



Teamwork for prevention: Reducing HAPUs in cardiac surgery patients

By Charina Ballesteros, MSN, RN, CCRN-CSC

The National Pressure Ulcer Advisory Panel defines *pressure injury* as an area of localized damage to the skin and/or underlying soft tissue caused by intense or prolonged pressure alone or in combination with shear.^{1,2} Hospital-acquired pressure injury (HAPU) is a preventable complication, causing pain and suffering, contributing to morbidity, and increasing length of stay.³ The National Quality Forum defines *never events* as errors in medical care that are clearly identifiable and preventable. Stage 3 and 4 pressure injuries acquired during hospitalization meet the criteria for a never event and aren't reimbursed.⁴ According to the Centers for Medicare and Medicaid Services, the cost of Stage 3 or 4 pressure injuries in an acute care hospital is approximately \$43,180. HAPUs are painful, and the emotional turmoil patients and families experience decreases satisfaction and increases litigation risk. The average settlement for HAPUs in the United States is around \$250,000, with the largest settlement currently reported as \$84,000,000.⁵ HAPUs often result in poor outcomes and can negatively impact the hospital's financial bottom line.

Cardiac surgery patients are at a high risk for developing pressure injuries. During the operative procedure, cardiac surgery patients remain on a firm OR table for a lengthy period of time, with periods of hypotension, paralysis, and heavy sedation due to anesthesia.^{3,6} Intraoperatively, manipulation of body temperature and metabolic changes to the tissues caused by prolonged immobility, inability to reposition, extracorporeal circulation, and anesthesia impact circulation to the skin.^{7,8} In the postoperative period, cardiac assistive devices also interfere with effective patient turning and repositioning because immobilization is required for an extended period of time.⁷ Cardiac surgery patients have rates of HAPUs reported to be as high as 29.5%.⁹ Older age and comorbidities, such as poor nutritional condition, aberrant body mass index, low levels of albumin or hematocrit, and

complicated conditions, predispose and increase the risk of skin breakdown in these patients.¹⁰

Background and significance

The cardiac surgery ICU (CSICU) is a 14-bed unit that provides care to patients who've had or require permanent or temporary implantable cardiac assist devices and those who've undergone cardiac surgery or aortic or thoracic aneurysm repairs. The insertion of cardiac assist devices requires immobilization for prolonged periods, restricting turning and repositioning, which can increase pressure injury risk.

To align the CSICU quality indicators with the organization's strategic plan of providing and sustaining high-quality care, we recognize our responsibilities to apply new knowledge and innovative strategies. This involves continuously reviewing our processes and identifying any opportunities for improvement.

From January to May 2015, the number of HAPUs in the CSICU accounted for 57% of the total HAPUs on our CCUs. This was an undesirable patient outcome that warranted our efforts to create an initiative focused on decreasing HAPU incidence. Upon review, the team identified that the majority of pressure injuries occurring during the postoperative period were in the sacrum and coccygeal area.



Empowering frontline staff

Our journey reflects our culture of shared governance, which is the empowerment of frontline staff to share practice decisions and responsibilities.¹¹ Shared governance warranted the involvement of frontline staff in the creation of the CSICU HAPU reduction initiative. A change in practice can be challenging, and it's paramount that all key stakeholders buy in to the implementation of a practice change. In collaboration with the wound, ostomy, and continence nurses (WOCNs) and a quality improvement (QI) liaison, the problem of the increasing number of HAPUs on the unit was discussed with frontline staff.

Empowered and determined that the course of action must engage all team members, a HAPU prevention taskforce was formed. The taskforce was comprised of clinical nurses,

unlicensed assistive personnel (UAP), and an advanced practice registered nurse (APRN), with the WOCNs and QI advisor as consultants. The team searched for and reviewed the current practices on HAPU prevention, identifying the elements that were working well and opportunities for improvement.

Cardiac surgery care occurs in three stages—preoperative, intraoperative, and postoperative—with each stage having opportunities for pressure injury development or prevention.¹² To take advantage of opportunities in the preoperative stage, the taskforce reached out to the cardiac OR team. To gain the cooperation of the cardiac OR staff and leadership, HAPU prevention was discussed. A proactive, collaborative, team-based approach between the CSICU and cardiac OR staff to reduce the number of HAPUs was forged.

Staff engagement is crucial for success in any QI initiative. The HAPU prevention taskforce created educational material on pressure injury for the CSICU and cardiac OR staff, including pressure injury stages; predisposing factors; and prevention interventions, such as a nutrition consult, correct mattress firmness, and the use of a prophylactic sacral dressing.

Studies testing the prophylactic application of a silicone border sacral dressing on critically ill patients found a reduction in shear, friction, and pressure forces, while absorbing moisture within the gluteal cleft created by perspiration and insensible fluid loss.^{10,13} It was decided that the cardiac OR team would apply a prophylactic dressing to the patient's sacrum before the start of surgery.

Positive outcomes

Best practices for preventing HAPUs include turning and repositioning the patient at least every 2 hours, the use of pressure redistributing surfaces, and completing the Braden Scale for Predicting Pressure Ulcer Risk.⁷ The Braden Scale is a risk assessment tool that's widely used to predict the patient's risk of developing a pressure injury based on his or her mobility, nutrition status, degree of skin exposure to moisture, sensory perception, and likeliness of shearing or friction.¹⁴ A numerical value corresponds to the level of pressure injury development risk, whether low, moderate, or high. The staff performs the Braden Scale assessment every shift, upon admission or transfer to the unit, and during any change in patient condition. Staff members also incorporate the patient's score when formulating the care plan.

The interdisciplinary approach includes the CSICU and cardiac OR nurses, UAP, the licensed provider or APRN involved, and nutritionists.

Table 1: CSICU turning guidelines⁵

Clinical conditions that may prevent turning

- Development of a life-threatening arrhythmia with symptomatic response, not including asymptomatic atrial fibrillation
- Active fluid resuscitation, massive transfusions, and the use of high dose and multiple vasopressor therapy
- Active hemorrhaging following cardiac or thoracic surgery/active tamponade
- Acute phase post insertion of a life-sustaining device
- Unstable cannulation/insertion sites
- A change in baseline hemodynamic parameters that doesn't recover within 10 minutes of position change and isn't an expected result based on the diagnosis

Recommended interventions for the unstable patient

If the patient is deemed too unstable to turn based on the above parameters:

- Provide mini-turns.
- Weight shift the patient at least every 30 minutes.
- Reposition the patient's head, arms, and legs at least every hour; consider passive range of motion.

- Consider use of "continuous lateral rotation therapy" to prevent development of "gravitational equilibrium." Begin with slow and low angles of turning to gauge the patient's response to change in position. Rotation therapy doesn't replace turning.
- When turning the patient, go slow! Provide serial small turns from the supine to lateral position to achieve linen changes and hygiene checks, and reposition the patient with body wedges and pillows.
- A trial turn should be attempted at least every 8 hours to determine the ability to resume frequent turning at least every 2 hours.
- Obtain a "do not turn" order on a daily basis after reassessing the patient.
- Document using "unable to turn."

Prevention is key

- Use of a sacral dressing prophylactically
- Air mattress with correct firmness
- Nutrition consult
- Proactive involvement of CSICU staff
- Pressure injury reduction taskforce
 - Staff education
 - Close monitoring for compliance
 - Pressure injury review tools

The nurses and UAP play a major role in physically turning and repositioning patients. The licensed provider or APRN leads the daily multidisciplinary rounds to assess specific patient needs and coordinate the appropriate consults. The nutritionist reviews the patient's nutrition status and provides necessary input.

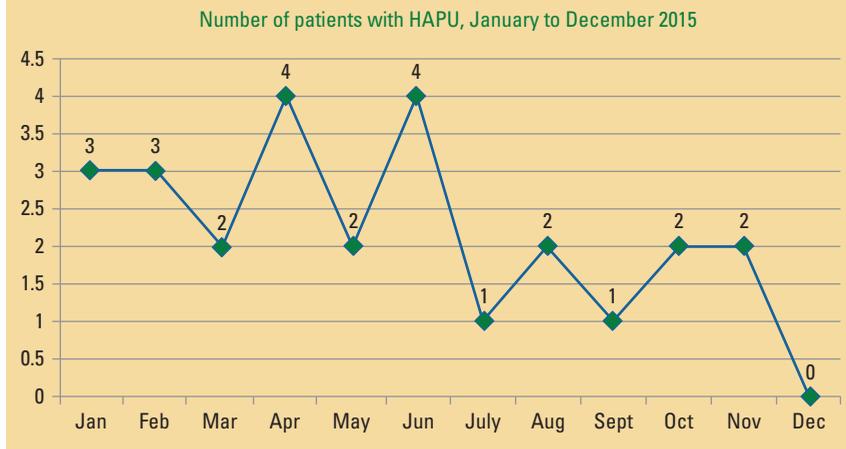
Upon arrival to the cardiac OR, staff members assess, verify, and document sacral skin integrity of patients undergoing cardiac surgery or device implantation. After establishing skin integrity, a prophylactic silicone border sacral dressing is applied to the intact skin, labeled "P" for prophylactic, and then dated and initialed by the OR staff.

At the completion of the surgery, the patient is transferred to the CSICU for immediate postoperative care. The primary CSICU nurse peels off the sacral dressing; assesses, verifies, and documents sacral skin integrity; and then re-applies the dressing. CSICU staff members subsequently perform this skin check, utilizing a two-RN check every shift until the patient is extubated and able to get out of bed. In instances of prolonged intubation or bed rest, the dressing is maintained and changed as needed.

In addition to the prophylactic dressing, CSICU staff members apply standard HAPU prevention measures, such as proactive staff involvement in promoting frequent turning and repositioning of patients led by UAP champions, correct mattress firmness based on the patient's weight, and collaboration with the nutritionist and APRN to ensure adequate protein/calorie intake.

If a patient is too critically ill to be turned or repositioned, staff members use the CSICU turning guidelines developed by Brindle et al., modified based on our cardiac surgery patient population.⁵ (See Table 1.) A daily assessment and dis-

Figure 1: 2015 CSICU pressure injury incidence



cussion with the unit intensivist is performed to check the patient's hemodynamic stability and tolerance to turning and repositioning.

Cardiac OR team members continue to follow up on patients through constant communication with CSICU team members. Any pressure injury incidence that occurs goes through a root-cause analysis to identify any preventable elements. The CSICU leader shares the monthly update on HAPU incidence provided by the WOCN with the staff members of both units, and recognizes efforts when incidence is low.

Five months after the QI initiative's inception, there were 10 HAPUs in the CSICU, with 0 incidents during the last month. (See Figure 1.) Total HAPUs in the CSICU decreased to 36% of the total HAPUs in our critical care areas. The two units continue to collaborate through handoff communication and monthly data updates to monitor practice and ensure compliance. In 2016, there were a total of 21 HAPUs in the CSICU, which is a decrease of 30% from the unit's HAPU incidence in 2015.

Implications for practice

The initiative was limited to cardiac surgery patients who were cared

for in the OR and CSICU, and who didn't have preexisting pressure injuries preoperatively. By taking a proactive, preventive approach at patients' point of entry to the hospital, the CSICU team was able to decrease HAPUs. Because critical care patients are prone to skin injury, other points of entry that should be considered include the cardiac catheterization department, the ED, and other procedural areas. These areas are where patients may be lying on unfavorable, firm surfaces for extended periods of time, causing compromised circulation to the sacral and coccygeal areas.

A careful review of HAPU trends and tracing patients' points of entry can greatly influence unit collaboration. Prophylaxis shouldn't be limited to the sacral and coccygeal regions because other parts of the body can be compromised as well. Lastly, consider other surgical patients who sometimes spend an even longer time in surgery than those undergoing cardiac surgery.

Regardless of the unit or ICU patient population, a combined effort between two or more departments with the strong support of their respective leaders can promote better practice, empower more staff, and develop a culture of ownership and

collaboration across the organization. The HAPU prevention taskforce continues to educate new hires; monitors compliance; and reviews charts on any pressure injuries that develop, sharing the information with the cardiac OR staff. **NM**

REFERENCES

1. Cherry C, Moss J. Best practices for preventing hospital-acquired pressure injuries in surgical patients. *Can Oper Room Nurs J*. 2011;29(1):6-8, 22-26.
2. Bergquist-Beringer S, Davidson J, Cuddigan J. Pressure injury training. <https://members.nursingquality.org/ndnqipressureulcertraining>.
3. Jackson M, McKenney T, Drumm J, Merrick B, LeMaster T, VanGilder C. Pressure ulcer prevention in high-risk postoperative cardiovascular patients. *Crit Care Nurse*. 2011;31(4):44-53.
4. Centers for Medicare and Medicaid Services. Eliminating serious, preventable, and costly medical errors—never events. <https://www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2006-Fact-sheets-items/2006-05-18.html>.
5. Brindle CT, Malhotra R, O'rourke S, et al. Turning and repositioning the critically ill patient with hemodynamic instability: a literature review and consensus recommendations. *J Wound Ostomy Continence Nurs*. 2013;40(3):254-267.
6. Feuchtinger J, Halfens RJ, Dassen T. Pressure ulcer risk factors in cardiac surgery: a review of the research literature. *Heart Lung*. 2005;34(6):375-385.
7. Paul R, McCutcheon SP, Tregarthen JP, Denend LT, Zenios SA. Sustaining pressure ulcer best practices in a high-volume cardiac care environment. *Am J Nurs*. 2014;114(8):34-44.
8. Sewchuk D, Padula C, Osborne E. Prevention and early detection of pressure ulcers in patients undergoing cardiac surgery. *AORN J*. 2006;84(1):75-96.
9. Brindle CT, Wegelin JA. Prophylactic dressing application to reduce pressure ulcer formation in cardiac surgery patients. *J Wound Ostomy Continence Nurs*. 2012;39(2):133-142.
10. Lumbley JL, Ali SA, Tchokouani LS. Retrospective review of predisposing factors for intraoperative pressure ulcer development. *J Clin Anesth*. 2014;26(5):368-374.
11. Ott J, Ross C. The journey toward shared governance: the lived experience of nurse managers and staff nurses. *J Nurs Manag*. 2014;22(6):761-768.
12. Scott SM. Progress and challenges in perioperative pressure ulcer prevention. *J Wound Ostomy Continence Nurs*. 2015;42(5):480-485.
13. Chaiken N. Reduction of sacral pressure ulcers in the intensive care unit using a silicone border foam dressing. *J Wound Ostomy Continence Nurs*. 2012;39(2):143-145.
14. Ast A. The Braden Scale for predicting the risk of pressure ulcers. www.healthguideinfo.com/skin-disease/p97153.

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