

Use of a Horseshoe-Shaped Glycerine-Based Dressing to Protect Patients From Pressure Sores

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SUMMARY

It is well established that pressure sores often develop after a patient has been on the operating table for an extended period of time. The treatment of pressure sores is a very costly one and in some cases, pressure sores can cause the death of a patient. In a retrospective study over the years 1995-1996, we have reviewed over 9000 patients in the medical wards and over 9000 patients in the surgical wards with respect to the preventive effects of a horseshoe-shaped *Elasto-Gel™* dressing (Southwest Technologies, Inc.) compared with a hydrocolloid dressing in the Red Cross Hospital in Beverwijk, the Netherlands.

Medical patients were preventively treated with hydrocolloid dressings and special beds. Surgical patients were treated either with horseshoe shaped hydrocolloids or with *Elasto-Gel™* horseshoe shaped dressings combined with foam mattresses. There was no significant difference between using a horseshoe shaped hydrocolloid dressing and using the standard shape for reducing the number of pressure sores. By contrast, we noted a highly significant difference with patients treated with the *Elasto-Gel™* horseshoe shape. The cost saving when using the *Elasto-Gel™* horseshoe shaped dressing and eliminating the use of specialty beds is highly significant.

Consideration of the causes of pressure sores leads to the simple conclusion that the very best way to protect patients is to prevent pressure and shearing forces upon the skin,^{1,6}. To reduce shearing forces, a great number of nursing institutions apply a film or a hydrocolloid wound dressing to the skin. However, two problems arise concerning the prevention of shearing forces on the sacrum in daily practice: firstly, the anatomy of the buttocks does not make it easy to hold a film or hydrocolloid dressing in place, and secondly, when using hydrocolloid dressings

possibly combined with alginates, the condition of the intact skin can deteriorate.

AIM OF THE STUDY

The aim of the two year study was to investigate the effect on pressure and shearing forces of an *Elasto-Gel™* horseshoe shaped dressing applied to the buttocks and ischial tuberosities of patients in surgery. The idea for this investigation, involving nurse intervention on surgical and medical patients, came from the practicing nursing staff on a surgical ward of the Red Cross Hospital, Beverwijk, The Netherlands

THE INNOVATION

Pressure sores often develop after a patient has been on the operating table for an extended period of time. The treatment of pressure sores is a very costly one and pressure sores can cause the death of a patient. In an attempt to prevent pressure sores, a number of products were evaluated over a two year period in the medical and surgical wards of the Red Cross Hospital. The project actually started three years ago in the surgical department. The nursing staff were using a gel pad called *Elasto-Gel™* which was introduced in 1998 by Southwest Technologies, Inc. This occlusive dressing is a mixture of glycerine and water in a cross-linked polymer matrix. *Elasto-Gel™* has a high glycerine content that does not macerate the skin³. The dressing is breathable, but can also be seen as an occlusive dressing because it protects the skin against the outside environment⁴. *Elasto-Gel™* is a thin gel sheet. The nurse cannot inspect the wound through the dressing, but in daily practice that is not a problem because the nurse can inspect the skin by removing the *Elasto-Gel™* dressing very easily after which it can be replaced. The nursing staff was enthusiastic about using *Elasto-Gel™* on the intact skin instead of using hydrocolloids and urethane films because:

- it does not dehydrate the intact skin.

- it molds to the body because it is flexible and stretchable.
- it has pressure-distributing properties and shearing forces are to a large extent eliminated, reducing the risk for pressure sores.
- it can be replaced on the wound if not saturated.
- the skin under the dressing remains in good condition because of the glycerine in the dressing.
- it shows mild adhesion.
- it has a high humidity and oxygen transfer rate and can absorb 3 to 4 times its own weight without macerating the skin.
- it consists of natural ingredients which mimic the epidermis.

Following the successful use of the standard *Elasto-Gel™* dressing, the nursing staff developed a new shape of dressing that is adapted to the anatomy. This new shape looks like a horseshoe and covers both the sacrum and the ischial tuberosities.

METHODOLOGY

Over a two year period (1995-1996) 9419 medical patients and 9562 surgical patients in the Red Cross Hospital in Beverwijk, the Netherlands were reviewed for this study. The Red Cross Hospital is a 375-bed general hospital with a specific focus on burn wounds. A quantitative review of the admission statistics and purchase statistics in the hospital was undertaken. All patients who used a special care bed or mattress were identified by survey of the company which delivers the special beds to the medical and surgical wards. All details, e.g., kind of bed or mattress, length of stay on the special bed or mattress, date of stay, patient's name and ward of admission were recorded. Nursing reports were used for detailed information about patient characteristics. Patients who came to the hospital with any signs of pressure sores (stage 1-4) were excluded from the study. The surgical patients who were reviewed in this study were treated on the operating table for more than one hour.

The Statistical Package for the Social Sciences (SPSS) was used to analyze the results. We chose SPSS because it is a highly flexible program providing excellent capabilities for labeling variables, and includes all of the most commonly used parametric and non-parametric statistical procedures⁵⁻⁷.

RESULTS

Dressings

A total of 4723 medical patients were treated at the Red Cross Hospital in 1996, compared with 4696 in 1995. The corresponding figures for surgical patients were 4870 (in 1996) and 4692 (in 1995). In 1995 nursing staff on the medical wards used 143 hydrocolloid dressings to protect 107 patients from pressure sores. In the same year, nursing staff on the surgical wards used 430 hydrocolloid dressings to protect 145 patients from pressure sores. Compared with the medical wards, nursing staff on the surgical wards were using three times as many hydrocolloid dressings. In 1996, the nursing staff on the surgical wards were using the *Elasto-Gel™* horseshoe shape instead of using hydrocolloids to protect patients who were undergone major surgery. In 105 patients, the *Elasto-Gel™* horseshoe shape was used in combination with a foam mattress because the use of a special mattress alone will not prevent pressure sores^{1,8,9}. In total, 72 *Elasto-Gel™* dressings were used because two horseshoe shapes can be cut out of one *Elasto-Gel™* dressing. Nursing staff on the medical wards used hydrocolloids to protect medical patients from pressure sores. In total, 139 medical patients were treated with hydrocolloids to protect them from pressure sores.

Number of Pressure Sores

In both 1995 and 1996, nursing staff on the medical wards were using hydrocolloid dressings to protect patients from pressure sores. In 1995, 117 out of 4696 medical patients (2.5%) developed pressure sores. In 1996, 172 out of 4723 medical patients (3.6%) developed pressure sores.

In 1995, 139 surgical patients developed pressure sores (3.0%). Only 12 patients were using preventative the *Elasto-Gel™* horseshoe shaped dressing. None of them developed pressure sores. In 1996, 105 surgical patients were using the *Elasto-Gel™* horseshoe shaped dressing in combination with a foam mattress. Only 8 patients (0.16%) developed pressure sores, a decrease of 95%.

Cost of the Treatment

The total cost of special beds was \$26,276.24 in 1995 and \$31,367.15 in 1996 for medical patients. The cost of dressings, used by medical patients was \$793.86 in 1995 and \$1,076.16 in 1996. Therefore, the total material cost of the treatment on the medical wards was \$27,070.10 in 1995 and \$32,443.31 in 1996, i.e. the cost of the treatment on the medical wards increased by 20% in one year.

The cost of special beds used by surgical patients was \$19,682.32 in 1995 compared with \$11,798.34 in 1996. The cost of dressings decreased from \$4,063.80 in 1995 to \$2,774.19 in 1996. The total cost of treatment for surgical patients therefore decreased from \$23,746.12 to \$14,572.53 in just one year, a 39% decrease.

DISCUSSION

It is well known that some patients come into hospitals with pressure sores, particularly the elderly, but many sores develop while in the hospital and tend to do so in the first two weeks of hospitalization¹. To reduce shearing forces, a great number of nursing institutions use a sheepskin or apply a film or hydrocolloid dressing to the skin. These methods, combined with pressure-reducing measures can contribute to pressure sore prevention. The advantages and disadvantages of any tool must be weighed against each other and compromises must be made in most instances

This retrospective study represents the kind of clinical nursing research needed to establish a scientific body of knowledge upon which definitive guides for the improvement of practice can be based. Using the *Elasto-Gel™* horseshoe shaped dressing to protect surgical patients from pressure sores at the sacrum and the ischial tuberosities is a highly successful nursing intervention. However, there is one major problem: nurses are generally resistant to change^{1,10}. Change requires effort, retraining and restructuring one's work habits and may also be perceived as threatening.

In addition, to the results described, there was a savings in nursing time and patient quality of life that was greatly improved when using the *Elasto-Gel™* horseshoe-shaped dressing. The conclusion is that using the *Elasto-Gel™* horseshoe shaped dressing in conjunction with a polyurethane mattress greatly reduces the risk of pressure sores, a significant difference compared with patients who were treated with hydrocolloid dressing. Using the *Elasto-Gel™* horseshoe shaped dressing is very cost effective because, as was shown in this study, it can save 39% of the total cost of treatment.

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