Use of Chitosan-based Hemostatic Dressings Facilitates Safe, Thorough Debridement of Chronic Wound Eschar at the Bedside

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Background

Chronic wounds such as diabetic ulcers, pressure sores, and venous stasis ulcers often present with necrotic eschar requiring aggressive debridement. Patients' comorbidities often preclude them from safely tolerating a general anesthetic without risk. These patients are often debilitated with coagulopathies or on significant antithrombotic therapies. On the other hand, bedside debridement is often limited by concerns of hemorrhage outside of the controlled setting of the operating room. We hypothesize that the availability of effective hemostatic dressings allows for safe, effective, thorough debridement of necrotic chronic wounds at the bedside, thus improving patient safety and wound care while optimizing resource and personnel utilization, particularly in debilitated patients.

Methods

Twenty wounds in 14 patients were sharply debrided at the bedside. Immediately after debridement chitosan-based hemostatic dressings (HemCon® Bandages) were applied along with two minutes of direct pressure to the wounds. After pressure was held for two minutes, the wounds were packed with a dry dressing that was left in place for 24 hours. Dressings were then changed to routine wound dressings. Wounds were assessed for successful hemostasis.

Chitosan-Based Dressings

Chitosan is a naturally occurring bio-compatible and bio-degradable polysaccharide derived from chitin, the structural element in the exoskeleton of crustaceans. Chitosan-based dressings have rapidly gained acceptance in military and traumatic wound settings where massive hemorrhage often leads to depletion of clotting factors. Chitosan's mechanism of action functions independently of either the intrinsic or extrinsic clotting cascades and forms an immediate seal on wounds. This allows time for the patient's native coagulation pathway to take effect. Furthermore, the use of chitosan has been implemented in order to specifically address bleeding while minimizing collateral tissue injury inherent with electrocautery.

Results

The successful implementation of chitosan-based hemostatic dressings allowed for safe yet adequately aggressive sharp debridement of 20 wounds in 14 patients at the bedside without complication. These wounds would otherwise have been inadequately debrided at the bedside due to bleeding concerns or would have required a trip to the operating room.

Conclusion

The use of chitosan-based dressings is a safe, cost-effective alternative to operative debridement for deep wounds and/or superficial wounds in non-operative patients and/or patients with coagulopathies. All patients were successfully debrided at the bedside without the need for electrocautery. Further research is warranted on use in inpatient and outpatient settings.

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Pre-bedside debridement
Left foot wound in a 51 year old obese, diabetic male patient.

Post-bedside debridement
Prior to application of chitosan-based dressing.

Post-bedside debridement
After application of chitosan-based dressing.

AGE	WOUND LOCATION / ETIOLOGY	COMORBIDITIES	OUTCOME
64	L plantar foot wound/ Diabetic Foot	T2DM, CVA, CHF, Smoker	Successful Hemostasis
81	Sacral/Pressure	Alzheimers, HTN, HL, COPD, Aortic Aneurysm	Successful Hemostasis
75	Sacral/Pressure	Transverse Myelitis, T2DM, CAD, HTN, CVA, PVD, Hypothyroidism	Successful Hemostasis
35	B/L foot wounds/ Pressure & Diabetic	T5-6 Paraplegia, Obesity, T2DM	Successful Hemostasis
58	Sacral/Pressure	T2DM, HL, DVT, Endocarditis	Successful Hemostasis
56	L ischial/Pressure	C4 Quad, T2DM, Obesity, HTN, CAD	Successful Hemostasis
53	L ischial & Sacral/ Pressure	C6 Quad, COPD, Smoker, ETOH Abuse	Successful Hemostasis
62	R ischial/Pressure	T6 Paraplegia, CVA, HTN, HL	Successful Hemostasis
77	Sacral/Pressure	T10 Paraplegia, DVT, Gout, HTN, COPD	Successful Hemostasis
51	Bilateral posterior thigh & feet/Pressure	Obesity, HTN, Venous Insufficiency, Lymphedema	Successful Hemostasis
64	R medial thigh/ Pressure	Dry Gangrene, CHF, UTI, Respiratory Failure	Successful Hemostasis
70	Sacral/Pressure	Alzheimers, Osteoporosis	Successful Hemostasis
73	L ischial/Pressure	T3 Paraplegia, HTN, PVD, HL	Successful Hemostasis
49	L calcaneal/Pressure	CVA, CAD, HTN, PE	Successful Hemostasis