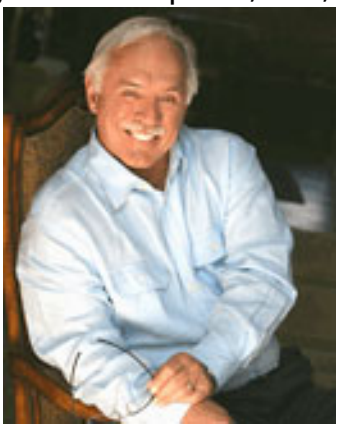
Who Is At Risk For Developing A Pressure Ulcer During The Perioperative Time Frame?

James G. Spahn, MD, FACS



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 fair expectation due to my career as a head and neck surgeon and in my teaching role at a well known university. Well, I don't have an instant answer. 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 to 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, by attending lectures and through discussion with wound care experts. For me, the learning curve has been humbling, exciting and thought provoking.

Universally, it is accepted that pressure ulcers **do** develop during the perioperative time frame. However, the magnitude of the problem is less unanimous. 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 how deep tissue injuries can take place in as little as two hours but recognition can take from 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. Distortion increases the likelihood of an ischemic necrosis developing in the soft tissue. Generally it is not 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 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 decreased mobilization and ambulation risk factor 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. Decreased nutrition jeopardizes the additional protein/calorie needs associated with the surgical procedure and subsequent wound healing process.

Incontinence and excessive moisture are other risk factors to consider 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 an enema prior to surgery. Prep solutions and irrigation fluids are also possible risk factors due to maceration and chemical irritation to the skin. Pooling of liquid against the skin should be prevented.

An existing wound, including a pressure ulcer, is another highly predictive risk factor for future development of pressure ulcers. Presence of a wound creates a systemic hyper- inflammatory state that predisposes the patient to potential endothelial cell damage resulting in 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 of the shell and core during the perioperative period should be addressed. 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 using 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.

It is important that the patient has an individualized care plan relating to the specific environment in the perioperative phase. Even minor surgical procedures can place a patient 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.

Recent studies impacting traditional beliefs on when and how pressure ulcers develop, and new regulatory initiatives now consider pressure ulcer development as a core patient quality indicator. 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 patients are not placed at risk for time frames greater than two hours.

In the future, this time period may be considered too long for specific high-risk patient populations. Maintaining this seamless continuum of care will require a timely recognition and an understanding of the problem, so protocols can be individually designed.

Along with addressing each risk factor, choosing an appropriate support surface is important. Support surfaces must deliver volumetric support, not just provide a large contact area between the body and the support surface. The selected support surface pad must be supported by the surgical table. Many tables have a structural void at the sacral area causing the supporting area to collapse if not filled. This can counteract 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, it is my opinion that every surgical patient should be evaluated to determine their risk of developing a pressure ulcer. Patients immobilized for longer than three hours during the perioperative (pre op and post op) time frame with an ASA score of one; or patients immobilized longer than two hours with an ASA score of two, three, four or five should have an individualized care plan.

This care plan needs to include a pre and post op skin and soft tissue assessment up to three to seven days following the surgical procedure. And the plan should include the appropriate measures defined to address the individual risk factors such as 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 reevaluation of general medical conditions and medications.

The care plan should also include a flotation device that delivers equalized pressure while maintaining 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. Care plans should be developed, documented, monitored on a scheduled basis, changed if adverse conditions or additional risk factors develop and communicated to all facility personnel, patients and legal advocates.

This approach is aggressive, but until a more scientifically proven method is developed, I believe this approach is beneficial for the patient, clinician and the facility.

Suggested Reading List

Aronovitch S, *Intraoperatively Acquired Pressure Ulcer Prevalence A National Study.* JWOCN 1999; Vol.26, pp 130-135.

Vermillion C, *Operating Room Acquired Pressure Ulcers*. Decubitus 1998; Vol.3, pp 26-30.

Scott S, *Perioperative Pressure Ulcer Prevention: What Are Evidence-Based Best Practices for the WOCN*?; Oral Paper Presentation-Wound Poster 1998; #678A.

Scott S, Mayhew P, Harris E, (August 1992). *Pressure Ulcer Development in the Operating Room: Nursing Implications*. AORN, 1992; Vol. 56.

Defloor T, Schuijmer J, *Preventing Pressure Ulcers: An Evaluation of Four Operating-Table Mattresses*. Applied Nursing Research 2000; Vol. 13, pp 134-141.

Schultz G, Mozingo D, Romanelli M, Claxton K, *Wound Healing and TIME; new concepts and scientific applications*. Wound Repair and Regeneration 2005; S1-11.

Stotts N, *Risk of Pressure Ulcer Development in Surgical Patients: A Review of the Literature.* Advances in Wound Care 1998; Vol. 12, pp 127-136.

National Pressure Ulcer Advisory Council *Pressure Ulcers in Neonates and Children.* White Paper 2005; pp. 1-8.

National Pressure Ulcer Advisory Council *Deep Tissue Injury.* White Paper 2005; pp. 1-5.

Holm R, Bakewell S, *Predicting and preventing pressure ulcers in surgical patients.* AORN 2005.

First Annual OR-Acquired Pressure Ulcer Symposium Presentation Summaries. A Supplement to Advances in Wound Care 1998.

Hobbs, L. Spahn, J., *Support Surface Principles-Based on Scientific Fact,* Poster, 1998.

Spahn, J., Sprinkle, C. *Support Surface Principles-Based on Scientific Fact.* Japanese

Journal of Pressure Ulcers 1999; Vol. 1, pp 243-47.

Duncan, C. Spahn, J. edited by Lorraine Butts. *Effects of a Support Surface on Homeostasis- Keep it Simply Scientific.* Paper and Paper presented at WOCN; 2000.

Stark, J., Brenner, L., Fisher, L., Acunivucm, S., Zimpfer, M. Illicvich, UM. *Thermoregulatory efficacy of a new microprocessor controlled water garment in neurosurgical setting.* Department of Anethesiology and General Intensive Care, University of Vienna 2001; A-1090 Vienna, Austria

Piotr K. Janicki, Higgins M, Janssen J, Johnson R, Beattie C. *Comparison of Two Different Temperature Maintenance Strategies during Open Abdominal Surgery- Upper Body Forced-Air Warming versus Whole Body Water Garment.* Anesthesiology 2001; Vol 95, pp 868-74.

Sharp C, McLaws M, *A discourse on pressure ulcer physiology: the implications of repositioning and staging.* World Wide Wounds 2005.
Walker, Richard, *ASA AND CEPOD SCORING*. World Federation of Societies of Anesthesiologists; 2002; Issue 14.
Draft -Candidate 2007 National Patient Safety Goals, Requirements and Implementation Expectations -Hospital and Critical Access Hospital Programs JCAHO Joint Commission on Accreditation of Healthcare Organizations

Copyright 2005 EHOB, Inc.

Source URL (retrieved on *04/01/2015 - 2:02pm*):
http://www.surgicalproductsmag.com/articles/2010/01/who-risk-developing-pressure-ulcer-during-perioperative-time-frame?qt-digital_editions=0