

Tina Nguyen, MD MS¹; Ireland Coates, MS²; Oygul Mirzalieva, PhD²; Cameron Galic, MS⁴; James Pai, MS³; Jessica Reid, MS³; John Holtrop, MD³; Kaylie Miceli, FNP³; Abigail Chaffin, MD, FACS, CWSP, MAPWCA³

[1] Tulane School of Medicine, Department of General Surgery [2] LSU Health Sciences Center [3] Tulane Surgery, Division of Plastic Surgery [4] Tulane School of Medicine

Introduction

- Pelvic pressure injuries (PIs) represent one of the most severe outcomes of chronic immobility and tissue ischemia.
- Sacral and ischial PIs have been associated with substantial morbidity, hospitalization, and financial burdens on healthcare systems.
- Flap reconstruction is considered the definitive procedure for achieving durable closure, particularly after failure of conservative therapy.
- However, complication rates remain above 50%, and recurrence rates range from 20-40% (1,2).
- A recent study on pelvic reconstruction showed that failure of flaps ranged from 65-80%, highlighting the complexity of this patient population (3).
- The failure of flaps is often multifactorial and not due to surgical technique.
- Perioperative offloading and pressure redistribution, glycemic control, nutritional status, smoking, and infectious processes have all been identified as major factors that contribute to dehiscence and recurrent PIs (1,3,4).
- It is important to develop algorithms that include nutritional status, infection control, and standardized postoperative offloading and redistribution of pressure (4,5).
- Implementing a team-based, multidisciplinary protocol has resulted in significantly improved patient outcomes and is a major step in providing enhanced patient care to individuals

Case Presentation

- This patient is a 33-year-old quadriplegic female with PMHx of stage IV sacral PI complicated by osteomyelitis, requiring extensive wound care, debridement, and bilateral gluteus maximus muscle advancement flaps.
- The patient was initially doing well from index procedure until an event in which the air fluidized sand bed malfunctioned for an unknown time. Once recognized, the patient was evaluated by the wound care team and was found to have sustained a pressure re-injury to the sacral flap.
- She was transferred from the long-term acute care (LTAC) facility to the hospital to undergo a diverting ostomy per patient request for hygienic purposes, followed by sharp excision of the necrotic skin edge, sacral flap reconstruction, and secondary layered complex closure. The patient tolerated the procedure well and returned to the LTAC facility, where she continued to heal as expected.

Methods

- We developed a comprehensive, multidisciplinary protocol to standardize perioperative management of pelvic PIs.
- Preoperative optimization included glycemic control, cardiovascular risk stratification, nicotine cessation, nutritional assessment with targeted supplementation, and comprehensive infection evaluation.
- Postoperatively, patients were transferred using strict offloading techniques to a long-term acute care facility, where they received pressure redistribution on an air-fluidized bed, incisional negative pressure wound therapy, a staged sitting protocol, and adjunct monitoring with infrared thermography.

Results

Initial Wound, Pressure Re-injury, and Postoperative Course



Figure 1A: Pre-operative state of sacral pressure injury prior to flap intervention.

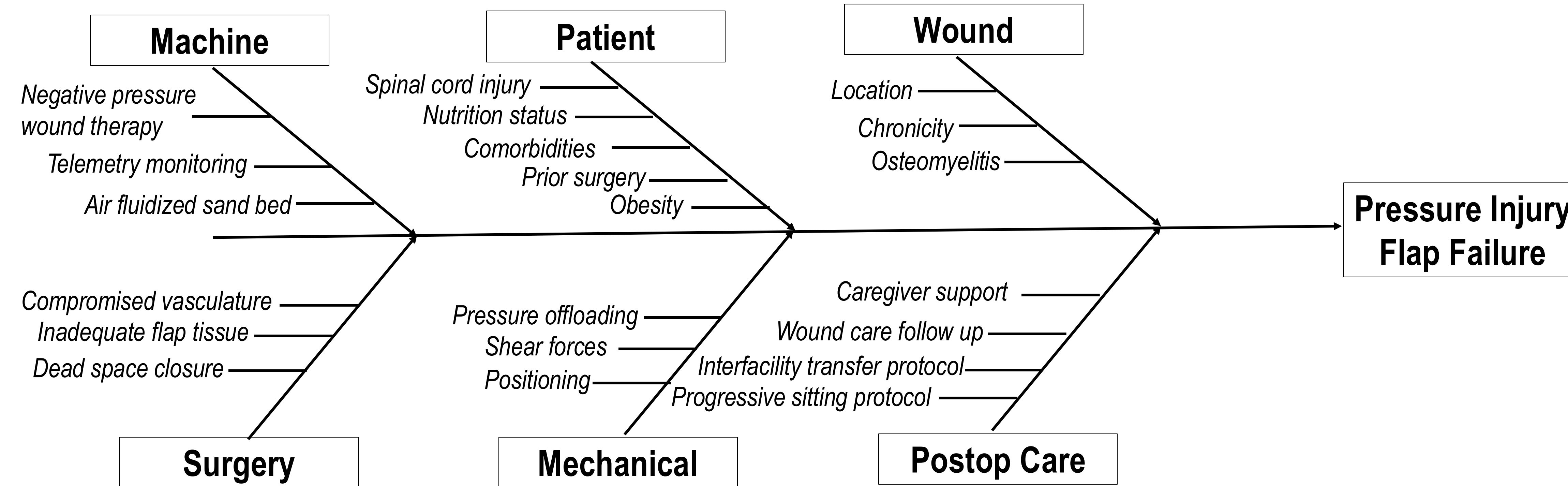
Figure 1B: Two weeks postop from index surgery.

Figure 1C: Breakdown of patient's first sacral flap due to air-fluidized sand bed malfunction.

Figure 1D: Intra-operative sharp excisional debridement of necrotic tissue.

Figure 1E: Day 0 postoperative revision of sacral flap pressure reinjury.

Factors Leading to Pressure Re-Injury



Team-Based Pressure Flap Protocol

Preoperative Evaluation

- HbA1c optimization
- Prealbumin >20 and albumin >3
- Cessation of nicotine products
- Pelvic imaging to evaluate for osteomyelitis, consult orthopedic or gynecologic surgery as needed
- Insurance coverage is ensured to cover procedure and postop care

Perioperative Care

- Patient is admitted by internal medicine
- Infectious disease is consulted
- Wound care team
- Air-fluidized sand bed is ordered and available at time of surgery
- Nurses are educated on emergency protocol for bed malfunction
- Plastics and reconstructive surgery evaluates the patient preoperatively, performs the surgery, and follows up with the patient in outpatient setting

Postoperative Protocol

- Interfacility transfer protocol using pink foam system
- Biweekly televisit communication with operating surgeon
- Specialized care at LTAC facility
- Progressive sitting protocol

Key Pearls

- Pelvic PIs are a significantly morbid condition with a >50% complication rate and 20-40% recurrence rate.
- Adherence to a post-PI protocol and early recognition of failure is imperative for flap success.
- With our team-based protocol, the flap success rate is >95%.

Conclusion

- Implementation of this coordinated care model resulted in full healing achieved in patients with sacral and ischial PIs at 12 and 6 months, respectively.
- A mechanical air-fluidized bed failure in a patient with spinal cord injury prompted protocol refinement, including establishment of a backup bed and emergency offloading procedures.
- These findings suggest that flap failure in pressure injury reconstruction reflects vulnerabilities in perioperative systems and care transitions rather than surgical technique alone, highlighting the importance of structured multidisciplinary coordination to improve outcomes.

References

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