A Comparison of Foam and Hydrocolloid Dressings: the Results of a Literature Review

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Introduction

A wide range of modern products, aimed at promoting a moist wound healing environment, are available to clinicians; these include alginate, film, foam, hydrocolloid and hydrogel dressings. Foams and hydrocolloids account for over half of the global market for moist wound dressings (Figure 1). The description, composition, key properties and uses of these two dressing types are presented in Table 1.

Objectives

To compare the properties and performances of foams and hydrocolloids by means of a literature review.

Methods

A literature search of electronic data sources (Table 2) and manual searches of conference proceedings and journals of relevance to wound care were undertaken to identify clinical data that compares the usage of foam and hydrocolloid dressings.

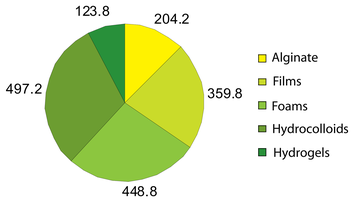

Figure 1: Global market for moist wound dressings ($ million) (Fatz, 2004)

Table 1: Foams and hydrocolloids (adapted from Moreau (2003) and Morgan (2004))

	Foams	Hydrocolloids
Description	Absorptive, sponge-like, polymer dressings (with or without adhesive borders)	Dressings consisting of adhesive, carbohydrate-based wafers (most have waterproof backing)
Composition	Polyurethane and other components	Microgranular suspensions of natural or synthetic polymers (e.g. gelatin or pectin) in adhesive matrix (e.g. polyisobutylene)
Key properties	Absorptive Provide moist wound environments Promote autolytic debridement	Provide some degree of absorption Impermeable to oxygen, water and water vapour Turn to gel as they absorb moisture, helping to maintain moist wound beds, and promoting autolytic debridement
Uses	Primary or secondary dressings on wounds (flat or cavity) with minimal to high exudate, where a non-adherent surface is important	Dressings for wounds with minimal to moderate exudate, including necrotic and sloughy wounds Sheet dressings may also be used as secondary dressings

Table 2: Electronic data sources

Type	Sources
Bibliographic databases	MEDLINE, EMBASE, CINAHL, AMED
Internet sites	Cochrane Library, World Wide Wounds

Results

Clinical data comparing a number of different foam and hydrocolloid dressings were identified, involving patients with a variety of wound types (Table 3).

Table 3 Clinical comparisons of foam and hydrocolloid dressings

Reference	Wound Type
Collier, 1992	VUs or AUs (n=71) treated with polyurethane foam (Tielle®) (n=39) or hydrocolloid (unspecified) (n=32) for up to 8 weeks*
Banks et al, 1994	PUs (n=29) treated with polyurethane foam (Spyrosorb) (n=13) or hydrocolloid (Granuflex) (n=16) for up to 6 weeks*
Banks et al, 1994a	PUs (n=40) treated with polyurethane foam (Spyrosorb) (n=20) or hydrocolloid (Granuflex) (n=20) for up to 6 weeks*
Bowszyc et al, 1995	VUs (n=82) treated with polyurethane foam (Lyofoam) (n=41) or hydrocolloid (Granuflex) (n=41) for up to 16 weeks*
Bale et al, 1997	PUs (n=60) treated with polyurethane foam with adhesive border (Allevyn Adhesive) (n=29) or hydrocolloid (Granuflex) (n=31) for up to 6 weeks*
Bale et al, 1998	PUs, DUs, VUs, and AUs treated with polyurethane foam (Allevyn) (n=50) or hydrocolloid (Granuflex) (n=50) for up to 8 weeks*.
Karlsmark, 2006 Zillmer et al, 2006	Peri-wound skin of VUs (n=45) treated for up to 14 days with dressings utilising different adhesive types: hydrocolloid-based (DuoDERM Extra Thin; Biatain); polyurethane-based (Tielle); and soft silicone-based (Mepilex Border)

* or until ulcers healed, whichever occurred first
AU=arterial ulcer; DU=diabetic ulcers; PU=pressure ulcer; VU=venous ulcer

Discussion

This literature review has highlighted a number of clinical parameters in which foam dressings outperform hydrocolloid dressings:

- Wound healing
  - Foams associated with better healing rates in four out of five studies (Figure 2)
  - Higher proportion of improved ulcers at study end with foams in two out of three studies (Figure 3)
  - Greater percentage reduction in wound area with foams (Bale et al, 1998)
  - In one study, 10% of patients treated with hydrocolloids were withdrawn due to overgranulation (Banks et al, 1994) . Interestingly, Harris & Rolstad (1994) report on the successful use of foam dressings to reduce the height of granulation tissue

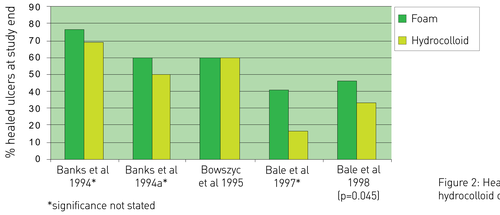

Figure 2: Healing rates for foam and hydrocolloid dressings

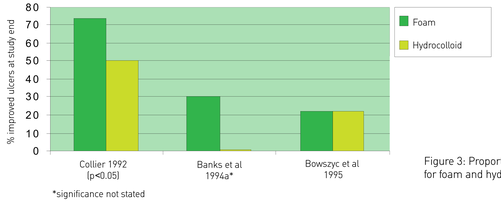

Figure 3: Proportion of improved ulcers for foam and hydrocolloid dressings

- Exudate management
  - Foams associated with superior absorbencies in the two studies that measured this parameter (Bale et al, 1997; Bale et al, 1998) (Figure 4)
  - Some hydrocolloids interact with exudate, resulting in liquefied material which is frequently associated with malodour, can resemble pus (Figure 5) and may cause leakage (Thomas, 1990; Milward, 1991). Malodour was observed in one of the identified studies (Collier, 1992)
  - Percentage of cases of soiling higher with hydrocolloid (25%), compared with foam (4%) (p=0.002) (Bale et al, 1997)
  - Percentage of dressing changes due to leakage / imminent leakage higher with hydrocolloid (64%), compared with foam (56% (p=0.037) (Bale et al, 1998)

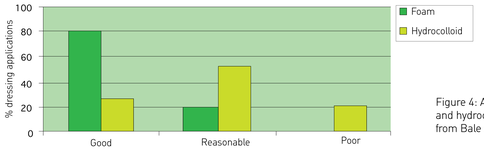

Figure 4: Absorbency ratings of foam and hydrocolloid dressings (adapted from Bale et al, 1997)

Figure 5: Removal of foam dressing utilising Safetac soft silicone technology (Figure 5a) and hydrocolloid dressing (Figure 5b)

Figure 5a

Figure 5b

- In-use dressing characteristics
  - Foams shown to be significantly easier to remove in all five studies that measured this parameter (Collier, 1992; Banks et al, 1994; Banks et al, 1994a; Bowszyc et al, 1995; Bale et al, 1997)
  - Higher comfort ratings reported for foams (Bale et al, 1998) (Figure 6)
  - Percentage of applications rated as conforming to body contours was higher with foams (88%), compared with hydrocolloids (76%) (p=0.018) (Bale et al, 1997)

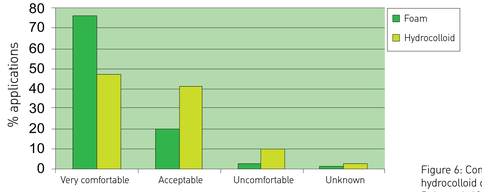

Figure 6: Comfort ratings for foam and hydrocolloid dressings (adapted from Bale et al, 1998)

- Patient acceptability
  - Pain on dressing removal was reported to be lower with foams in two of the three studies that measured this parameter (Banks et al, 1994; Banks et al, 1994a; Bowszyc et al, 1995) (Figure 7)
  - One study reported less trauma to the wound and peri-wound skin in those treated with a foam dressing, compared to those treated with a hydrocolloid dressing (Bale et al, 1997)

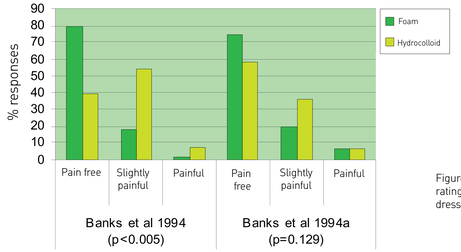

Figure 7: Pain on dressing removal ratings for foam and hydrocolloid dressings

- Adhesion

In a study undertaken to evaluate the effects of repeated removal of dressings utilising different adhesive systems on peri-ulcer skin, hydrocolloids induced major functional alterations of peri-ulcer skin (as measured by transepidermal water loss (TEWL) and conductance, whereas the polyurethane- and soft silicone-based adhesive foam dressings did not influence these parameters (Karlsmark, 2006; Zillmer et al, 2006) (Figure 8)

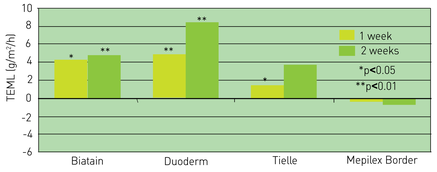

Figure 8: Comparison of absolute TEWL changes from baseline to week 1 and 2 associated with adhesive dressings (adapted from Karlsmark, 2006)

CONCLUSIONS

The published data indicate that, compared to hydrocolloids, foam dressings are associated with better healing rates, exudate management properties and in-use characteristics. Foam dressings that utilise soft silicone adhesive technology have also been shown to be associated with less trauma, pain and odour at dressing change than hydrocolloids and foam dressings containing certain other types of adhesive systems.

References
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