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REVIEW ARTICLE

Use of Alternatives to Air-Fluidized Support Surfaces in the Care of Complex Wounds in Postflap and Postgraft Patients

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Abstract Air-fluidized support surface therapy has many drawbacks, such as dehydration, in an already difficult recovery for those wound patients who have undergone flap and graft surgery. In addition, patient care and handling are also problematic. Patients complain of discomfort, and the instability of the surface interferes with patient stability in side lying and semi-Fowler's positions. Alternative support surfaces can be considered for postflap or postgraft patients. Such technologies as alternating pressure, low-air-loss, and therapeutic nonpowered, advanced, and lateral rotation surfaces are widely used for pressure management in high-risk patients and those with existing pressure ulcers. These surfaces must be used within a total pressure ulcer management program that includes frequent turning and repositioning, skin and ulcer care according to evidence-based protocols, patient and caregiver instruction, nutrition, and offloading and positioning. The proposed recommendations require more research on the relative effectiveness of less expensive and more user-friendly support surfaces such as low-air-loss and nonpowered advanced support surfaces and is necessary in order to conclusively

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recommend one type of surface over another. However, at this time the available clinical studies and opinions remain positive.

Introduction

Myocutaneous and fasciocutaneous flaps, along with split-thickness skin grafts, are surgical treatments of last resort that could be used in selected patient for nonhealing chronic wounds and other conditions. They are major, costly procedures that have high rates of failure if the patient's health is not optimized, both before and after the surgery, and if the patient is not prepared for both short-term and long-term follow-up care and potential lifestyle changes. Flaps are applied over full-thickness defects. Flaps are very fragile immediately postsurgery, with drains usually placed under the flap which is covering the defect. Flaps are only secured in place over the defect by only sutures placed at the edges. No pressure is allowed on the surgical site for several weeks postsurgery in order to avoid necrosis and allow the flap to heal by attaching to the underlying tissues. Skin grafts are applied on a prepared wound bed with healthy granulation tissue to maximize graft take. Occlusive dressings, bolster dressings, and negative pressure wound therapy dressing are being used to secure the grafts, apply vertical pressure, and avoid sheer forces from peeling the graft off the wound bed and maximize take.

Two important components of the postsurgical care of these patients are frequent repositioning and careful handling. Repositioning is required to minimize the risk of skin breakdown on the remaining surfaces of the body.[1,2] Most individuals prefer recumbent positions such as lateral decubitus or supine and, less frequently, prone. With the body surface of the surgical site being eliminated as a weight-bearing surface, the number of lying surfaces is limited, which puts extra stress on the skin and soft tissues over bony prominences on the remaining surfaces and puts them at higher risk for future pressure ulcers. It is essential to reposition these patients often and to teach self-repositioning and proper weight shifting to reduce prolonged pressure on these bony prominences.

Along with frequently repositioning these patients, staff is required to handle them very carefully in order to avoid any pull or strain on the surgical site. Dehiscence of the flap can occur easily, and loosing the protective dressing and sheet forces may lead to graft failure. In both situations, the patients are left with open wounds that may require further surgery and a prolonged healing time. Unstable support surfaces complicate this delicate but necessary job of the nursing staff. In addition, it is difficult to guarantee that the surgical site will never have pressure during the entire time that the postsurgical protocol demands. Recurrence of pressure ulcers is a common, serious problem after flap closure surgery, and flap choice becomes limited, which may lead to prolonged and expensive hospitalization. Recurrent breakdown may result from inadequate debridement of devitalized tissue or infected bone under the flap; failure to eliminate wound dead space and achieve a tension-free closure; poor hygiene and nutrition. Failure to eliminate the causative condition, such as the presence of spasm and contracture, pressure, shear force due to poor care or altered mentation and dementia may also lead to recurrence. The labor-intensive nursing care issues such as turning, local wound care, and avoidance of urine and fecal contamination of the wound may have not changed from the preoperative setting. In short, unless the predisposing factors have been modified, the recurrence rate is very high.[3]

The support surface becomes an integral part of patient care for these patients and their fragile tissues. Maximizing pressure redistribution away from the high-risk bony prominences, and away from the surgical sites when they inadvertently take pressure, is a major requirement. Less often discussed but nevertheless important goals to consider in tandem with pressure redistribution include the following[4]:

- ease of patient care for staff.
- ease of maintaining patient position on the surface.
- patient comfort while on the surface.
- cost.

A support surface widely used for these fragile patients is a technology called *air-fluidized therapy* (AFT), also known as *high air loss*. In 2007, the National Pressure Ulcer Advisory Panel defined "air-fluidized" as "a feature of a support surface that provides pressure redistribution via a fluid-like medium created by forcing air through beads as characterized by immersion and envelopment."[5] See Figure.

The fluid-like nature of the air being forced through millions of sand-like silicone beads provides a unique medium that allows immersion of the patient into the surface, envelopment of the surface around the patient, equalization of pressure across the weight-bearing surfaces of the body, and a claim of reduced shearing. Extensive use of this technology over the years has led to its wide acceptance as a top-of-the-line support surface.

Drawbacks of AFT commonly referred to include difficulty with patient care because the envelopment of the