RANDOMIZED TRIAL COMPARING NEW CHITOSAN-BASED BANDAGE WITH KALTOSTAT HEMOSTATIC DRESSING TO CONTROL BLEEDING FROM HEMODIALYSIS PUNCTURE SITE.

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INTRODUCTION

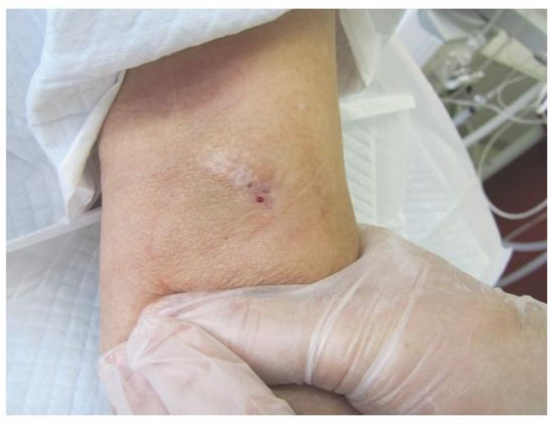
Many patients undergoing hemodialysis have thin and weak skin over the vascular access sites due to repeatedly punctures. Furthermore, the patients not only have coagulopathies associated with chronic renal failure, but also use heparin and oral anticoagulants. In case of prolonged bleeding at the vascular access site after hemodialysis, a nurse must compress the bleeding site longer than usual and might cause thrombosis, not to mention consuming valuable staff time.

To investigate whether application of a chitosan-based bandage (HemCon Strip, HemCon Medical Technologies, Portland, USA) to stop bleeding from a hemodialysis puncture site shortens the time to hemostasis compared to a standard topical hemostatic alginate dressing (KALTOSTAT® Calcium Sodium Alginate Dressing), we conducted a prospective randomized trial on 30 patients undergoing hemodialysis. Patients were randomized session by session to receive chitosan-based bandage (CBB) or alginate dressing (AD) as a hemostatic agent.

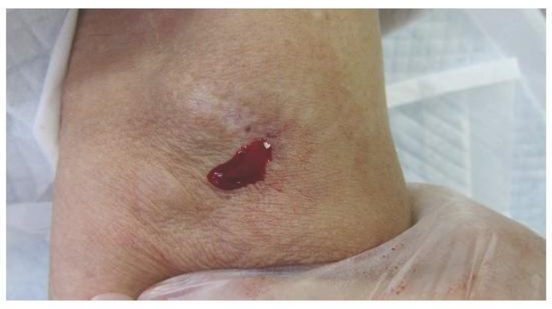
METHODS

Of 450 patients with an arteriovenous fistula in the upper extremity, 30 patients (18 males and 12 females) continued to bleed after 30 minutes of compression of the puncture site, and satisfied the eligibility criteria of the study protocol. Exclusion criteria were cognitive inability to provide informed consent; and allergy to shellfish, shrimp, chitin, or chitosan. Of 89 sessions studied, CBB was used in 38 sessions and AD in 51 sessions. The puncture site was compressed for 2 minutes in sessions using CBB and for 4 minutes in sessions using AD. Then compression was relieved immediately and evidence of bleeding around the dressing was observed.

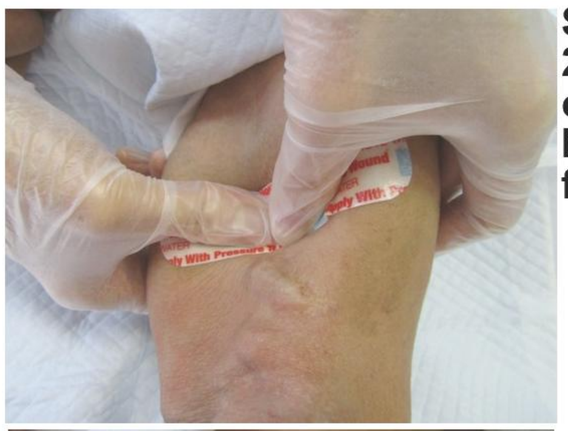
RESULTS



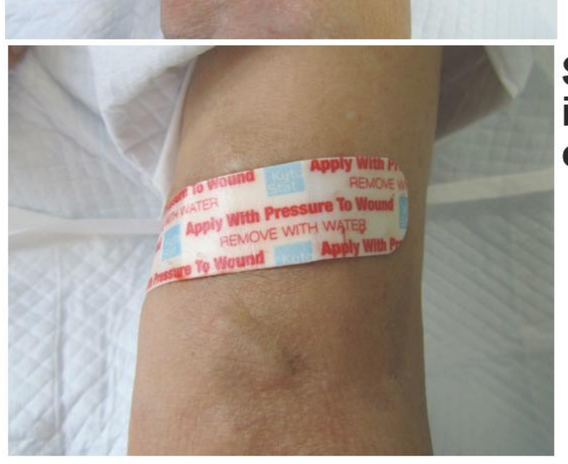
STEP1:Press the AVF to stop blood flow.



STEP2：Keep prssing and allow small amount of blood and put on the dressing.It takes about 5 to 10 seconds.



STEP3:Compress 2minutes for a chitosan-based bandage and 4minutes for Alginate Dressing.



STEP4:Depress immideately and check for bleeding.

Figure 1. Hemostatic procedure

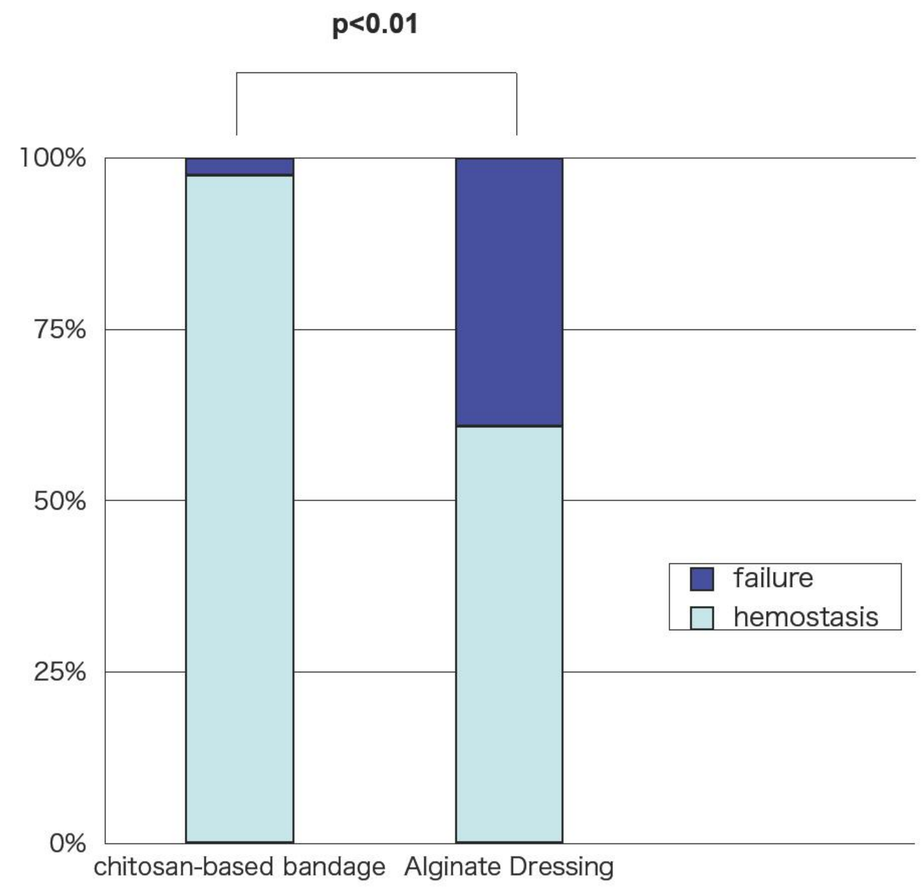


Figure 2. The hemostatic success rate

METHODS

At the next dialysis treatment, we examined the area where the styptic was applied for bleeding and adverse effects such as contact dermatitis and infection.

Hematologic examination was performed at the beginning of hemodialysis. All patients underwent hemodialysis using heparin (695 ± 201 units/hour) without other anticoagulants. Needles with a diameter of 1.7 mm were used. Puncture was performed by a specialist doctor using the rope-ladder technique.

RESULTS

At the beginning of hemodialysis, platelet count was 165000 ± 46000/μL and activated clotting time during hemodialysis was 138.0 ± 17.0 min. Before the experiment, average time to achieve hemostasis was 15-60 min. By using CBB, hemostasis was achieved within 2 minutes in 37 of 38 sessions, and an additional 1 minute of compression was required in one session. By using AD, hemostasis was achieved in only 31 of 51 sessions. A significant difference was detected between the two methods (Pearson's chi-square test $p<0.01$). No adverse effects such as contact dermatitis and infection were observed in either method.

CONCLUSIONS

Our study suggests that the chitosan-based bandage is a safe and more effective hemostatic agent than hemostatic alginate dressing to stop severe, prolonged post-hemodialysis puncture site bleeding.