

Evidence Summary Author: Wound Healing and Management Node Group – R. Watts, E. Frehner

Summary

QUESTION

What is the best available evidence regarding the effectiveness of hydrogel dressings without additional therapeutic additives in the management of wounds?

BACKGROUND

Hydrogels are designed to rehydrate a wound depending on the wound moisture levels. They are available in different forms including sheets, amorphous gels and impregnated gauze.^{1,2} They are best used with wounds with no or minimal exudate as they do not have capacity to absorb large amounts of exudate due to their high water content (up to 96%).²

CLINICAL BOTTOM LINE

Effectiveness in promoting healing

The authors of a systematic review based on three randomised controlled trials (RCTs) concluded that hydrogel dressings may heal superficial or partial thickness burns more quickly than silver sulfadiazine (SSD), paraffin gauze or paraffin gauze with antibiotics (a mean of 11.9 days compared to 13.55 days); however the evidence was assessed as being of low quality due to perceived risk of bias.³ (Level 1a) (Note: these comparator treatments are no longer commonly used for burns.)

Another systematic review of the effectiveness of hydrogel dressings for treatment of lower grade diabetic foot ulcers concluded that there was some evidence that hydrogel dressings were more effective than other basic dressing products such as paraffin gauze or cotton absorbent dressings. A meta-analysis of three of the five included studies indicated significantly greater healing [risk ratio (RR) 1.80, 95% CI 1.27 to 2.56]. However, there were no RCTs comparing hydrogel to contemporary wound dressings⁴ (Level 1a) (Note: it appears that these comparator treatments are no longer commonly used for diabetic foot ulcers.)

A third systematic review of 11 RCTs of Grade 2 or above pressure ulcers/injuries with a total of 539 participants, compared hydrogel dressings of various brands to a number of alternative dressings e.g. hydrocolloids, foam, topical treatment. Anatomical location and size of pressure ulcers/injuries were not stated. With two exceptions, the included studies were conducted in the 1990's. The quality of evidence was rated as very low as the studies were very small and poorly reported so the risk of bias was unclear. The authors' conclusion was that there was no evidence to suggest that hydrogel dressings were either more or less effective than other dressings in the review in healing pressure ulcers/injuries.² (Level 1a)

A small RCT, comprised of 27 patients with a total of 49 pressure injuries (Grades 1 to 3), compared the effectiveness of a hydrogel sheet dressing with povidone-iodine gauze in the treatment of pressure injuries. The anatomical location of the pressure injuries varied. The

study determined that complete healing of epithelialised wounds in the patients treated with a hydrogel sheet dressing was significantly higher (84% versus 54.2%, $p=0.04$) than those patients treated with povidone iodine dressings. The mean healing rate (cm^2/days) for the hydrogel group was also faster but the result was not statistically different ($p>0.05$).⁶ (Level 1c)

A multicentre, prospective observational study that assessed the efficacy of a hydrogel dressing on 81 patients with acute or chronic wounds found a reduction in wound slough (63% at start of study to 37% at completion), increased granulation and epithelialisation (25% to 35% and 13% to 28% respectively) and a reduction in average wound size. The average treatment time was 12.1 days (± 7.7 , median 7.7).⁵ (Level 3e)

Skin maceration

The only reported occurrence of skin maceration as a result of hydrogel sheet dressings in these studies was in the observational study by Zoellner, et.al.⁵ As a result, six patients (7.4%) withdrew from the study following the second dressing. (Level 3e) Although the amount of wound exudate was assessed on entry to study, no data were reported.

Pain

Also in the above observational study⁵ the authors noted that hydrogel sheet dressings could be left in situ for several days and removed easily for dressing changes, increasing patients' comfort. The percentage of patients reporting no pain increased from 29.6% at baseline to 56.3% at the final assessment, with a decrease of those reporting severe pain from 11% to 6%. (Level 3e)

In the systematic review³ on burns dressings only one study reported on pain associated with hydrogel dressings. Although there was no significant difference between the intervention and comparison groups at baseline, by the end of the study the hydrogel group reported significantly less pain than those treated with silver sulfadiazine (SSD), paraffin gauze or paraffin gauze with antibiotics (MD -1.31, 95% CI -2.37 to -0.25). The pain assessment tool used for measurement was not named or described. (Level 1a)

In contrast, the systematic review⁴ on diabetic foot ulcers found no difference in reported pain between the group being treated with hydrogel dressings (11/70 -16%) and those with basic wound contact dressings (10/68 - 15%) (RR 1.07, 95% CI. 0.49-2.35). (Level 1a)

Although the systematic review² on hydrogel dressings and pressure ulcers/injuries aimed to extract data on pain as an adverse event, poor reporting precluded any conclusions being drawn.

Effectiveness in reducing infection

In the systematic review³ of studies on superficial and partial thickness burns there was no difference between hydrogel dressings and the comparison dressings in respect to infection with *P. aeruginosa* requiring antibiotic treatment. (Level 5c) No additional evidence was found relating to the effectiveness of hydrogels (or lack of) in relation to healing infected wounds.

Advantages

The following advantages of hydrogel dressings for wound management have been identified:

- promote a moist wound bed to facilitate granulation and epithelisation^{1,6} (Level 5b; Level 1c)
- rehydrate dry wounds to provide a moist wound bed¹(Level 5b)
- encourage autolytic debridement where appropriate through maintenance of a moist wound environment⁵ (Level 3e)
- the conformable characteristics of amorphous hydrogel dressings maximises contact between the dressing and the wound bed in smaller wounds. This reduces the formation of dead space inside the wound where bacteria can flourish. (Level 5b)
- subject to the type and consistency of the hydrogel, the dressing may be left in situ for several days on non-infected wounds⁵ (Level 3e)
- transparent gel sheets allow wound inspection without disturbing the dressing⁴ (Level 1a)
- unless dried, easily removed without traumatising the wound and surrounding skin (sheet dressings)⁵ (Level 3e).
- reduce pain due to moisture maintenance and the cooling effect of the hydrogel¹ (Level 5b)

Adverse effects

- An important consideration in using hydrogel dressings concerns the amount of wound exudate that is present. Hydrogel dressings are composed of up to 96% water resulting in limited absorbency² (Level 1a) and this may contribute to peri wound maceration⁵ (Level 3e).
- Should not be used when autolytic debridement is not the desired effect e.g. diabetic foot ulcers when the goal of care is to keep the eschar dry.

CHARACTERISTICS OF THE EVIDENCE

This evidence summary is based on a structured search of databases using the search term hydrogel. The evidence in this summary is from:

- Three systematic reviews of RCTs: one on the effectiveness of traditional (sheet, gel or beads) hydrogel dressings on superficial and partial thickness burns⁽³⁾ the second on the effectiveness of hydrogel dressings on diabetic foot ulcers⁽⁴⁾ and the third reviewing the use of hydrogel dressings for treating pressure ulcers/injuries⁽²⁾ (Level 1a)
- A prospective randomised control study that compared the effectiveness of a occlusive hydrogel dressing with povidone-iodine gauze in the treatment of pressure ulcers⁶ (Level 1c)
- An observational study on the effectiveness of hydrogel dressings on chronic wounds⁵ (Level 3e)
- An article based on expert consensus of dressing products¹ (Level 5b)

BEST PRACTICE RECOMMENDATIONS

- Assessment of the wound should include the amount of exudate. Hydrogel dressings are not the dressing of choice for wounds with moderate to heavy exudate (Grade B).
- As amorphous and gel impregnated gauze hydrogels are used as a primary dressing material, a suitable secondary dressing should be applied. (Grade B).
- Observation of the wound should include maceration of the wound edges and peri wound skin (Grade B).

Related Evidence Summaries

JB13981 Use of hydrogels in burns

JB13450 Wound management: Debridement- autolytic

JB13461 Chronically infected wounds: silver containing hydrogel dressings

References

1. Broussard K, Powers J. Wound dressings: selecting the most appropriate type. *J Clin Dermatol.* 2013;14:449-59. (*Level 5b*)
2. Dumville J, Stubbs N, Keogh S, Walker R, Liu Z. Hydrogel dressings for treating pressure ulcers (Review). *Cochrane Database of Systematic Reviews.* 2015;2:1-74. (*Level 1a*)
3. Wasaik J, Cleland H, Campbell F, Spinks A. Dressings for superficial and partial thickness burns (Review). *Cochrane Database of Systematic Reviews.* 2013;3:1-85. (*Level 1a*)
4. Dumville J, O'Meara S, Deshpande S, Speak K. Hydrogel dressings for healing diabetic foot ulcers (Review). *Cochrane Database of Systematic Reviews.* 2013;7:1-54. (*Level 1a*)
5. Zoellner P, Kapp H, Smola H. Clinical performance of a hydrogel dressing in chronic wounds: a prospective observational study. *J Wound Care.* 2007;16(3):133-6. (*Level 3e*)
6. Kaya A, Turani N, Akyuz M. The effectiveness of a hydrogel dressing compared with standard management of pressure ulcers. *J Wound Care.* 2005;14(1):42-4. (*Level 1c*)