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People, Places, Processes & Products that Influence the Supply Chain

INSIDE THE CURRENT ISSUE

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Operating Room

Pressure ulcers hit a sore spot in the OR

Rarely is time on the side of the operating room. In many cases, every minute costs dearly. And more and more often, pressure ulcers are being seen as a potentially expensive outcome of time spent in the OR, one that can create ripple effects throughout the entire healthcare system. That pressure sore that's found on the nursing home resident may very well have started in the OR.

"Awareness of OR-acquired pressure sores has increased over the last few years," said Dan Allen, a consultant for STERIS Corporation, Mentor, OH. "Longer surgeries are being performed on higher risk patients. The risks of developing a pressure ulcer as the result of an OR experience is increasing every year."

KCI RIK fluid operating table pad

"Time is one of the biggest issues in pressure ulcer development," explained Allen, who specializes in surgical table accessories, patient posturing, pressure management and pressure sore prevention. The developer of the Allen Stirrup, he has spent the last 25 years devoted to developing posturing devices that protect patients from injuries that may occur as a result of lengthy surgical procedures.

The Association of periOperative Registered Nurses (AORN) 2006 Recommended Practices for Positioning the Patient in the Perioperative Setting, state that "procedures longer than two and one-half to three hours significantly increase the patient's risk for pressure ulcer formation."[1]

While AORN guidelines recommend pressure relief surfaces for surgeries lasting longer than two hours, "pressure sores can start to form in as few as 20 minutes," acknowledged Michael Bredal, vice president, sales for Action Products Inc., Hagerstown, MD. "It's important to think about how quickly they can form."

Complicating the matter, said Allen, "When a patient's under anesthesia, they can't tell you what

Outpatient Connection

Heart attack death rates appear lower at 'America's best hospitals'

Individuals admitted for heart attack to a hospital ranked as one of "America's Best" by *U.S. News & World Report* are less likely to die within 30 days than those admitted to a non-ranked hospital, according to a report in the July 9 issue of *Archives of Internal Medicine*, one of the JAMA/Archives journals. Using a methodology that is similar to the recently released mortality measures that are publicly reported by the Centers for Medicare and Medicaid Services (CMS), the study found that ranked hospitals were also more likely to have lower-than-expected death rates, however, many unranked hospitals did as well.

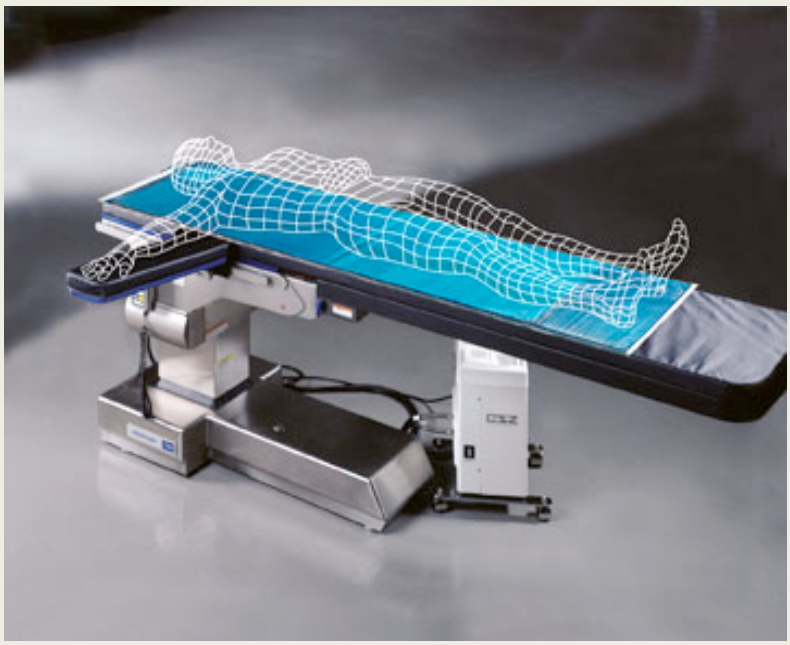
Oliver J. Wang, M.D., of Yale University School of Medicine, New Haven, CT, and colleagues assessed 30-day death rates among 13,662 patients admitted to 50 hospitals ranked on the U.S. News list as the best in "Heart and Heart Surgery" and among 254,907 patients admitted to 3,813 unranked hospitals in 2003. The researchers also compared the hospitals' standardized mortality ratios, where a ratio of greater than one indicates that the hospital had more deaths than expected and a ratio of less than one means there were fewer deaths than expected. After the researchers factored in patient characteristics, the 30-day death rates were, on average, lower in ranked hospitals vs. non-ranked hospitals (16 percent vs. 17.9 percent). When the hospitals were divided into four groups based on these rates, 35 ranked hospitals (70 percent) were in the group with the fewest deaths, 11 (22 percent) were in the middle two groups and four (8 percent) were in the worst-performing group. Eleven ranked hospitals (22 percent) and 28 non-ranked hospitals (0.73 percent) had standardized mortality ratios significantly less than one, meaning that although ranked hospitals were more likely to have lower-than-expected death rates, non-ranked hospitals with favorable ratios outnumbered ranked hospitals with similar performance by nearly three to one. "As a result, the U.S. News & World

hurts. The highest level of risk occurs when the patient is least able to provide feedback to deal with it."

Therefore, "Vigilance and making sure they're using products that are appropriate is key to pressure ulcer prevention", said Bredal.

"Pressure sores develop from a combination of intrinsic and environmental causes," said Allen. Patients are at greatest risk for pressure sore development as the result of pressures created at the bone-tissue interface. Bony prominences (heels, sacrum, shoulder blades, back of the head and elbows) are the most susceptible sites. Allen calls these sites "the landing gear" because they are the primary support structures interfacing with the table surface. "The goal of posturing a patient to achieve pressure relief is accomplished when pressure is redistributed away from the bone-tissue interface to areas where the bone is no longer pressing into tissue," he said.

Vertical and horizontal shear also contribute to the formation of pressure sores. Capillaries allow only one blood cell to pass through at a time. If you stretch or elongate the capillary enough, it can become so thin as to be occlusive. If that occurs, blood cells can't get through and tissue can die. According to early studies, it takes only 32 mm/Hg interface pressure to close a capillary, Allen noted. AORN guidelines state "studies suggest that positioning devices should maintain normal capillary interface pressure of 32 mm/Hg or less."1



Cincinnati Sub-Zero's Gelli-Roll
combines pressure and temperature management in one pad.

If you've ever shopped for pressure management devices, or even a new mattress for your home, you've probably seen a pressure map. With areas that are considered to be high pressure marked in red, and low pressure areas marked in shades of white and blue, pressure maps are often used in an attempt to compare interface pressures to represent the efficacy of patient surfaces, but manufacturers cautioned against using them as the sole measure of a product's pressure-relieving performance. Looks can be deceiving, they agreed.

For one, the scales representing pressure can be set for favorable results. Allen explained, "A number of comparative pressure maps utilize a scale of 0 (white) to 125 (red) to represent the quality of their pressure management surface. It would be better science for manufacturers to supply pressure mapping using a much lower scale range. Since interface pressures greater than 32 mm/Hg close capillaries, the pressure maps should be set at 0-50 with any interface pressure greater than 50mm/Hg being depicted in red. Unless lower scales are applied to this mapping, it will continue to be difficult to evaluate patient surfaces."

Action's Bredal pointed out another nuance related to pressure maps that buyers should be aware of. "The way that pressure maps are conducted is that you do an average of all of the sensors that are activated. There are pressure points that would go beyond 32 mm/Hg, but on average they are

Report ranking list does not include many hospitals that have outstanding performances for the care of patients with acute myocardial infarction," or heart attack, the authors write.

One reason for this may be the reputation component of the rankings, which accounts for one-third of the overall ranking score and is based on cardiologists' opinions of hospitals that provide the best treatment, the authors speculate. "Citations by cardiologists likely favor tertiary centers with strong subspecialty care for the most critically ill patients while not necessarily reflecting the perceived care for the overwhelming majority of admissions for more common diagnoses, which in turn have a more substantial impact on overall hospital outcomes," they continue.

below. That is the industry standard for measuring pressure."

Added Michael Brown, senior programs manager for therapeutic surfaces, Kinetic Concepts Inc. (KCI), San Antonio, TX, "An individual pressure map really only represents how a surface performed for the patient being measured, by the technology (equipment) used to measure, and dependent on how the equipment was set up and calibrated. Bottom line, pressure maps can be misleading."

What's more, 32 mm/Hg may be too much pressure for patients at higher risk for pressure ulcers, including elderly patients with thinner and less elastic skin, he said.

Cindy Miller-Mikolajczyk, RN, director of wound market development for KCI, and a former OR nurse, noted that blood volume loss and shunting are other contributing factors to pressure ulcer development in surgery and trauma patients. "In a cold environment like the OR, the body will shunt blood away from the skin into the trunk of the body to protect the vital organs. In the OR these patients are susceptible to pressure ulcer formation. These patients are just so vulnerable without aggressive intervention before the surgery starts."

"Individual patient conditions, the overall environment within the OR, and the length of surgery can have a cumulative effect on the risk of pressure ulcer formation," said Brown.

There are a variety of pressure-relieving positioning devices on the market that are designed to help prevent pressure sores from forming in the OR. According to AORN, "selection criteria for positioning equipment and devices, include, but are not limited to: availability in a variety of appropriate sizes and shapes; durable material and design; ability to maintain normal capillary interface pressure; resistance to moisture and microorganisms; radiolucency; fire resistance; nonallergenic to the patient; ease of use; easily cleaned/disinfected if not disposable; easily stored, handled, and retrieved; and cost effectiveness."1

AquaGel pressure management positioners from STERIS feature three-dimensional contouring that conforms to anatomical characteristics and cradles the skin. This contoured pressure redistribution disperses pressure away from bony prominences to areas where there is no bone to push against the fascia and the muscle. A dual-density construction helps protect against skin shear with a top layer that replicates skin and an inner layer that is similar to fatty tissue.

The RIK Fluid Operating Table Pad from KCI helps relieve pressure by conforming to body contours and distributing pressure evenly across the entire body using a proprietary fluid material that is neither gel nor foam.

Action Products' positioners are filled with a visco-elastic polymer called Akton that will not leak, flow or bottom out, even with patients up to 1,000 lbs. The pads are covered with a stretchy, ultra-thin polyurethane film that is similar to skin, provides shear-reducing capabilities and brings the protective properties of the polymer through to the skin. Action's extensive line includes specialty frame pads, pediatric positioners and custom designs.

Cardinal Health has a variety of Private Brand disposable foam positioning and cushioning products. These include heel and elbow protectors, foot cradles, abduction pillows, body aligners, head cradles, wheelchair cushions and mattress pads. "These products offer protection to patients while in bed, in a wheelchair or on the operating room table and allow air to circulate and minimize pressure during recovery," said Stephanie DeGroot, associate product manager, Cardinal Health, Dublin, OH.

New from Cincinnati Sub-Zero is the Gelli-Roll which combines pressure management with warming and cooling capabilities in one pad. A CSZ Plasti-Pad warming blanket is encapsulated within Akton gel. This reusable combination product can be used with CSZ's Norm-O-Temp, Blanketrol, or Hemotherm before, during or after surgery to help provide temperature management and pressure reduction for infants to bariatric patients.

Premier Healthcare

Rosebud Solutions

Ruhof Corporation

Stretchair

Stryker Medical

Tronex Healthcare Industries

TSK Products, Inc.

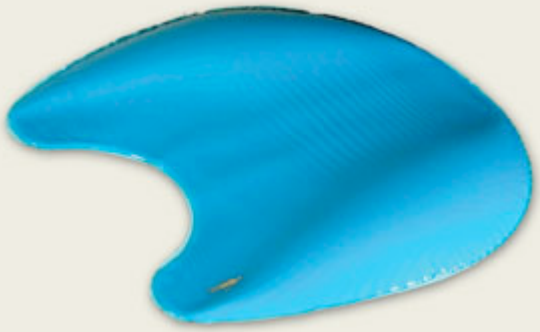
TSO3

Uni-med

VHA

The pressure builds

"There are so many factors that go into forming pressure ulcers," said Bredal.



STERIS
AquaGel contoured sacral protector

That's part of the reason why it's so hard to pin pressure sores to the point at which they started. Complicating the issue further, while a Stage I or Stage II pressure sore appears in the first 24 to 48 hours after surgery, explained Allen, what had been called a Stage III or Stage IV pressure sore is really a deep tissue injury that starts at the bone/fascia/muscle interface. "Sometimes these terrible injuries don't appear until 5 to 7 days post-op," said Allen. "These injuries take so long to present because they start from the inside and work their way out. In most instances the protocol for following patients stops after 72 hours. When patients are discharged within hours of their procedure, there is little or no follow-up communication. So a lot of the most serious pressure sores that are showing up in nursing homes and in ambulatory care facilities could very well have started with the patient's experience in the operating room."

"There's also a continuity of care issue," Allen remarked. "Pressure sores do not necessarily start in the OR. They are also a function of cumulative time. The kind of pressure required to create a pressure sore often starts the moment the patient becomes immobile or unable to react to ischemic pain. The clock starts ticking when the patient gets hit by a car, or when they fall and they can't get up."

He explains a common scenario in which a patient is put on a hard surface in the ambulance, placed on a cheap stretcher mattress in the ER, and left on the stretcher to wait several hours for a room. "Then they take the patient to the OR, and what happens? Amazing! This 85 year-old woman develops a pressure sore," lamented Allen. "The damage is caused by the cumulative time spent placing pressure on the vascular system."

KCI AtmosAir stretcher MRS

"If we're going to point fingers at the OR, let's remember that patients tend to be put on a two inch or three inch thick pad on the stretcher either in the ER, and/or on the way to the OR," said Brown. "And then they're returned to that two inch or three inch stretcher pad to go to recovery where they may stay for potentially hours, if not longer, especially if there's no room in the ICU."

"All that damage that you're thinking happened in the OR or ICU, could have happened starting out at the accident site," said Miller-Mikolajczyk. "There's so much

research that's starting to percolate up about where pressure ulcers are really happening. The OR is a phenomenal focus, it's an area with a great chance for quality improvement, but there are other areas that need to be addressed as well."

New from KCI, the AtmosAir Stretcher MRS with "open pressurized", Self Adjusting Technology (SAT) addresses a potential gap in a hospital's overall wound care program by helping to prevent and treat facility acquired pressure ulcers on patients who spend time on ER, Recovery/OR and Transportation Stretchers.

Clearly pressure management is the enitre hospital's responsibility.

"Another important issue is the general absence of a protocol for intra-departmental reporting of post operative pain unrelated to the incision site," said Allen. "As a result the OR staff, who are genuinely dedicated to protecting patients from harm, continue to posture patients with old methods, with no knowledge that patients are being injured and no understanding of what they need to guard against."

He continued: "I can't tell you how many major hospitals I've walked into where OR staffs have said, 'We know that other hospitals have problems with pressure sores, but we've never had a single one in 25 years. We must be doing something right.' Then you walk down to the wound care people, and they say, 'are you kidding me? At least 20 percent of our pressure sores are on surgical patients."

Statistically, 25 percent of all nosocomial pressure sores come out of the OR, noted Allen. "Some procedures have risk factors that are inordinate, such as vascular, re-implantation, and cardiac procedures that can last 11, 12, or even 15 hours. For these types of surgeries, the pressure related wound incidence in some areas is as high as 60 percent," he said.

"I went into a post-operative care unit (PACU), and the first question was, 'why do we have so many patients complaining about pain that's not related to the incision site?' If someone had an abdominal procedure, why do their legs ache? Why does the patient feel like he jammed the funny bone in his arm? It's all because of patient posturing injuries. I asked the staff if they report these incidents to the OR, and they said, 'there's really no procedure to do that'", related Allen. "If a wound care specialist doesn't tell an OR nurse that they've had pressure sores from surgical patients, how would a surgical nurse know to guard against or prevent surgical-induced pressure sores? It's not their fault if they don't know about it. We're finding time and time again that the only way to get through the lack of communication is to discuss this issue at the risk manager, CFO, corporate council, vice president of nursing and director of OR levels."

According to Bredal, patient posturing devices are no longer the sole concern of the OR nurse. "Lately we've had to increase the number of people we approach. We no longer speak only to the OR nurse. We speak to the risk manager, purchasing manager; it's a multi-pronged sale."

"They need to cut holes in their management silos," Allen emphasized. "They need to share concerns and tell each other what's going on."

Action donut head pad and pediatric chest rolls

Cost justifications

The cost savings potential for avoiding pressure ulcers is huge. Allen noted that the literature states that a Stage II pressure sore can cost upwards of $15,000 to treat, a stage III can cost up to $30,000 and a stage IV up to $90,000.

And litigation raises the stakes even higher. "Let's consider the case of a nosocomial pressure sore," said Allen. "Some patients who developed a single pressure wound have been awarded hundreds of millions of dollars in compensation for their serious injuries."