Review: Specially designed products to prevent or heal pressure ulcers are more effective than standard mattresses

Cullum N, Deeks J, Sheldon TA, Song F, Fletcher AW. **Beds, mattresses and cushions for pressure sore prevention and treatment.** Cochrane Review, latest version 26 May 1999. In: The Cochrane Library. Oxford: Update Software.

Question

In patients who are at risk for pressure ulcers, are pressure-relieving beds, mattresses, and cushions (support surfaces) effective for preventing and treating pressure ulcers?

Data sources

Randomized controlled trials (RCTs) were identified by using 19 databases from their inception to 1997, hand searches of 5 wound care journals, conference abstracts, bibliographies of relevant studies and review articles, and contact with experts and manufacturers. Unpublished data were also sought.

Study selection

Interventions included standard or specialized foam mattresses or overlays; gel-, fiber, or water-filled mattresses or overlays; alternating pressure mattresses or overlays; air-fluidized, bead, or low-air-loss beds; sheepskins; turning beds or frames; wheelchair cushions; or operating table overlays. Outcomes were incidence or healing rates of ulcers; cost; and comfort, reliability, and acceptability.

Data extraction

Data were extracted on study quality, inclusion and exclusion criteria, baseline characteristics, settings, interventions, follow-up, outcomes, and acceptability and reliability.

Main results

37 RCTs met the inclusion criteria, and methodologic quality was generally poor. Many settings and products were studied, and sample size was often small. 29 RCTs studied patients without pre-existing pressure ulcers. Constant low-pressure mattresses and a water-filled mattress decreased the incidence and severity of pressure ulcers in high-risk patients, including those with hip fractures, more than did standard foam mattresses. Low-technology products (e.g., foams and water-filled supports) did not differ for the incidence of pressure ulcers. 1 primary-prevention RCT showed a greater reduction in incidence of pressure ulcers for an alternating-pressure bed than for a standard hospital mattress (relative risk 0.32, 95% CI 0.14 to 0.74). Only 1 of 7 RCTs showed that alternating-pressure devices were superior to low-technology (constant pressure) products. The 1 RCT of low-air-loss beds showed they were more cost-effective than standard beds in the intensive care unit. 5 RCTs evaluated special products for the operating room, and pooling of the data showed reduced incidence of pressure ulcers. The role of seat cushions in preventing pressure ulcers is unclear. Air-fluidized beds were shown to be superior to standard beds for healing of pressure ulcers but were not superior to low-air-loss or alternating-pressure mattresses.

Conclusions

Special products designed to prevent or heal pressure ulcers are generally more effective than standard mattresses. Evaluations of specific products are limited in size and quality.

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For correspondence: Dr. N. Cullum, Centre for Evidence Based Nursing, Department of Health Studies, University of York, Genesis 6, York Science Park, York YO10 5DQ England, UK. FAX 44-1904-434102.

Commentary

Not all patients are at risk for pressure ulcers, but in nursing homes, rehabilitation centers, and hospitals, the common risk factor is an inability to shift weight independently. Patients who are at risk for pressure ulcers (1, 2) are dependent on health care providers to reduce the exposure of bony areas to pressure. Moving patients, the use of a bed surface with altered biomechanical characteristics, or both are necessary aspects of prevention and treatment. Because purchase or rental of pressure-modified beds and cushions is expensive, cost-effectiveness information is important. Objective evidence of reduction in outcomes (3), such as length of stay, home nursing service, and systemic complications, is often missing.

Cullum and colleagues have done an exhaustive compilation of the available RCTs on support surfaces. The studies, however, were small, and some did not provide baseline data on such variables as severity of illness, incontinence, and nutrition. One source of confounding was the inability to standardize the essential hands-on care and the influence, positive or negative, of using an "improved" product.

Although many health care providers are responsible for care plans for individual patients at risk for pressure ulcers, most physicians and nurses are not directly involved in acquiring these expensive products. The evidence from the review is somewhat limited, and the results are complex, but the review by Cullum and colleagues is useful for providers and administrators involved in fiscal decisions, policy making, and education. The power of this review is that it will be updated as technology changes and new studies are published.

Jomarie Zeleznik, MD
Montefiore Medical Center
Bronx, New York, USA

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