Combination of Advanced Wound Care Modalities for an Infected, High-Risk Patient: Case Study

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Abstract

Chronic wounds with osteomyelitis and abscesses requiring incision and drainage can create complex wounds and a high acuity treatment scenario. Patient compliance and agreement to treatment protocols can create concerns for lengthening the life of the wound and likelihood of re-infection. Our case study describes the journey of one patient with a complicated disease process and several confounding factors that put him at risk for wound chronicity and amputation. Using an "aggressive" combination of advanced modalities including surgical drainage, debridement, application of single use graft, negative pressure wound therapy, and concurrent oral antibiotics can provide a satisfactory treatment algorithm. Shortening the life of the wound can decrease rates of re-infection, decrease incidence of re-hospitalization, and reduce healthcare costs.

Single Cryopreserved Umbilical Tissue Graft applied surgically to a non-compliant, young patient with chronic ulcers to RIGHT Hallux with concurrent osteomyelitis. Negative Pressure Wound Therapy (NPWT) was also initiated over the graft and oral antibiotics were given to treat acute osteomyelitis of the distal phalanx.

A large, infected wound overlying the 1st Metatarsophalangeal joint with exposed tendon and known osteomyelitis was able to shrink in size quickly, decreasing risk for re-infection and amputation. The patient in our case study required multiple surgeries and did leave the hospital against medical advice and returned to complete treatment. The wound was able to heal almost completely before being lost to follow-up.

Utilizing advanced wound-care modalities can help with achieving closure of wounds and protection of vital structures sooner. In cases where patient compliance complicates delivery of care; Home health nursing visits can be a useful adjunct, especially when utilizing NPWT. In the future we will employ these tactics as indicated for high-risk patients with complicated wounds.

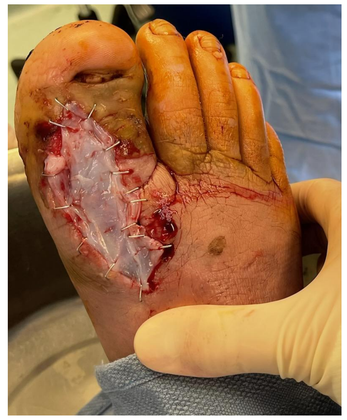
Introduction

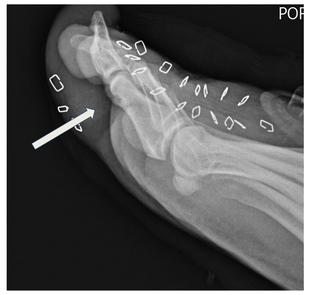
Chronic wounds are nothing new to Wound Centers or the Podiatry service at our facility. Wounds are typically defined or categorized as a "chronic" wound after not improving more than 50% in after 4 weeks of standard of care.(1) While this exact definition is not universally agreed upon, there are features of chronic wounds that are shared and that can make healing the wound challenging.(2) The interesting thing about this case is that the wound was consistent with a diabetic foot ulcer (DFU) in the absence of a diabetes diagnosis. This patient presented struggled with alcohol abuse which has been shown to affect nutritional status (3) and also had admitted a history of other drug use and mental health diagnoses.

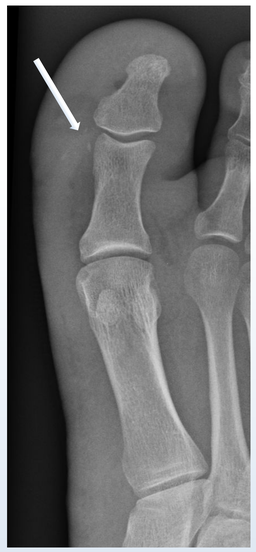
Additionally, this case involved a series of incision and drainage surgeries which caused a significant deficit of tissue and exposed underlying structures including bone, fascia and tendon. Advanced wound care products can accelerate healing and formation of granular tissue formation to help cover deep structures and promote a healthier wound bed. (4) Of particular interest to this case was the use of a cryopreserved Umbilical tissue graft which has a significant quantity of living stem cells which have been shown to close DFUs at a faster rate when compared to the traditional standard of care. (5-6)

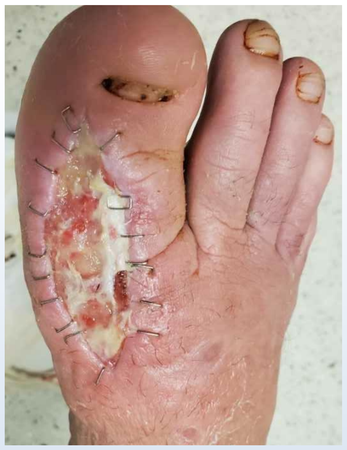
Introduction Continued

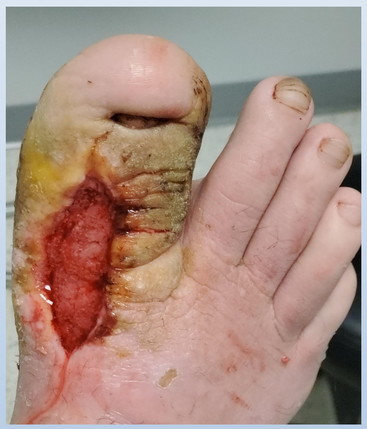
We also elected to utilize NPWT in this case to manage the heavily exudating wound and cover the graft. The vac was also helpful in this case in aiding with granulation tissue formation. Historically, NWPT has been used as a adjunct to both traumatic and chronic wounds to reduce edema, control bacterial contamination and reduce the number of dressing changes. (7-10)

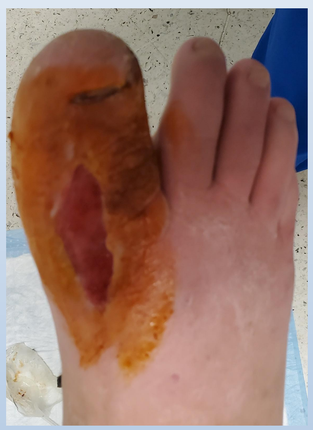


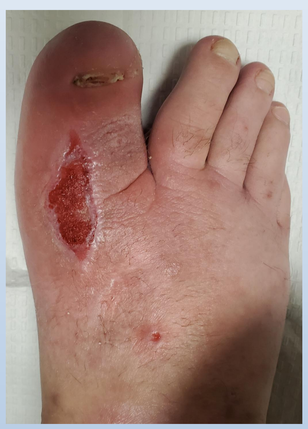


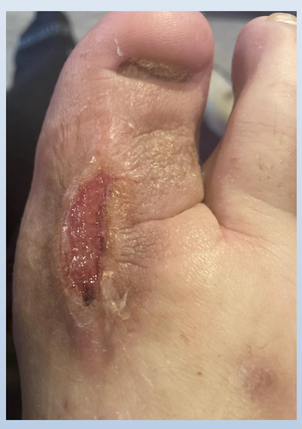












Materials & Methods

The patient in our case study was a 28 y/o male with a PMHx of anxiety, ADHD, Depression and EtOH abuse with peripheral neuropathy secondary to his history of EtOH. He stated in the ED that his wound has present, off and on for the past 2.5 years. He had been hospitalized for wounds to his feet in the past but denied any recent issues until he presented to the ED on 9/2/22.

Initial incision and drainage (I&D) was performed after admission to our hospital and consultation of our service. Wound cultures and bone biopsy performed at that time. The patient did leave AMA the following day after the initial surgery due to his personal commitments and overall dissatisfaction with the hospitalization process. It was noted in the chart that he was non-compliant with remaining non-weightbearing and that he removed his dressings to shower that morning. He was also seen taking medications from home and security was called to suspend this illicit activity.

The patient did leave against medical advice but stated that he would return the next day. At that time, the cultures from the bone grew out staph aureus and the bone biopsy revealed acute osteomyelitis.

However, he did return and underwent a second I&D with application of a Cryopreserved Umbilical Tissue Graft.

It was discussed with the Medicine team that the patient would not be a good candidate for a PICC line due to polysubstance abuse issues and patient compliance with care so far. After sensitivities returned, he was placed on oral Moxifloxacin which was used to treat after discharge.

We did apply the KCI wound vac (NPWT) over the graft at 125mmHg and utilized this for approx 6 weeks. Of note, the patient was also intermittently compliant with allowing home health nurses into his home to change the vac.

A high-tide pneumatic walking boot was used to off-loading the wound and help stabilize the vac. He was compliant with this for approx 3 weeks.

Results / Discussion

The patient in this case study was followed for only 9 weeks after surgery and was inconsistently compliant with not only the wound care instructions but follow-ups. He was contacted to follow-up and the initial plan was to apply another cryopreserved umbilical graft to potentially speed up closure but this did not occur.

Below are the measurements of the wound we were able to take at his follow-up appointments. The wound vac was discontinued at his last appointment and he was transitioned to a collagen dressing with DSD.

Date	Dimensions	Total Area of Wound
9/7/22 (I&D#2)	7.7 x 2.8 x 0.5 cm	21.56 cm2
9/14/2022	Graft left intact	21.56 cm2
9/21/2022	No Show	*
9/28/2022	5.7 x 2.0 x 0.7 cm	11.4 cm2
10/19/2022	4.5 x 2.0 x 0.3 cm	9 cm2
11/2/2022	No Show	
11/9/2022	3.5 X 1.5 X 0.1 cm	5.25 cm2

Conclusion

Infected foot ulcerations in high-risk populations can be challenging cases to manage and achieve good outcomes. Prevention of re-infection and reducing risk of amputation is always the primary goal in acute, inpatient wound management. We found from this case that a "kitchen-sink" approach allowed us to secure a favorable outcome. Many chronic wound patients struggle with compliance to wound care plans and no-shows/issues with follow-up are legion in the wound care industry.

We posit that by engaging and implementing several advanced wound care modalities, we were able to reduce the size and complexity of the wound at faster rate and thus decrease the risk of further complications and possible amputation in this particularly challenging case.

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