# The Ability to Perform Optimal Debridement in Patients on Anticoagulant Therapy With Use of a Chitosan-based Hemostatic Agent

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## BACKGROUND

Debridement is a  key component of wound care.[1] Optimal debridement may be difficult to achieve in patients on anticoagulant therapy due to the concern for difficulty in achieving hemostasis.[2]

Another consideration is use of a hemostatic agent that is not caustic to the wound bed to minimize any further damage which could perpetuate prolonged healing.[2,3,4,5]

Presented here are three cases of wounds in patients on anticoagulant therapy where a chitosan-based hemostatic agent was used following wound debridement to achieve hemostasis.

## PROTOCOL

**OMNI-STAT chitosan-based hemostatic granules:**

1. **Pour** granules to cover the wound bed
2. **Pack** the granules into the wound to ensure contact
3. **Press,** holding pressure for 1 to 3 minutes

**OMNI-STAT chitosan-based hemostatic gauze:**

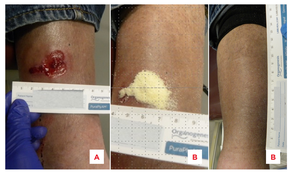
1. **Pack** the wound with the gauze
2. **Press,** holding pressure for 1 to 3 minutes

## CASE REPORT ONE

65-year-old male on Apixaban two weeks following suture removal at another facility for a traumatic wound sustained to the right leg (A). Debridement performed and chitosan-based hemostatic granules applied (B). Hemostasis achieved allowed for adjunctive use of an antibiotic coated collagen dressing at three weeks following initial presentation. Chitosan-based hemostatic granules were applied following weekly debridement on an as needed basis (C). (Wound resolution was achieved at one month (D). The wound remained healed at six months following resolution (E).


## CASE REPORT TWO

73-year-old male on Warfarin and Enoxaparin presented with a fresh, actively bleeding wound immediately after hitting his left leg on his truck (A). A chitosan-based topical hemostatic agent was utilized to obtain hemostasis allowing for application of a silver-impregnated collagen product. Chitosan-based hemostatic granules were applied following weekly debridement on an as needed basis (B). Wound resolution was achieved at two weeks. The wound remained healed at four months following resolution (C).




## CASE REPORT THREE

72-year-old male with peripheral arterial disease presented to clinic with a wound to the Left foot heel originating from ill-fitting shoe gear. (A). Vascular intervention was performed, and the patient was placed on Clopidogrel for anticoagulant therapy. Treatment began with debridement and application of chitosan-based granules.(B) Rapid hemostasis allowed for early adjunctive use of an antibiotic coated collagen dressing, a silver impregnated collagen dressing, and two types of placental allografts to try and expedite healing. Due to failure of wound progression with these advanced treatment modalities, they were discontinued. Treatment continued only with debridement and application of chitosan-based hemostatic granules. The wound begun to progress towards resolution with this treatment. Wound appearance at six weeks. (C). Wound resolution was achieved at ten weeks (D).


## RESULTS

The cases presented here demonstrate the ability of a chitosan-based hemostatic agent to achieve rapid hemostasis in acute and chronic wounds in patients on anticoagulant therapy. This allowed for adjunctive use of other advanced wound care products in two patients, who all achieved wound resolution. One patient achieved resolution after discontinuation of all advanced wound care products and treatment with debridement and application of the chitosan-based hemostatic agent alone.

## DISCUSSION

Chitosan is a naturally occurring biocompatible, biodegradable, and non-toxic hemostatic agent with antimicrobial and antifungal properties that has been shown to promote wound healing.[6,7] Results of the case series presented here suggest that, in addition to rapid hemostasis, use of the chitosan-based hemostatic agent does not cause tissue injury that could prolong healing and may help expedite wound resolution.

**References: 1.** Pérez-Panero AJ, Ruiz-Muñoz M, Cuesta-Vargas AI, Gónzalez-Sánchez M. Prevention, assessment, diagnosis and management of diabetic foot based on clinical practice guidelines: A systematic review. Medicine (Baltimore). 2019 Aug;98(35):e16877. **2.** Snyder, RJ, Sigal BD. The importance of hemostasis in chronic wound care: An open-label controlled clinical study of OMNI-STATE (Chitosan) versus standard of care in post-debridement treatment of patients with chronic wounds with or without concomitant use of anticoagulants. WCHM. 2010. 4(2):9-16. **3.** Ogawa C, Sato Y, Suzuki C, Mano A, Tashiro A, Niwa T, Hamazaki S, Tanahashi Y, Suzumura M, Hayano S, Hayakawa M, Tsuji T, Hoshino S, Sugiyama Y, Kidokoro H, Kawada JI, Muramatsu H, Hirakawa A, Ando M, Natsume J, Kojima S. Treatment with silver nitrate versus topical steroid treatment for umbilical granuloma: A non-inferiority randomized control trial. PLoS One. 2018 Feb 13;13(2):e0192688. **4.** Groenewold MD, Gribnau AJ, Ubbink DT. Topical haemostatic agents for skin wounds: a systematic review. BMC Surg. 2011 Jul 12;11:15. **5.** Kang BS, Na YC, Jin YW. Comparison of the wound healing effect of cellulose and gelatin: an in vivo study. Arch Plast Surg. 2012 Jul;39(4):317-21. **6.** Dai T, Tanaka M, Huang YY, Hamblin MR. Chitosan preparations for wounds and burns: antimicrobial and wound-healing effects. Expert Rev Anti Infect Ther. 2011 Jul;9(7):857-79. **7.** Dreifke MB, Jayasuriya AA, Jayasuriya AC. Current wound healing procedures and potential care. Mater Sci Eng C Mater Biol Appl. 2015 Mar;48:651-62.