The prevention of hospital-acquired pressure injuries (HAPIs) continues to be a challenge in acute care settings. HAPIs can cause increased pain and discomfort for patients, lengthen hospital stay, and potentially lead to death. For a facility, this translates into additional cost, loss of reimbursement, and risk of litigation. Recently, the National Pressure Ulcer Advisory Panel (NPUAP) released new terminology and revised pressure injury (PI) staging definitions to clarify what constitutes a PI, and to describe what is happening at the cellular level with skin injury. As a result, caregivers will be better informed about how PIs develop and evolve, and will be better able to pinpoint where and how PIs originate within facilities.

The NPUAP estimates that PIs originating in the operating room (OR) may account for up to 45 percent of all HAPIs. Therefore, raising awareness regarding incidence and cause of PIs in this setting is critical. It is important to consider all entry points into the hospital in which a patient receives care prior to becoming a surgical patient. Although patients are occasionally admitted directly to a unit, the majority enter through the emergency department (ED).

The Emergency Department: Patient Point of Entry
EDs typically provide care to a full array of patients, from those with minor medical needs to those with life-threatening issues. This creates what is called a triage-sensitive environment. The selection process in this setting can be challenging: staff must be attuned to patients at risk of developing a HAPI, but whose presenting condition does not require immediate care. Risk factors in the ED include increased wait times, limited patient mobility, and the use of ineffective support surfaces. The average ED wait time is estimated to be three hours, but may be 24 hours or longer according to the Centers for Disease Control and Prevention (CDC). Limited mobility in this ED can be attributed to numerous factors, including severity of injury, sedation requirements, radiology and other testing, and patient conditions that compromise mobility. Another risk factor is that fluids and nutrition are often withheld as patients await testing and diagnosis. Additional patient-specific risks for skin injury include incontinence, diaphoresis (excessive sweating), and drainage from wounds.

Support surfaces utilized in the ED include waiting room chairs, wheelchairs, exam tables, and gurneys—most of which are inadequate for PI prevention and ineffective in pressure redistribution. St. Joseph Hospital in Nashua, N.H., promotes a proactive solution in dealing with the ED patient at risk for skin injury. According to staff members Donna Roe and Virginia Tuttle,
Patient Risk of Skin Injury in the OR

Intrinsic Risk Factors
- Age greater than 60 years
- Albumin levels lower than 3.5 g/dL
- American Society of Anesthesiologists (ASA) score greater than 3
- Diabetes
- Body mass index (BMI) less than 19 or greater than 40
- Peripheral vascular disease
- Cerebrovascular accident
- Sepsis
- Hypotension
- Pulmonary disease
- Renal insufficiency
- Low core temperature

Extrinsic Risk Factors
- Duration of time immobilized before surgery
- Estimated operation time of three hours or longer
- Prone positioning
- Trauma
- Cardiac, orthopedic, vascular, transplant, or bariatric procedure
- Increased hypotensive episodes
- Use or continued use of vasopressors
- Reduced mobility on the first post-op day

facilities protocol at St. Joseph Hospital is to perform patient skin assessments on admission and on every shift. When it is known that a fragile, compromised patient is en route to the ED, a specialty mattress is ordered to be in place upon patient arrival.

“Emergency nurses, in general, haven’t tackled skin assessment,” Roe explains, “because that’s not what an emergency nurse does. We deal with the immediate reason a patient enters the emergency room, but we forget about skin being a critical part.” Roe and Tuttle view themselves as the “gatekeepers” in their facility, responsible for identifying patients at risk for skin injury.

The Perioperative Environment
ED patients triaged to the preoperative (pre-op) setting and then to the OR may be significantly compromised even prior to surgery. The preoperative preparations, surgery (even a short 2-hour procedure), and postoperative (post-op) recovery period can equate to six or more hours of immobility for a patient.

According to Debra Fawcett, Professor of Nursing at Indiana University, a PI is not always immediately evident post-op because the damage is internal and can take four to five days to surface as a PI. PIs that develop during post-op recovery typically develop on the surface of the skin, usually from moisture irritation or patient movement.

Studies show a significant correlation between length of surgery and risk of PI development. Current data indicate a prevalence rate of 8.5 percent or higher among patients who undergo surgical procedures lasting longer than three hours.

Etiology of the Operating Room Pressure Injury
The Braden Scale for Predicting Pressure Sore Risk is the most widely used skin assessment tool for determining skin injury risk within the medical/surgical unit. Braden scoring, however, has limited value for OR patients because it does not capture the critical risk factors that are specific to the OR.

The “complex etiology” of OR-related PIs is believed to be primarily related to circulatory and metabolic changes. When assessing the OR patient for skin injury risk, factors may be grouped as being physiologic (extrinsic) or non-physiologic (intrinsic). Two of the more common skin assessment screening tools specific to the OR are the Munro Pressure Ulcer Risk Assessment and the Scott Triggers Tool. Scoring from
the use of a screening tool provides direction on the preventative interventions specific to that setting.

The positioning of the surgical patient is procedure-specific and can affect the location of a developing PI. As previously mentioned, it is not uncommon for several days to pass before a deep tissue injury (DTI) becomes visible to bedside staff. Common locations for OR skin injuries are the sacrum, heels, chin, sternum, and bilateral trochanters. Although pillows and foam pads are frequently utilized in positioning OR patients, the use of additional padding may increase pressure and should be carefully monitored. The standard OR table pad is “comprised of 2-inch elastic foam with a laminate cover. This is a significant risk factor for increased pressure incidence compared to newer technology.”

Studies show that an OR table pad is more effective if it is made of high-specification foam that allows for some degree of body immersion. One important element when developing a prevention protocol is to evaluate OR table pads and other pressure-relieving equipment and assess the need for any upgrades. Newer table pads are thicker (3½-4”) with multilayer technology, and improvements include visco elastic and thicker foam densities, which provide improved pressure redistribution. The investment in table pads and other pressure-relieving equipment should be viewed as a necessary requirement for a prevention program from a clinical patient safety standpoint, as well as a cost-effective measure, given the average treatment costs of PIs and the cost savings of PI prevention.

Conclusion: Communication and Continuity of Care
Perioperative staff play a significant role in the prevention of skin injury. Preventive measures must be initiated at the point of patient entry into the facility, and a baseline skin assessment for all surgical patients is imperative. In addition, a skin assessment tool specific to the OR needs to be utilized and PI preventative measures must be implemented accordingly. The post-op report or handoff to the recovery room should include information regarding surgical positioning of the patient and any significant occurrences during the procedure that could potentially contribute to PI development. Regardless of where a PI may originate, thorough documentation and communication will assist caregivers in improving strategies to decrease HAPiIs.

Specialty Surfaces Prevent HAPiTs

**Envy Line OR Table Pad™**
This self-adjusting gel operating room table pad features F3 Free™ construction that reduces chemicals of concern in the fabric, foam, and fire barrier. A specially formulated polymer gel topper contours to the patient’s body while providing low interface pressure, and a high density foam base provides additional stability while enhancing comfort and pressure relief.

**Envy Line S Series Stretcher Pad™**
This stretcher pad system also features F3 Free™ construction. The specially formulated topper contours to the patient’s body while providing low interface pressure. The heel slope is designed to offload pressure from the heels while the perimeter of high density foam aids in transfer and provides additional stability while enhancing comfort and pressure relief.
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