Topical negative pressure and the rise of superabsorbent polymers

In anticipation of a detailed report in 2014, Richard White (Professor of Tissue Viability, University of Worcester) outlines the key points discussed at a roundtable meeting on the clinical positioning of topical negative pressure and super absorbent polymers that took place in Worcester on 27 September 2013.

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While a wealth of published evidence exists in reference to topical negative pressure (TNP) and its applications, comparatively little exists in support of superabsorbent polymers (SAP) – an increasingly popular type of wound dressing.

Although SAP have been available for some years, it is evident that a paucity of published evidence has contributed to confusion regarding their clinical role, particularly in relation to the use of TNP.

In an attempt to add clarity the premise that an overlap in clinical usages exists between the two interventions (*Figure 1*), the overlap zone of the Venn diagram representing where either might be used with equal clinical efficacy.

This premise has formed the basis of a roundtable discussion between a group of selected key opinion leaders from various hospitals and trusts across the UK. Each was chosen on the basis of their expertise in a range of areas within wound management, as well as their experience using both TNP and SAP. Professor Dominic Upton was selected for his proven expertise in quality-of-life research and related perspectives in wound management. The full list of contributors is as follows:

- Joy Tickle, Tissue Viability Specialist and Clinical Lead, Shropshire Community NHS Trust.
- Pam Kirby, Service improvement lead for surgery, Chesterfield Royal Hospital NHS Foundation Trust.
- Sarah Pankhurst, Service head tissue viability, Nottingham CitiHealth.
- Dominic Upton, Professor of psychology, University of Worcester.
- Jeanette Milne, Tissue viability nurse specialist, South Tyneside Foundation Trust.
- Michelle Greenwood, Lead nurse tissue viability, Walsall Healthcare NHS Trust.
- Richard White (chairperson), Professor of Tissue Viability, University of Worcester.
- Karen Ousey, Reader in Advancing Practice, University of Huddersfield; and Clinical Editor, *Wounds UK*.
- Leanne Atkin, Lecturer/Practitioner University of Huddersfield, Vascular Nurse Specialist, Mid-Yorkshire NHS Trust.
- Louise Morris, Harm Free Care Nurse, Birmingham Community Healthcare, Lecturer in Tissue Viability, Birmingham Community Healthcare Trust, Birmingham.

The individual contributions of each member of the group will be drafted into a detailed report, to be published early in 2014. Meanwhile, a summary of key points is presented, the objective being to draw attention to specific areas of TNP and SAP with respect to clinical use, evidence and potential problems. This will hopefully result in clinicians beginning to discuss and reflect upon practice, and the industry recognising its responsibilities in providing evidence.

ASSESSING THE OVERLAP ZONE

The discussion group sought to establish whether or not an overlap, as shown in *Figure 1*, exists and, if so, to define the extent of that overlap and the limits of each therapy's usage. The

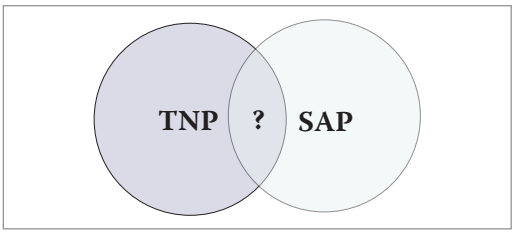

Figure 1. A Venn diagram showing the postulated overlapping, but distinctive roles, of topical negative pressure (TNP) and superabsorbent polymers (SAP).

"Beyond the marketing hyperbole, the level of superabsorbent polymers knowledge in clinical staff appears to be minimal."

parameters applied included: exudate control, bioburden reduction, availability, cost, treatment environment, practitioner competency, quality-of-life aspects.

Topical negative pressure

The indications and limits of TNP were deemed to be, on the whole, clearly defined, as may be expected for what is an established, prevalent treatment modality with a wealth of supporting evidence.

TNP is, and must be viewed as, a therapy that enhances wound closure and accelerates healing and not simply an exudate management system. Indeed, the use of TNP solely for exudate control was deemed by the discussion group to be inappropriate. All TNP systems require competency from the practitioner and shortcomings in competency and, thus, in the application of the TNP mean that it does not always deliver consistent therapy. It is often the case that staff wrongly blame these failures on the technology, instead of reevaluating their clinical decisions. That aside, the assertion was made that all UK tissue viability nurses have used TNP and some will have seen instances in which it does not work, yet some may not have used SAP dressings.

Superabsorbent polymers

Unsurprisingly, there are many questions surrounding the precise role of SAP and its real-world indications. Industry has made a concerted effort to promote SAP dressings, with all of the major companies developing their own iterations. However, beyond the marketing hyperbole, the level of SAP knowledge in clinical staff appears to be minimal. There are many questions requiring exploration and examination, such as the following:

- Are SAP dressings merely high-tech "sponges", to be used when the exudate capacity of an absorbent dressing is insufficient or should their super-absorbency be used to prolong wear-time between the visits of a community nurse?
- What are the clinical ramifications of leaving an SAP in place until it reaches its full capacity?
- What are the sub-bandage pressure changes when the SAP dressing is used under compression, as indicated in many of the manufacturers' instructions?
- What does the presence of a fully saturated SAP, whether or not under compression, do to the wound bed and the surrounding area?

There is, as yet, little evidence to differentiate the use of SAP dressings from TNP therapy. Some aspects regarding the performance of SAP dressings have not been adequately researched or considered by clinicians (White et al, 2013). The following questions remain:

- How does their cost-effectiveness vary with wear time?
- Should they always be used until fully-saturated?
- Does performance fail at high saturation?
- How do they cope with purulent or similar viscous exudate?
- How do they influence bioburden?
- Do they trap matrix metalloproteinases (MMPs) and inflammatory mediators?
- How much do they vary in their osmotic "pull"? And what does this drawing power do to the tissues of the wound bed?
- How much is their fluid handling influenced by secondary dressings?
- Is there any advantage to using SAP instead of TNP if the patient is experiencing localised discomfort and pain from an exuding wound?
- Does the SAP have any impact on controlling malodour?
- Does the weight and bulk of an SAP which is almost at full capacity absorption cause additional pressure and trauma to the wound bed?

Potential issues

Questions regarding the performance of SAP dressings cannot be asked without considering the patient's quality of life; a heavy, swollen or soggy dressing left *in situ* for many days purely because it can absorb so much exudate is not an approach which places the patient, or the wound, at the top of the priority list.

There is the possibility that wounds dressed with a SAP and compression bandaging are more likely to be monitored less frequently, potentially leading to neglect and damage to the underlying wound or skin area. Conversely, a community nurse visiting a patient may be likely to change the dressing irrespective of whether or not it has reached capacity, because not doing

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so means an extra visit and more expense. They would also want to observe the wound to check for deterioration or skin damage, especially if weekly visits are planned. This begs an important question: is the increasing use of SAP in the UK being achieved at the expense of foams? Does this matter?

While it is easy to switch to a more absorbent dressing as exudate levels increase, the reverse is much more difficult. For example, what would be the preferred approach to stopping the use of SAP dressings as exudate decreases? A SAP that is not used to full capacity may be inefficient economically, since it may be more effective to use a less absorbent dressing. These will require an accurate, and consistent, assessment of exudate levels, something that is a challenge for even the most experienced clinician.

In addition, the failure to recognise exudate (volume and viscosity and changes in either) as a symptom, and to investigate the underlying cause, can lead to the inappropriate use of any absorbent dressing and potentially delay healing. Such a failure can increase morbidity and treatment costs.

Considerable concern was expressed by the discussion group about the criterion drawn up by formulary committees concerning the maximum absorbency for SAP. These dressings should not be selected by this single performance parameter as it encourages inappropriate use (i.e. prolonged wear time).

The discussion group have encountered an apparent misuse of SAP dressings, which is the practice of layering them on wounds. Much more clarity is required when being instructed on their use in combination with other dressing products.

The use of SAP on diabetic foot ulcers requires much more evidence and guidance for clinicians. The panel were concerned about the use of these dressings on plantar ulcers in ambulant patients. TNP can be used on the diabetic foot, with the added advantage that it keeps patients off of their feet, so aiding pressure off-loading to vulnerable and ulcerated areas.

There is evidence that some SAP dressings can modulate MMPs but this must be translated into clinical significance. How does such inhibition impact on the wound?

The role of SAPs in promoting autolytic debridement require clarification. What is their performance relative to other dressings that promote autolytic debridement?

EDUCATION

The vagaries "in use" and suitability of, as touched upon above can largely be tackled by addressing the education of clinical staff concerning the most cost-effective use of SAP dressings. Much more evidence is required. That said, staff on the frontline have to see the products work for themselves, even if research has been published and is available; scientific papers and classroom learning cannot replace real-world usage. The provision of such education necessitates a firm base of evidence, not just the claims of industry and, obviously requires significant economic input.

Conclusion

The discussion group concluded that the group of dressings known as SAP is not homogeneous. Consequently, it cannot be claimed that one dressing is equivalent to another simply because they are both SAP. Robust evidence is required in place of slogans in order to support marketing claims. This article is a broad overview, and the first stage of a discussion which must be built on to ensure that SAP dressings are fully understood, researched and have the necessary evidence to support their clinical use. WUK

REFERENCE

White R, Milne J, Jeffery SLA (2013) Debate: superabsorbents or topical negative pressure: when and why to use each. *Wounds UK* 9(2): 18–24