

## **Who is at Risk for Developing a Pressure Ulcer During the Perioperative Time Frame?**

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I have been asked this question many times over the past 20 years. Many who asked the question thought I would have an immediate answer. This is a proper expectation due to my career as a head and neck surgeon and in my teaching role at a well known university. Well, they were wrong. To my knowledge, no one has been able to adequately predict who is at risk for a pressure ulcer during the perioperative time frame.

At the end of this document are references of articles that I have found helpful in understanding and addressing the pressure ulcer problem during the perioperative time frame. I am presenting my opinion based on 30 years in the perioperative setting and 20 years experience in the wound care industry. I have supplemented this experience with extensive reading, attending lectures and discussion with wound care experts. For me, the learning curve has been humbling, exciting and thought provoking.

One universally accepted fact is that pressure ulcers do develop during the perioperative time frame. However, the magnitude of the problem is less universally accepted. Many surgeons and operating room personnel believe that if skin ulceration is not evident immediately following a surgical procedure, then soft tissue injury has not occurred. This thought process is unacceptable and must be corrected.

It is imperative, in my opinion, that health care professionals understand deep tissue injuries and how they can develop in as little as two hours time but not be recognized for two to seven days.

Understanding pressure ulcer pathophysiology must be based on the fact that the tissue at risk is three dimensional and must be volumetrically supported to avoid soft tissue distortion. If distortion occurs, there is an increased likelihood of an ischemic necrosis to develop in the soft tissue. It is not generally recognized that an ischemic event can occur with no skin involvement. In other words, the skin looks intact but it is masking subcutaneous, or deep tissue injury. And to make matters worse, the deeper the ischemic injury, the longer it takes to be diagnosed. NPUAP's proposed definition of a deep tissue injury is "A pressure-related injury to subcutaneous tissues under intact skin. Initially these lesions have the appearance of a deep bruise. These lesions may herald subsequent development of a Stage III-IV pressure ulcer even with optimal treatment." The pathophysiology of pressure ulcer development, along with the recognition of deep tissue injury, must be understood before hospital acquired pressure ulcers can be prevented. This will not only have an impact on the overall pressure ulcer problem approach in the general medical arena, but will also significantly impact perioperative patient care.

The best approach to prevent pressure ulcers in a perioperative patient is to analyze their individual risk factors. The risk factor of decreased mobilization and ambulation is without question occurring during the perioperative time frame. It is intentionally created by sedation or general anesthesia with or without paralysis. Poor nutrition and hydration are also risk factors that can predispose a patient to an OR acquired pressure ulcer. While hydration is usually monitored and maintained by IV therapy, nutrition is briefly suspended or diminished in the perioperative time frame. The decreased nutrition is compounded by the additional protein/calorie needs associated with the surgical procedure and subsequent wound healing process.

Incontinence and excessive moisture are other risk factors that need to be addressed during the perioperative period. Urinary incontinence can be controlled by planned pre op voiding or Foley catheter placement depending on the type and length of the surgical procedure. Fecal incontinence can be addressed by pre op forced evacuation or enema use prior to the

perioperative period. Prep solutions and irrigation fluids must be considered as a possible causative risk factor due to maceration and chemical irritation to the skin. The pooling of liquid against the skin should be prevented.

Existing wounds, including pressure ulcers, is another highly predictive risk factor for future development of pressure ulcers. The presence of a wound creates a systemic hyper-inflammatory state that predisposes the patient to potential endothelial cell damage with resulting intravascular coagulation. A closed pressure ulcer is also a major risk factor for reoccurrence of pressure ulcers due to the loss of function of the affected skin and soft tissue. This occurs due to the tissue being repaired by the scarring process and not by regeneration.

Controlling body temperature during the perioperative period needs to address both the shell and core temperatures. Attempting to warm the peripheral shell temperature while the core temperature is decreased will cause additional metabolic requirements of at risk tissue during a time with restricted blood flow to the periphery. Synchronizing the control of the shell and core temperature will better protect the tissue at risk.

The general medical condition and medication being used by the patient should be evaluated and documented utilizing the American Society of Anesthesiologists (ASA) classification. This scientifically proven evaluation is performed preoperatively on each patient undergoing a surgical procedure. The ASA score classifies the physical status of the patient.

The patient must have an individualized care plan relating to the unique environment in the perioperative phase. Even minor surgical procedures can place a patient's at risk. It is important that pressure ulcer prevention or treatment be included in a perioperative care plan and be consistent with the patient's overall continuum of care. In other words, from the time a patient enters a hospital through discharge, all pressure ulcer risk factors need to be examined individually and addressed in an appropriate medical protocol.

Not only are recent studies impacting traditional beliefs as to when and how pressure ulcers develop, a new regulatory initiative is considering pressure ulcer development as a core patient quality indicator. Now, all of these issues must be addressed at all levels of care, by all caregivers, at all times including the perioperative time frame. The continuum of care must be seamless so that a patient is not placed at risk for any time frame greater than two hours maximum. In the future, this time period will in all probability be considered too long for specific high-risk patient populations. Maintaining this seamless continuum of care will require a timely recognition and understanding of the problem so protocols can be individually designed.

Along with addressing each risk factor, the choice of an appropriate support surface must be considered. The support surface must deliver volumetric support, not just more contact area between the body and the support surface. The selected support surface pad must be supported by the surgical table. Many designs have a structural void at the sacral area and if not filled causes the support surface to collapse. This can contradict the effectiveness of the support pad. In addition, the heel must be completely elevated from the surface while maintaining the calf configuration. No support surface alone can accomplish this task.

In conclusion, my opinion is that every surgical patient should be evaluated relating to the risk of developing a pressure ulcer. A patient who is immobilized for greater than 3 hours during the perioperative (pre op and post op) time frame and has an ASA score of one or is immobilized greater than two hours with an ASA score of two, three, four or five should have an individualized care plan developed. This care plan needs to include a pre and post op skin and soft tissue assessment up to 3-7 days after the surgical procedure along with appropriate measures defined to address the individual risk factors. The care plan should address early post op self or assisted ambulation and mobilization, aggressive pre op and post op dietary consideration, urinary and fecal incontinence control, preventing moisture pooling against the skin, synchronized control of the shell and core temperatures, and general medical conditions and medications should be

reevaluated. The care plan should also include a flotation device that delivers equalized pressure to maintain proper volumetric support of the soft tissue trapped between the skeletal press and the support surface. Along with the support surface, the heels need to be unloaded with a device that maintains the calf configuration. This care plan should be developed, documented, monitored on a scheduled basis, changed if adverse conditions or additional risk factors develop and communicated not only to all facility personal but also to the patient or a legal advocate. This suggestion is aggressive, but until a more scientifically proven method is developed, I believe this approach is beneficial for the patient, clinician and the facility.

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