The Role of Cyanoacrylates* in the Prevention of Superficial Tissue Injury

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Study # LIT678

Presented at the Symposium on Advanced Wound Care, San Diego, CA., April 2008.

This study was sponsored by:

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wound & skin care education

The clinical education division of MEDLINE

MKT208141/LIT678/2.5M/K&M7

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CLINICAL PROBLEM

The prevention of skin damage in the elderly is a major issue in all healthcare settings. Mechanical forces such as friction and moisture applied to the buttocks, coccyx, heels and elbows are especially prone to cause superficial tissue injury that present as dermal erosions.[1] Wounds created in these areas may provide a locus for further enlargement and deterioration to a full thickness chronic wound that is resource intensive to heal. The literature reports acrylate-based skin protectants have traditionally been used to treat both peri-wound areas as well as damaged, denuded skin but have not addressed their role in prevention.[2,3] This study compared the use of a cyanoacrylate based skin protectant* to traditional skin protectants** in the prevention of superficial tissue injury.

The medical use of cyanoacrylates is gaining increasing acceptance. Cyanoacrylates, chemically speaking, are reactive monomers which polymerize speedily in the presence of water, for example in the presence of the moisture present in wounds. This polymerization sets up a bonding layer that can be used hold the edges of the skin together following surgery. Such technology is the basis of wound closure products such as Dermabond® and Indermil®.[5,6] Similar polymerization of the cyanoacrylate monomer by the moisture present in intact or semi-intact skin is also possible, and the resulting polymer film can protect the underlying skin from external insults and injuries. This study examined whether cyanoacrylate polymers can indeed protect intact skin in a clinical environment.

METHODS

Heel risk assessment was performed using the Heel Pressure Ulcer Risk Assessment Tool (HPURAT)[4] on elderly residents of two long-term care facilities that commonly use non-cyanoacrylate film protectants to prevent heel breakdown. A convenience sample of twenty immobilized non-ambulatory patients whose risk score required preventative heel precautions by HPURAT were enrolled in a prospective comparison evaluation. The right heel of each patient was treated with a non-cyanoacrylate skin protectant (control) daily** and the left heel was treated once a week with a cyanoacrylate based product.* Both products were delivered out of a sealed, single dose unit. Heels were monitored over a two week period on a daily basis for evidence of skin alterations. The average application times of the protectant regimens on the test and the control arms were also noted for the two week period of the study.

RESULTS

Analysis of the differences between the two regimens showed no statistical differences in age, sex or Heel Pressure Ulcer Risk scores between the two groups. Neither were there any differences in outcomes. There was no heel breakdown in either group, though the heel with the traditional dressing was less firm in all participants suggesting increased transepidermal water loss as compared to cyanoacrylate dressings.

Time studies of both product applications found no differences in prep time, application of the dressing or documentation for a single application. However, the cyanoacrylate had a distinct advantage over the traditional dressing as its application is only once a week. This would impact labor costs between the two regimens.

This study has several limitations. The study was not statistically powered. Using expected ulceration incidence rates, a larger study would be indicated even if one was to look for a moderate reduction, such as 20%, in ulcer rates. Future studies should also be designed to occur over a longer period of time. Comparison of transepidermal water loss rates between the two methods should also be investigated.

One week after application, left heels with cyanoacrylate based product and right heels with non-cyanoacrylate skin protectant.

Notice that there is no visible difference between the two heels.

CONCLUSIONS

The use of a cyanoacrylate dressing is a viable option in the prevention of heel pressure ulcers, requiring less labor time.

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*Remedy® SuperSkin®, Medline Industries, Mundelein, IL
**Skin-Prep®, Smith and Nephew, Largo, Florida