TIME TO PUT PRESSURE ON HOSPITAL ADMINISTRATORS AND OFF OUR PATIENTS' BUTTS (All Pressure Ulcers Are Preventable!)

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by John L. Baeke, M.D.

A health problem of epidemic proportions is afflicting our elderly and incapacitated. An inexpensive solution exists, yet remains elusive because of special interests and flat out ignorance. I am referring to pressure ulcers; "bed sores" as more commonly known; or "decubitus ulcers" as inaccurately called by others. The medical literature, and more worrisome, the legal literature, have well documented the high-risk rate for any patient to develop a pressure ulcer during the course of a hospitalization. Certainly, patients of nursing homes and extended care facilities are at highest risk, but even our finest medical centers should hang their heads in shame. As *Superman* actor Christopher Reeve's recent death attests, wealth cannot prevent what ignorance doth wreak. I am told even our beloved President Reagan, died with a pressure ulcer as well.

The problem has many root causes.

First, most of us (this includes almost every health care practitioner and hospital administrator) are operating under the mistaken notion that every pressure-preventative specialty mattress is equally efficacious. This belief has never been challenged, thus seems well embedded as a time-honored, universally accepted mantra. This attitude has unfortunately allowed healthcare facility administrators the luxury of believing that whichever brand of specialty mattress system they place on their formulary (usually one with a lot of confusing buttons and fancy flashing lights) will equally satisfy whatever moral obligation or regulatory duty they might have to care for their infirmed. Therefore, the only factor apparently directing the institution's selection of which pressure-preventative mattress system, is cost. This practice is understandable, but dangerous.

Second, physicians too often give little or no thought to pressure sore risk and prevention when authoring admission orders. Many attending physicians have tunnel vision when writing admitting orders and fail to properly contemplate the patient's needs for pressure relief. Many physicians are totally unaware of what the term "MDS" means, and where to find this important Minimal Data Set in the medical record or how to act on this information. Other physicians operate under the naive notion that the admitting nurse's assessment can be faithfully relied upon to properly provide whatever measures are needed for pressure sore prevention, thus absolving them of further responsibility. Most will rely on the wisdom of those who drafted the facility's "standard order set", being completely unaware as to precisely which preventative bed or mattress they have just ordered, but taking comfort that surely the all-wise facility must be providing what is best for their patient.

Third, too many nurses fail to show proper diligence when completing the important MDS or similar pressure risk assessment forms. Sadly, random audit of institutional medical records, often finds simple data entry to be absent or incorrect. Amazingly,

elementary mathematical addition is even a problem for some who are completing Norton and Braden pressure ulcer risk assessment scales. Whether this is a result of staff being over-burdened by the deluge of data-entry required by modern medical records, or too few fingers for elementary addition, these important data sets are frequently being neglected. Then, even when the MDS or risk assessment data entry has been properly completed, all too often the nursing staff will not act on that information. Weary hospital staff must resist the temptation of robotically entering data, without taking a moment to consider the nursing care plan these same MDS forms are designed to trigger. It is simply unconscionable for any healthcare facility to not timely and correctly complete the pressure sore risk assessment and then not immediately act on that determination. Yet this happens every day.

Patients at risk are still not being diligently turned. This critical function is too often relegated to the least trained, least paid, and least motivated worker. Some nurses feel it beneath their dignity, preferring to delegate. Others neglect this duty, because of being overworked or merely fearing that in the process of turning, a soiled sheet might be discovered, thus creating more work. Still others will fail to seek proper assistance, as with the morbidly obese patient. Yet still, others who have truly honorable intentions, fail to understand basic concepts of off-loading, and then improperly turn the patient (jamming pillows accomplishes nothing). Finally, others naively believe that some at-risk patients should not be turned at all (for example, those on ventilators, those with orthopedic external fixators or those already on pressure-reducing mattresses). Egad! These strong words are not an indictment on the honorable profession of nursing (my wife is a RN, MSN), rather acknowledging how the actions of a few can have major consequences.

Fourth, some institutions do not require charting of q2 hour repositioning, conveying the message that with no oversight this is a responsibility which lacks importance. Other institutions have designed health records allowing proper q2 hour charting, yet do not perform any internal audit to follow up when dereliction of duty occurs.

And the most unforgivable sin of all, is “nursing's dirty little secret”; something confided to me by multiple nurses. Charting that proper and timely patient turning occurred, when indeed, none was performed. Unfortunately, many times only the facility’s negligent employee, the injured patient and God, truly know what never happened behind the closed door.

Fifth, far too many in the medical profession have received woefully inadequate and incorrect basic training as to pressure sore prevention and pathogenesis.

For example: True, there are various factors which may place an individual at increased risk for developing (or not healing) a pressure ulcer. These include, immobility, incontinence, diabetes, vascular disease, malnutrition, smoking, neurological disorders, dementia, etc., etc., etc. It has become a pervasive notion that individuals with any of these risk factors are predestined to developing pressure ulcers, and thus little can be done to ward off the inevitable. Hospitals' popular term of convenience is "unavoidable".

The classification of pressure ulcers as being "unavoidable" is a popular but dangerous (some would say irresponsible) term of convenience, allowing for plausible deniability

and a relaxation of normal surveillance and diligence in pressure ulcer prevention in our most vulnerable. The attitude of some regarding causation of pressure ulcers is "Shit Happens"... a fait accompli, if you will.

It is also noteworthy, that many pressure ulcers are only documented as "unavoidable" *after* they developed, or worse, after a claim against the institution is being debated before a jury.

A survey of members of various healthcare professions by Brandeis[1] confirmed that the majority of respondents subscribe to this naive notion. Remember, there is a reason these wounds are called “Pressure Ulcers” and not “Mystery Ulcers”. That is because we know exactly what causes them... PRESSURE. It matters not how many predisposing risk factors an individual might have. Provide an environment of no pressure, and there will never be a pressure sore. NEVER! I would invite any of my learned colleagues to share clinical examples of any patient who developed a pressure ulcer in spite of what could be proven as proper diligence with pressure relief. After years of hearing defense experts make this claim, no one has ever accepted my challenge of showing me one such example.

THAT NOTION OF THE "UNAVOIDABLE PRESSURE ULCER" IS DANGEROUSLY WRONG! None of the aforementioned physical maladies ever *caused* a pressure ulcer. None.

Historically, it was difficult for a defendant healthcare facility to defend a malpractice claim of an institutionally-acquired pressure ulcer. These are typically *res ipsa* cases, meaning "the facts, they speak for themselves". The patient entered the hospital free of pressure wounds; and was discharged with wounds. Difficult to defend.

Like many of you, from time to time I have been asked if a pressure ulcer could have been prevented. After many years as a plastic surgeon with a large wound care population, it occurred to me that my answer to this question has always been the same, “Yes”. It mattered not whether the patient was a young paraplegic or elderly and demented; whether the patient was well-nourished or found on the concrete in an alcoholic stupor; the result of my probing into the wound etiology always came to the same conclusion. The pressure ulcer was preventable. Upon reflection, I have been unable to contrive of any situation where a pressure ulcer was not preventable.

The U.S. Federal government concurred, when in 2006 CMS developed their "Never Event" policies, which lists a group of nosocomial and iatrogenic events and complications deemed unacceptable and outside of the standard of care for which hospitals would be held financially accountable. Among these, are hospital-acquired pressure ulcers.

The darling of this [misguided] theory of pressure ulcer unavoidability is nurse Karen Kennedy who in 1989 published[2] the idea of what she proceeded to name "Kennedy Terminal Ulcers" and would later develop into a website, named after herself.

Nurse Kennedy and her Kennedy Terminal Ulcer (KTU) doctrine have naturally become the battle cry of hospitals and the medical-legal defense profession, as such a defense

would seek to absolve institutions from any culpability. Indeed, the explanation of total unavoidability of some pressure wounds seems plausible to most lay jurors.

For years I have publicly challenged any of the proponents of the unavoidable Kennedy Terminal Ulcer theory to explain why such ulcers only develop over pressure points (e.g. sacrum, heels, ischium, etc.) if they are not caused by pressure. For this theory to be valid, there should also be published reports of KTU wounds occurring on skin surfaces where there is never any pressure, e.g., the abdomen, anterior thighs, even eyelids. Please show me just one. Total silence.

To me the litmus test for this belief is this: *Hypothetically*, if it could be proven that the patient in question would still have developed the same pressure ulcers even if (theoretically) suspended from the ceiling by strings (i.e. zero pressure), then either a) indeed the pressure ulcer was unpreventable, and/or b) the etiology of the wound was obviously something other than pressure. Since, I believe no patient would pass such a test, we must assume all pressure ulcers are preventable. The concept of the unpreventable KTU cannot withstand simple common sense.

I suppose it is no wonder that the same journal editor who has routinely published reports on Kennedy Terminal Ulcers in *Advances in Skin and Wound Care* has refused my contrarian treatise.

Next, most in the medical and nursing professions have been trained as to the clinical differences between Stage I to Stage IV ulcers. Unfortunately, most received this knowledge from flawed charts one often sees posted on the walls at nursing stations. These colorful diagrams (provided by companies e.g. Calgon Vestal / Merck, ConvaTec, KCI, et. al.) erroneously convey the message that pressure sores initially begin with some surface injury to the skin (noted by erythema) and as the soft tissue damage extends, the wound then involves progressively deeper structures (i.e. fat then muscle). Except for the subgroup of “sheer type” pressure ulcer patients, this concept is unfortunately erroneous. However, most still subscribe to it today.

Food For Thought: If all pressure ulcers begin as Stage-1 injury, then why do patients in accredited healthcare institutions ever develop stage-2, 3, 4 pressure ulcers? Whenever I ask this of proponents of the Unavoidable Pressure Ulcer myth, the silence is deafening.

Pressure between a hard external surface (e.g. a conventional mattress) and a bony prominence (e.g. the ischium), dissipates in a funnel-shaped pattern, with the highest intensity of pressure focused against the bony prominence. I give credit to Vasconez, Schneider and Jurkiewicz[3] who in 1977 originally published the notion that the deeper soft tissues (fat and muscle) are most sensitive to pressure damage, rather than skin.

Consider a 190-pound patient resting supine on a firm surface. Let's say he has 50 pounds of pressure on each buttock. If the diameter of each buttock is 8 inches, then he will have ~1.0 psi of pressure against his dermis. However, if the promontory of the ischial tuberosity is $1inch^2$ (or ~ 0.8 sq in surface area) then the tissue closest (gluteus maximus) will experience ~63 psi! All of the pressure dissipated across the entire buttock is focused on the small ischium. Q: Which do you believe is more likely to

experience lysis (i.e. cell death) from ischaemia and crush; the cellular elements of the superficial dermis (1 psi) or deeper muscle and fat (63 psi)?

Furthermore, because of the higher tensile strength of collagen and other elements in the extracellular matrix, the dermis is the soft tissue structure most resistant to the effects of unrelenting pressure, i.e. the last structure to show signs of pressure damage. What this means clinically, is that many pressure sores will have been developing against the bony prominence for a extended time before they have progressed to involve the skin. The practical implications are, when the skin becomes red many providers will treat the area as if a superficial fresh stage I wound, and merely rub the surface with some soothing lotion (just as instructed by the aforementioned charts), when in reality what is seen is often the tip of the Stage IV-iceberg. The future of that wound has been cast, and no amount of rubbing or lotion will heal the deep tissue damage.

Since the knowledge and technology exists to prevent institutionally-acquired pressure ulcers either with proper diligent turning and/or proper mattress selection, then I have to believe ALL pressure ulcers are preventable. However, as inadequate as current hospital preventative practices may be, many pressure ulcers can therefore develop, all while adhering to the current minimum Standard of Care. Thus, the goal should be to elevate the current Standard of Care; rather than make excuses for its shortcomings.

As stated above, not all of the responsibility for this problem rests at the hands of the front-line caregivers. Many, if not most, health care institutions feel comfortable that they have adequately provided for the at-risk patient by merely providing some pressure-reducing mattresses on their formulary. These mattresses at most, only provide temporary comfort to the patient, and at their worst, allow staff a dangerous sense of compassionate neglect. Ask yourself this,

If mere “pressure-reducing” mattresses were so effective, why do nursing protocols still have them turning patients while on these devices? Why do the operation manuals for these mattresses still recommend turning? (Hmmm) It doesn’t seem that this expensive mattress has resulted in a net gain for the facility, over their standard firm mattress. Thousands of patients a year still develop pressure ulcers, when resting atop popular pressure-reducing mattresses. Might just as well have purchased a $5 egg-crate foam pad from WalMart.

Pressure-reducing mattresses are <u>not</u> the same as pressure-relieving (or zero-pressure) mattresses. Unfortunately, these two very different terms are used synonymously by most clinicians today.

I have used “zero-pressure” mattresses on well over two hundred patients, <u>including my quadriplegic father</u>. By physician order, I would even instruct the nursing staff, DO NOT TURN MY PATIENT. (You read that correctly.) What pressure relief has one gained if a wedged pillow is still jammed under the back? During the 14 years I used the Pegasus® mattresses, *none* of my patients developed *any* pressure ulcers. None! Furthermore, I have had no hesitation to place patients supine on top of fresh skin grafts and flaps!!!

What can be done? Infirmed patients deserve a better product. Instead of a mere pressure-reducing mattress, these at-risk individuals should be resting on a pressure-relieving or zero-pressure mattress. What is the difference? A pressure-reducing

mattresses does not offload the soft-tissue / bony interface by the critical capillary filling pressure. In other words, if a pressure-reducing mattress cannot reduce the pressure to something less than ~11 - 15mm Hg, the small vessels, especially those on the venous side of the microcirculatory loop, are still compressed shut. A truly preventative mattress must therefore be pressure-relieving or zero-pressure. To my knowledge, only one such product exists which meets that specification. These were manufactured by Pegasus Airwave, Inc. of Boca Raton, Florida. I believe they have the patent on zero-pressure technology.

To look at a Pegasus mattress, one observes no apparent difference from more familiar brand name alternating air cell mattresses. The key difference is that the transverse air cells in the Pegasus mattress do not just passively deflate to some lower pressure (deflated by the weight of the patient's body) as with conventional specialty mattress technology; but rather they actively implode (i.e. sucked flat), thus completely collapsing the air cell and temporarily suspending that portion of the patient's body between the two adjacent inflated air cells. This is a critical difference. This cycle alternates every few minutes. This process not only creates periods of zero pressure, but causes a reactive hyperemia, which further aids in healing wounds in those with established ulcers.

To convince myself of the superiority of Pegasus technology, in 1993 I voluntarily spent a night in a hospital patient room, atop a Pegasus mattress. I instructed the nursing staff to restrain my waist, wrists and ankles thus simulating quadriplegia. I was completely immobilized yet able to sleep pain-free through the night, without having to ask for release of the tethers. I became absolutely committed to this technology. Several times I presented my personal experience to Pegasus suggesting they promote to other healthcare facilities what I coined, the "Pegasus Challenge". I would be willing to travel, performing the same overnight demonstration alongside any facility's administrator as my roommate; only the administrator would be equally restrained on their institution's favorite pressure preventative mattress. I never received a corporate reply.

The story of the Pegasus company is one of little fish eaten by big fish eaten by bigger fish. Apparently, none of these corporate acquisitions were to broaden sales of the superior Pegasus technology; but rather to squash emerging competition. This ultimately resulted in closure of the Pegasus company and cessation of production of the zero-pressure mattress around 2005.

I possibly remain the sole remaining soldier of the legions of former Pegasus utilizers in the U.S.

The promising news is, engineers and other officials of the former Pegasus Company are back in business under new corporate name, producing an improved truly zero-pressure product in Europe. I am in consultation with this company to re-introduce their mattress back into the American market.

Until then, my suggestion for individuals searching to purchase a zero-pressure mattress would be to preferentially locate a reconditioned Pegasus mattress. I can attest, they are built like a tank, have idiot-proof controls (just an on/off switch) and work. The remaining old inventory of Pegasus mattresses were acquired by a former competitor (Arjo). I am investigating if they are available for purchase. As a last resort, consider eBay.

I am not employed by nor have financial interest nor own stock in any mattress company. Pegasus Airwave simply made the state-of-the-art mattress in pressure-ulcer prevention. It is a sad commentary that the mattress technology of the 1990s in the U.S. surpasses that of today.

One final word. In 1999, my father, Dr. John O. Baeke, was rendered a quadriplegic as a result of a subdural hemorrhage. For the next six years, he lived with me, while bed-ridden on a Pegasus mattress. During that entire time, he was never turned in bed. If my wife and I were able to keep him free of any pressure ulcers while maintaining a full professional workload, certainly any hospital or nursing home should be able to do the same.

Why are so few of us willing to go out on a limb and say, "Yes, all pressure ulcers are preventable"?

It is unfortunate that professional journals like Advances in Skin and Wound Care are so encumbered by ties to special interests and a certain author that they cannot publish a frank discussion like this, wherein a contrarian opinion is presented.

Santa Ynez Valley Plastic Surgery
1080 Viendra Dr
Solvang, CA 93463 USA
DrBaeke@SYVPlasticSurgery.com
Tel. (805) 350-9288

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