Evidence is building to support using a DACC-coated antimicrobial wound contact layer with NPWT

KEY WORDS

- DACC
- Exudate management
- Infection
- Negative pressure wound therapy

Heavily exuding, infected cavity wounds requiring negative pressure wound therapy (NPWT) can become chronically inert over time, resulting in complex clinical, financial and personal challenges to healthcare workers and patients. This evaluation explored the benefits of utilising a DACC-coated antimicrobial wound contact layer in conjunction with NPWT in 10 patients with heavily exuding, infected wounds. The results demonstrated positive outcomes in regards to non-adherence, atraumatic application and removal, reduction in bacterial burden and exudate levels and timely downgrading from NPWT to conventional dressing therapies.

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Heavily exuding, infected wounds can incorporate a myriad of wound groups, such as pressure ulcers, surgical incision sites, venous leg ulcers, burns and traumatic lesions (Gray et al, 2008).

Despite the use of modern, innovative dressings, some wounds can take a long time to heal, fail to heal, or recur, causing significant pain and discomfort to the individual. It is well documented that if infected, highly exuding wounds are not brought under control, healthcare costs increase, carer burdens rise, and patients' quality of life decreases (Bottomley, 2007; Guy and Grothier, 2012).

This article evaluates the use of an antimicrobial, DACC-coated wound contact layer to replace a conventional wound bed liner in conjunction with negative pressure wound therapy (NPWT) to promote an optimum environment for healing in 10 patients with static, exuding, infected wounds.

NPWT

NPWT has facilitated the management of various acute and chronic wounds which are at risk of infection and are failing to heal. NPWT devices perform using the same general principles – a foam or gauze is deployed within the wound cavity and covered with an adhesive film to create a seal which is connected to a vacuum device (Gregor et al, 2008; Bateman, 2013).

To enhance wound healing, it is recommended that the wound bed is prepared adequately and where possible, necrotic tissue is removed prior to application and a protective wound bed liner is utilised where appropriate (Vowden et al, 2007; Jeffery, 2012).

NPWT increases blood flow to the wound bed, improving waste product removal, increasing granulation tissue within the cavity, aiding epithelial cell migration, and ultimately leading to wound closure (Morris et al, 2007; Orgill et al, 2009).

Removal of excess exudate containing inhibitors such as cytokines and proteinases alongside effective mechanical action, wound contraction and reduction are induced, providing an optimum environment for wound healing to occur (Orgill and Bayer, 2011).

Caution should be taken when employing NPWT on wounds with contraindications to the mechanical effects of the device, such as malignancy, visible underlying blood vessels and risk of haemorrhage (Guy and Grothier, 2012).

Many NPWT device packs provide the clinician with a non-antimicrobial wound contact layer to act as a barrier to prevent adhesion of the accompanying foam or gauze to ensure atraumatic

Table 1. Patient demographics.

Patient	Gender	Age	Wound type	Location	NPWT duration (weeks)	Confirmed bacteria prior to evaluation
1	Female	52	Surgical	Left hip	12	*Staphylococcus aureus*
2	Male	68	Surgical	Right knee	4	*Pseudomonas aeruginosa*
3	Male	44	Diabetic foot ulcer	Right heel	4	*S aureus*
4	Male	28	Self harm lesion	Left forearm	3	*P aeruginosa*
5	Female	51	Burn	Right hand	4	MRSA
6	Female	68	Surgical	Left hip	23	*Candida albicans*
7	Male	55	Venous leg ulcer	Left calf	12	*S aureus*
8	Male	44	Surgical	Right forearm	3	*P aeruginosa*
9	Female	52	Trauma	Abdomen	2	Strep A and B necrotising fasciitis
10	Female	47	Surgical	Abdomen	1	*P aeruginosa*

removal and therefore protection of underlying structures (Guy and Grothier, 2012).

It is within this evaluated patient group that a low adherent liner was required to primarily protect the underlying structures and one that also provides additional antimicrobial benefits which would possibly benefit the static nature of the wounds.

Previous clinical evaluations exploring the use of DACC-coated dressings within NPWT have highlighted positive outcomes in regards to both atraumatic and antimicrobial properties and are therefore safe to use in this patient population (Bateman, 2013; Jeffery, 2014).

INFECTED, EXUDING WOUNDS

Infection status occurs within tissue when bacteria quickly multiply and overwhelm the patients' natural defence mechanisms, resulting in an increase in pain, inflammation, erythema and systemic fever which delay wound healing (NICE, 2008). Bacteria will initially contaminate the wound through either endogenous or exogenous processes at the time of the tissue injury with variance in contamination (Bateman, 2013).

Jeffery (2014) emphasises that the presence of devitalised tissue alongside excessive fluid will encourage bacterial reproduction, resulting in more severe symptoms. Mangram et al (1999) and Milne et al (2012) concur, stating that infection and excess exudate will have a negative effect upon tissue healing and progression if not managed in a timely manner.

DACC-COATED CUTIMED® SORBACT® DRESSINGS

Cutimed® Sorbact® antimicrobial dressings are coated with DACC, a fatty acid derivative which, in the presence of moisture, attracts and binds bacteria and fungi to the dressings, reducing the overall concentration of microbes in the wound. This innovative mode of action effectively removes microbes that otherwise may result in delayed wound healing (Meberg and Schøyen, 1990).

The dressings can be used as a wound filler, as in Jeffery's (2014) clinical work, or as a liner, as in this evaluation. The dressings can be placed within many wound types, are effective on all common wound pathogens and fungi and can be utilised by any patient group.

METHOD

Ten patients were referred to the wound care service with exuding, infected wounds, confirmed with a wound bed swab taken one week prior to the introduction of Cutimed Sorbact. All wounds were being treated with Trust-agreed NPWT, but wound progression had stagnated.

Verbal consent was obtained by all patients following discussion and agreement from the respective managing consultants. The evaluated patients had a broad range of demographics, wound types and bacterial infection (*Tables 1* and *2*).

A DACC-coated Cutimed Sorbact swab was used to line the wound bed and walls, replacing the conventional liner, in conjunction with ongoing NPWT.

This product was chosen due to its antimicrobial benefits and low adherence properties. It was familiar to the clinician from experience with its use in patients with similar wounds, where it had shown to successfully reduce bacterial burden and lead to timely downgrading to conventional dressing therapies (Bateman, 2013).

The normal regime of cleansing with sterile saline utilising a non-touch aseptic technique and vacuum closure was adhered to. The NPWT device regime continued with twice-weekly gauze filler changes, but the DACC-coated liner remained *in situ* and was only replaced every 7 days.

Wound assessment and documentation was undertaken by the senior wound care lead prescriber, who did not undertake the dressing care, in order to ensure that the data collection process was consistent, objective and accurate.

Table 2. Summary of patient demographics.

Number of patients	**10**	
Gender	Male	50%
	Female	50%
Age range	28–68 years	
Mean age	51 years	
Wound types	Surgical	50%
	Burn	10%
	Ulcer	20%
	Trauma	20%
Confirmed bacteria within wound in 7 days prior to start of evaluation	*Staphylococcus aureus*	30%
	Pseudomonas aeruginosa	40%
	Strep A and B necrotising fasciitis	10%
	MRSA	10%
	Candida albicans	10%
Pre-evaluation wound and NPWT treatment duration	7–161 days (1–23 weeks) (mean 48 days)	Total NHS days = 476 (68 weeks)

RESULTS

Although the evaluation referred to a small cohort (*n*=10), the results were very positive in all regards to the key outcomes, despite the variation in wounds, patient demographics and microbiology. The results also reflected previous clinical evaluations (Bateman, 2013; Jeffery, 2014).

The results clearly demonstrate an overall success in exudate reduction by week two in all patients (*Table 3*).

Negative microbiology was achieved in 60% of patients at week 1 (*n*=6) and in all patients (*n*=10) at week 2. Mean time to negative microbiology was 10 days.

Stasis was reversed, with wound size reduced for all patients from week 1 to week 3 (*Table 4*). Although this product is not promoted as an alternative to other antibiotic therapies, it demonstrated a positive and effective presence in all the wounds, consistent with previous work in this area (Jeffery, 2014).

There was a reduction in NPWT duration after the deployment of the DACC-coated wound contact layer Before the dressing was used as a liner, the total number of days all patients were under NHS care for these wounds was 476. When DACC was added to the NPWT regimen, this fell to 266 days, a 44% reduction. Treatment duration with the DACC-coated dressing and NPWT ranged from 14–56 days, with a mean treatment time of 27 days.

Table 5 demonstrates the reduced time from advanced wound management to conventional

Table 3. Exudate reduction.

Pre-DACC	***n***	**%**	**End of treatment**	***n***	**%**
High	8	80%	High	0	0%
Moderate	2	20%	Moderate	3	30%
Low	0	0%	Low	7	70%

Table 4. Wound depth reduction

Patient	Pre-DACC (cm)	End of treatment (cm)	% reduction
1	2	1.5	25%
2	3	1	67%
3	1	0.5	50%
4	2	1.2	40%
5	2	1.3	35%
6	8	3	63%
7	2	1.8	10%
8	2.5	2.2	12%
9	4	1	75%
10	4.5	3.5	22%

care with a soft silicone foam dressing. The reduction in NHS healthcare days spent on providing NPWT signifies savings in cost and nursing resources, and increasing discharge to other healthcare environments in which wound management can occur.

CONCLUSION

Within this 10 patient evaluation, the use of DACC-coated Cutimed Sorbact dressings, when used as a low adherent wound contact layer, in conjunction with NPWT, has demonstrated benefits relating to non-adherence, atraumatic wound bed protection, reduction in exudate levels and subsequent wound bed size reduction.

The implementation of this low-cost dressing which could be left in place for 7 days, has enabled clinicians to downgrade wound care from advanced level to basic level dressing regimens by 50%, which ultimately has a positive benefit for healthcare costs and resources.

The author suggests further exploration in this area, particularly in regards to patient and clinician experiences alongside financial and procurement outcomes.

It is proposed that this product be made available through inclusion on regional and national dressing formularies. It is apparent that this innovative product is a welcome addition to the clinician's wound care toolbox in the ever challenging arena of infected, exuding wounds. WUK

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Table 5. Downgrading to conventional foam

Patient	NPWT duration pre DACC (weeks)	NPWT duration post DACC (weeks)
1	12	3
2	4	5
3	4	3
4	3	2
5	4	3
6	23	8
7	12	2
8	3	2
9	2	8
10	1	2