changes only involve changing the outer gauze instead of removing and replacing packing strips which is more burdensome to staff and uncomfortable to the patient.

After resolution of infection is noted clinically and through labs a 2nd procedure is done. The beads are removed, and the site inspected to ensure no necrotic tissue remains. Closure is either done primarily or by grafting or flap coverage. The patient is typically discharged after this and follows up in clinic for further care.

Clinical Application

Figure 1: Infected foot wound with significant purulence and erythema.

Figure 2: Wound is fully opened to allow for removal of all necrotic and infected tissue.

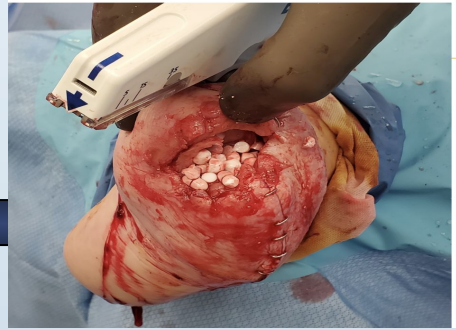

Figure 3: Antibiotic Beads (Stimulan) are delivered to the site to allow for drainage and closure of dead space

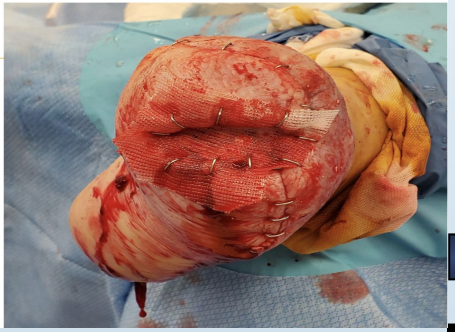

Figure 4: Beads secured with non adherent dressing and left in place. This simplifies dressing changes compared to gauze packing which needs to be changed frequently.

Discussion

25% of diabetic patients incur a foot wound at some point, and these become high risk of infection 1. This presents significant cost and burden to both the healthcare system as well as the patient themselves

Surgical treatment of DFI is typically performed in a staged manner as closing an infected wound has high risk of recurrence. The period of hospitalization to allow for resolution of a wound creates further costs to the healthcare system, the patient, and disrupts the patient's life.

Our protocol of using antibiotic beads (Stimulan) accomplishes several goals. The first of which is localized antibiotic delivery. Diabetics often have some degree of microvascular and large vessel arterial disease which can hinder delivery of IV antibiotics to the infected foot. These beads allow for immediate antibiotic delivery with minimal risk compared to systemic administration .

The other goal of using these beads is to simplify labor involved with dressing changes. Traditional gauze packing strips need to be changed frequently and are burdensome for staff as well as uncomfortable for the patient. We find these beads allow for adequate wicking of drainage as well as closure of dead space. When using these beads, only the outer gauze layers get changed. This is less cumbersome then exchanging packing strips.

It is our hope by presenting this protocol of adjunctive antibiotic bead therapy in management of DFI we can guide other clinicians in the management of DFI's.

References

1. Raghav A, Khan ZA, Labala RK, Ahmad J, Noor S, Mishra BK. Financial burden of diabetic foot ulcers to world: a progressive topic to discuss always. Ther Adv Endocrinol Metab. 2018 Jan;9(1):29-31.