

# Management of intravenous drug abuse (IVDA) soft tissue injuries with the continuum of negative pressure wound therapy

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## Background

- Soft tissue injuries (STI) resultant of intravenous drug abuse (IVDA) are rising nationwide.
- New varieties of drugs with toxic adulterants have led to necrotizing skin ulcerations/injuries.<sup>1</sup>
- One such adulterant, xylazine (an  $\alpha_2$ -adrenoreceptor agonist), is not FDA approved in humans but has surgical applications in veterinarian medicine as a sedative-hypnotic, anesthetic, muscle relaxant, and analgesic.<sup>1,2</sup>
- Xylazine, known colloquially as “Tranq,” has been used to cut opioid drugs for illicit use.<sup>1,3</sup>
- Given the proximity of a Level 1 Trauma Center in eastern Pennsylvania to the Tranq epicenter in Philadelphia, our wound care team has encountered multiple IVDA-associated injuries.<sup>1,4</sup>
- Persons who inject drugs (PWID) that present with skin ulcerations are treated with surgical interventions but are often left with considerable tissue deficits.<sup>1,4,5</sup>

## Methods

- Patients with IVDA-induced STIs were treated via fasciotomy and/or excisional debridement and negative pressure wound therapy (NPWT\*).
- Where applicable, different NPWT platforms were enlisted to either cleanse (NPWT with instillation and dwell; NPWTi-d<sup>†</sup>) the wounds or to help bolster a skin graft.
- Additional surgeries were performed, as needed, to apply cellular tissue product or split-thickness skin grafts (STSG).

## Results

- Three male patients (aged 36-46 years) presented with IVDA-associated skin wounds (Figures 1-3).
- Each patient had a history of tobacco use.
- Wound etiologies were as follows: Patient 1 (36-year-old) had a right forearm necrotic ulcer, Patient 2 (41-year-old) had left forearm necrotizing cellulitis, and Patient 3 (46-year-old) had left forearm fasciotomy wound post compartment syndrome.
- The surface area of the wounds ranged from 210 to 273 cm<sup>2</sup>.
- Patients 1 and 2 underwent surgical debridement within the operating room and received NPWTi-d with fused foam dressing<sup>‡</sup> and hybrid silicone-acrylic drape<sup>§</sup> to instill hypochlorous acid solution (28 mL for 10 minutes; -125 mmHg for 2 hours).
- Patient 3 received conventional NPWT.
- Each patient underwent further surgical procedures for STSG, and their wounds closed within 30-38 days.

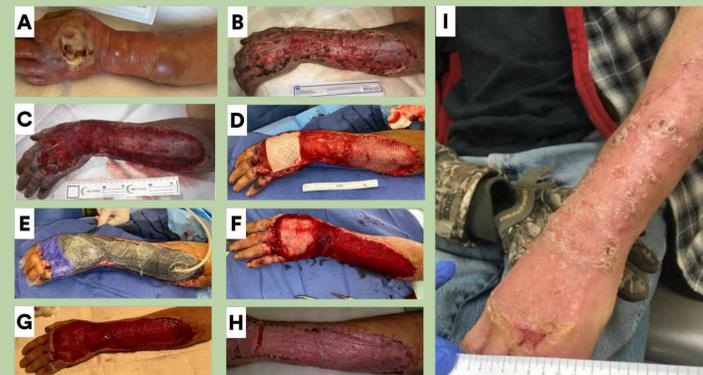
## Cases

**Case 1:** A 36-year-old male was transferred to our facility for surgical evaluation of his right upper extremity due to cellulitis complicated by skin necrosis, subcutaneous gas, and multiple abscesses. Right arm pain and swelling had been experienced for the prior two months. He had a prior medical history of benzodiazepine abuse and IVDA of heroin and xylazine. Wound culture isolated methicillin-susceptible *S. aureus*, which was treated with piperacillin/tazobactam and switched to amoxicillin/clavulanate potassium prior to discharge. Patient underwent surgery, received NPWTi-d, and skin grafting. During wound management, patient was also treated for drug withdrawal.



**Figure 1.** NPWTi-d use to help manage right forearm necrotizing infection. A. Arm at presentation. B. Wound (273 cm<sup>2</sup>) post debridement (Day 4). C. Wound (Day 5) prior to application of NPWTi-d and fused foam dressing. D. Evaluation of wound after NPWTi-d (Day 9). E. Application of cellular tissue product (Day 9). F. NPWT applied to bolster cellular tissue product (Day 16). G. Wound (Day 24) prior to STSG. H. Arm seven days post STSG (Day 31).

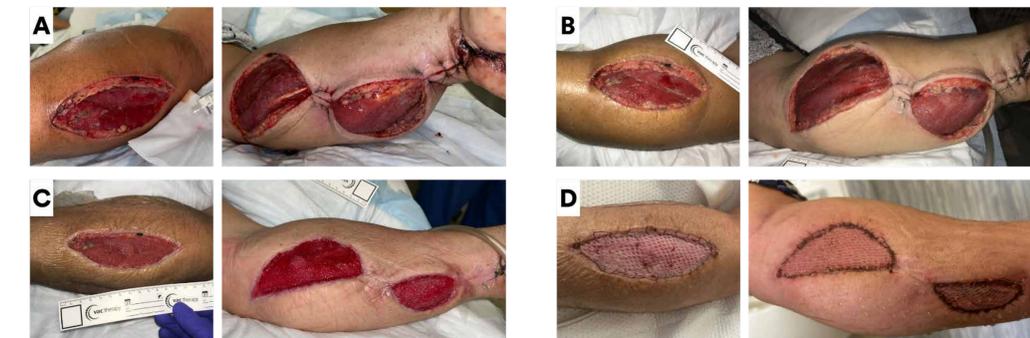
**Case 2:** A 41-year-old male presented to our facility with a left upper extremity infection. Despite disavowing IVDA, patient presented with left hand erythema, blisters, and skin necrosis. He had a prior medical history of hypothyroidism. Patient was administered broad-spectrum IV antibiotics. His symptoms putatively commenced 4 days prior subsequent to a fall on the impacted arm. As a result of evaluation, developing compartment syndrome and necrotizing fasciitis were noted, and surgical debridement was recommended. The plastic surgery team accepted the patient for intervention and wound management using NPWTi-d.



**Figure 2.** NPWTi-d use to help manage left upper extremity infection. A. Patient hand, wrist, and arm presenting with erythema, blisters, and necrosis. B. Wound (270.25 cm<sup>2</sup>) 2 days post debridement (Day 3). C. Wound on Day 7. D. Application of fish skin graft. E. NPWT applied to bolster fish skin graft (Day 8). F. Wound on Day 15. G. Full incorporation of graft (Day 22). H. Seven days post STSG placement (Day 34). I. Left upper extremity at follow up appointment (Day 99).

## Cases (Cont'd)

**Case 3:** A 46-year-old male with a history of IVDA was initially admitted to the Emergency Department resultant of fentanyl overdose. Patient reported syncope after upping the dosage after missing an injection and had been found lying on his left arm. Compartment syndrome of the left upper extremity was noted. Compartment pressures measured 30 and 44 mmHg. Following transfer to our facility, the plastic surgery team took the patient to the operating room for surgical intervention where he also received intravenous fluids and albumin. NPWT was administered for wound management. He was taken to the intensive care unit on a ventilator. NPWT was later used to help bolster the STSG placed on Day 27.



**Figure 3.** Conventional NPWT use to help manage lateral (first panel) and medial (second panel) post fasciotomy wounds. A. Post fasciotomy wounds (Lateral wound: 60 cm<sup>2</sup>; Medial wound: 150 cm<sup>2</sup>) prior to application of NPWT. B. Evaluation of post fasciotomy wounds after NPWT (Day 6). C. Healthy granulation tissue within wound bed (Day 20). D. Evaluation of wounds 1 week post STSG placement (Day 34).

## Conclusions

In these patients, NPWT platform use demonstrated favorable outcomes with challenging wounds among PWID. Social issues, lack of wound coverage, and pain management are among some of the care issues for these patients. As the IVDA crisis persists, wound care clinicians should be knowledgeable on treatment and closure options.

## References

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