



CS-049: A Case Series Comparing Negative Pressure Wound Therapy with Instillation: Hypochlorous Acid vs Normal Saline for Complex Infected Wounds

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BACKGROUND

Negative pressure wound therapy with instillation and dwell time (NPWTi-d) has become widely accepted as adjunct treatment for complex infected wounds; however, the results vary with the chosen irrigant. The objective of this study was to compare effects of different NPWTi-d irrigants on clinical outcomes of patients with complex, infected wounds. Hypochlorous acid[†] (HOCl), chosen for its antimicrobial and biofilm-disruptive properties, was compared to 0.9% sodium chloride solution (NSS).

METHODOLOGY

This is a single-institution, comparative, observational, and retrospective analysis of patients with multiple comorbidities and complex wounds or grossly infected wounds with multi-drug resistant pathogens. The primary endpoints were:

- length of hospital stay (LOS),
- number of wound-related operating room procedures,
- and days to wound closure.

Our institutional standard NPWTi-d of ten minutes dwell time every four hours was employed for patients treated with both HOCl[†] and NSS. If necrotic tissue was identified, it was debrided prior to implementation of negative pressure wound therapy.

RESULTS

The study includes 24 patients with 27 complex wounds of various etiologies, all with NPWTi-d incorporated into their wound management regimen. There was a trend towards:

- fewer operating room visits for patients treated with HOCl[†] compared to NSS (3.3 vs. 4.1, $p=0.19$).
- fewer days to wound closure compared to NSS (19.4 vs. 22.5, $p=0.33$),
- And shorter LOS for patients treated with HOCl[†] compared to NSS (24.3 vs. 37.9, $p=0.27$).

Our patients' diagnoses included:

- traumatic amputations, penetrating injuries, compartment syndrome
- necrotizing soft tissue infections/necrotizing fasciitis,
- infected stage IV pressure injuries,
- and complex multidrug-resistant abscesses.

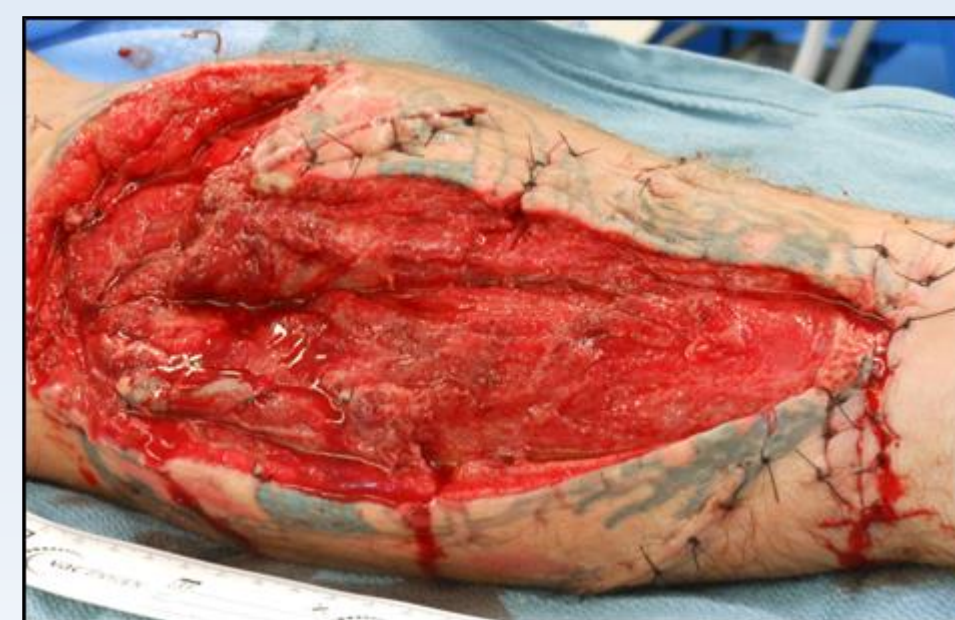
Case Series Patient Summary Statistics

Variable	HOCl NPWTi-d (n=17)	NSS NPWTi-d (n=7)	p-value
Age (yrs), avg. (SD)	49.7 (15.1)	36.1 (19.3)	0.13
Male, no. (%)	13 (76.5)	6 (33.3)	0.28
Medical history			
Smoking, no. (%)	1 (5.9)	4 (42.9)	0.06
Intravenous drug abuse, no (%)	2 (11.8)	1 (14.3)	1
Diabetes, no (%)	4 (23.5)	1 (14.3)	1
Comorbid med. conditions	4 (2-5)	0 (0-3)	0.18
Length of stay (days), avg (SD)	24.3 (16.6)	37.8 (53.7)	0.54

SD: standard deviation

Trademarked items:

[†]Vashe® Wound Solution, Urgo Medical North America, Fort Worth, Texas, USA



Postoperative day 8



Postoperative day 22

58 year-old male sustained self-inflicted stab wound to his left arm in a dirty pool of water that subsequently developed compartment syndrome following revascularization. Wound cultures: *Acinetobacter baumannii* complex, *Pseudomonas putida*, *Enterococcus faecium*, *Bacillus cereus* group.

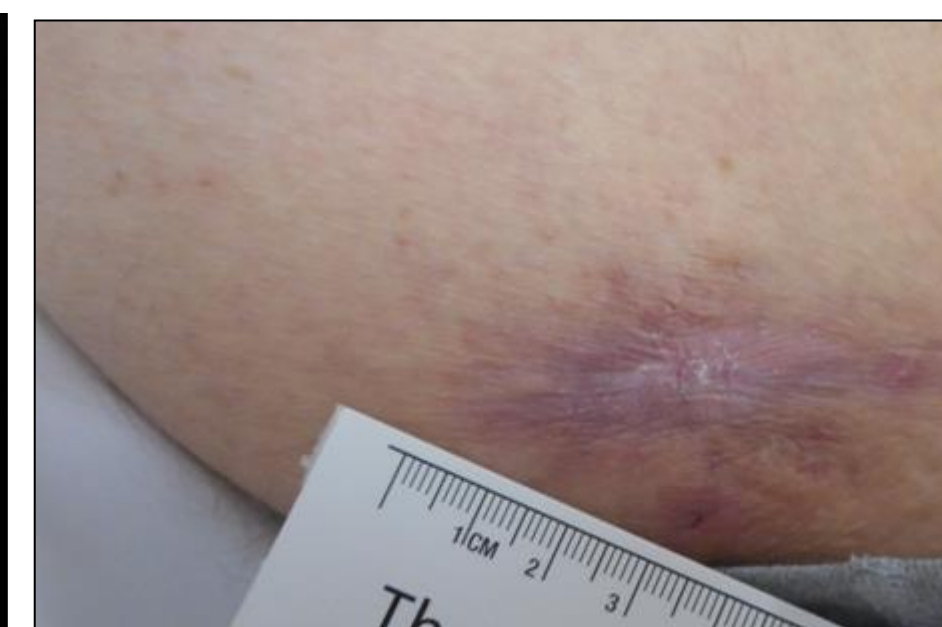
Wound management: Hypochlorous acid[†] NPWTi-d on consultation until healthy granulation allowed split thickness skin grafting 7 days later (postoperative day 15).



Day of Acute Surgical Wound Service Consultation
5x3.2x1.8cm (28.8 cm³)



2 weeks later
3x1x0.8cm (2.4 cm³)



4 months later
when patient stopped in office to thank us

54 year-old male with recurrent right medial thigh abscess in setting of multiple myeloma during chemotherapy. NPWTi-d Hypochlorous acid[†] implemented at consultation. By two weeks there was a notable reduction of 92% cm³. He went on to completely heal his wound with recommended wound management regimen and has not had recurrence in over 1 year.

Case Series Wound Summary Statistics

Table 2. Wound Summary Statistics

Variable	HOCl NPWTi-d (n=19)	NSS NPWTi-d (n=8)	p-value
Traumatic wound, no. (%)	8 (42.1)	6 (75)	0.21
Underlying wound cause, no (%)			
Compartment syndrome	5 (26.3)	4 (50)	0.01*
Open traumatic wound	4 (21.1)	2 (22.2)	0.01*
Infected surgical wound	5 (26.3)	1 (11.1)	0.01*
Necrotizing wound	3 (15.8)	0 (0)	0.01*
Pressure ulcer	1 (5.3)	1 (11.1)	0.01*
Vascular insufficiency	1 (5.3)	0 (0)	0.01*
Wound location, no. (%)			
Lower extremity	8 (42.1)	5 (62.5)	0.81
Upper extremity	2 (10.5)	1 (0.13)	0.81
Abdomen	5 (26.3)	1 (0.13)	0.81
Perineum/Sacrum	4 (21.1)	1 (0.13)	0.81
Wound size (cm ³), avg. (SD)	304.6 (292.9)	174.9 (174.1)	0.17
Bacterial colonization, no (%)	15 (78.9)	5 (62.5)	0.63
Trips to operating room, avg. (SD)	2.2 (2.3)	4.1 (2.0)	0.38
NPWTi-d duration (days), avg. (SD)	7.2 (5.2)	8.6 (2.9)	0.44
Time to wound closure (days), avg. (SD)	19.4 (9)	22.5 (18)	0.65

SD: standard deviation

CONCLUSION

Our clinical experience utilizing NPWTi-d with HOCl in grossly infected and complex wounds has shown favorable outcomes. Additionally, this study demonstrated a trend toward:

- decreased operative visits,
- days to closure,
- and LOS for medically complicated patients.

These outcomes suggest the effectiveness of HOCl as an irrigant for NPWTi-d and have resulted in an update to our institutional protocol, making HOCl our standard irrigant when using NPWTi-d for complex, infected wounds.

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