ORIGINAL ARTICLE

Eliminating Medical Device–Related Pressure Injury From Blood Pressure Cuffs During Continuous Monitoring in the Perioperative Setting: A Novel Approach

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Hospital-acquired pressure injuries have a significant impact on quality of life. Health care organizations continually strive to improve care and patient satisfaction, for the well-being of the patient and the fiscal health of the organization. A commitment to protecting skin and reducing risk for pressure injury in the perioperative setting is gaining momentum.

Keywords: *blood pressure cuff, hospital-acquired pressure injury, medical device–related pressure injury, stockinette.*

PERIOPERATIVE PATIENTS ARE at a distinct danger of developing skin compromise while in surgery. Multiple factors contribute to reduced sensation and awareness.[1] In particular, perioperative patients are at high risk for the phenomenon known as medical device–related pressure injury (MDRPI). Vulnerable patients can be effectively protected with a novel low-cost pressure injury prevention intervention, which in turn increases patient satisfaction, eliminates patient distress, and adds a figurative layer of protection against a hospital-acquired condition.

Purpose

Pain and discomfort, risk for infection, prolonged length of stay, patient distress, and increased costs are all potential complications resulting from hospital-acquired pressure injury.[2] A subset of the hospital-acquired pressure injury is the MDRPI, resulting from the use of a device designed and applied for diagnostic or therapeutic purposes.[3]

Blood pressure (BP) monitoring is part of a minimum standard of care in the anesthetized patient.[4] When a BP cuff is inflated, the pressure stops blood flow. Once the cuff is released, blood begins to course and systolic and diastolic pressures are identified. Continuous BP monitoring is not without risk. There are several physiologic changes that occur as a direct result of continuous BP monitoring, including decreased perfusion, skin temperature variation, and direct contact with a rigid device. These pose increased risk for skin compromise.

Perioperative-focused pressure injury prevention interventions, which take into account the classic pressure injury risk (vulnerability on bony prominences), include risk appraisal and skin assessment, as well as pressure injury prevention measures, including appropriate surface selection, adequate positioning equipment, and resolute attention to manual patient transfers.[5] MDRPIs are not typically linked to those same causative factors. Altered microclimate (atmospheric conditions), edema, and incorrect cuff sizing are contributing factors associated with the increased risk for MDRPI

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related to BP measurement devices.[6] Correct device application and routine monitoring are necessary to avoid undue harm and counteract a patient's risk for skin compromise.

Anesthetized patients are vulnerable because they can neither change positions nor sense discomfort.[1] Off-loading pressure is a key factor in reducing the risk for pressure-related skin injury.[7] Often, medical devices cannot be removed or repositioned during the intraoperative period. There are reports in the literature of soft tissue folding under BP cuffs as a result of inadequate padding.[8] These skin injuries may be mislabeled as tears or bruising, considered par for the course. However, these pressure injuries can be avoided.

At Mercy Medical Center in Baltimore, MD, the Certified Wound, Ostomy and Continence Nurse (CWOCN) is consulted on all nocosomial breaks in skin integrity for further assessment and care planning. Based on data tracked by the CWOCN, from March 2013 to July 2013, an increased trend in loss of skin integrity under BP cuffs was observed. During the 5-month period, nine patients were identified with incidences of MDRPI caused by BP cuffs used during the perioperative period.

The CWOCN conducted a search for pertinent literature related to prevention of MDRPI. The literature identified that a protective interface between the skin and device has been shown to reduce MDRPI.[9] Nurses wanted an intervention that would not alter the accuracy of BP monitoring while still providing a conforming and wicking interface. Current practice was to place a BP cuff directly on the patient without an interface.

Design

Mercy Medical Center applies a systematic approach to quality improvement (QI) methodology. The acronym AIIMM, which stands for assess, improve, implement, measure, and maintain, applies to the steps of this project.

Initial review of the BP cuff placement process revealed areas of vulnerability and opportunities for improvement. The process included the anesthesia provider placing the cuff on the patient, calibrating pressure and inflation intervals, and monitoring BP readings. The perioperative nurses were responsible for removing the cuff and performing a skin inspection.

The nurses determined that a multidisciplinary approach to improve practice was essential. The QI team included the CWOCN, perioperative skin champions, perioperative nurses, perioperative nurse educators, anesthesia providers, and perioperative nurse informaticists. The team's primary objective was to assess, improve, measure, and monitor progress and outcomes of the proposed intervention. In addition, each MDRPI would be analyzed in detail to determine causality and unique risk factors.

Methods

Our hospital uses a tubular bandage (stockinette) made of elastic cotton weave for casted orthopaedic patients (Figure 1). Stockinette is applied before cast application to wick moisture and protect skin from casting materials. In consideration of this practice, the team decided to apply stockinette before BP cuff application to protect arms from moisture and cuff material. Education, spearheaded by nurse educators, was provided to all perioperative staff (anesthesia providers, anesthesia technicians, registered nurses, and nursing support technicians).

Distribution of the stockinette was added to the anesthesia cart at an estimated cost of 18 cents per

Figure 1. Stockinette. This figure is available in color online at www.jopan.org.