Use of Renasys™ Gauze and Port to simplify negative pressure dressing techniques

The development of simpler dressing techniques is crucial if the field of wound care is to evolve further. Over the past decade, the use of negative pressure wound therapy (NPWT) has been part of this evolution. The introduction of gauze-based negative therapy has resulted in a major change in the type of interface used to treat wounds. Such gauze dressings can be applied to a wide variety of wounds that due to their location, extent and level of exudate would be difficult to manage with foam dressings. In addition to gauze dressings, the Port drainage system offers a simpler method of providing suction.

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KEY WORDS
Renasys™ Gauze and Port system
Negative pressure wound therapy (NPWT)
Exudate

Negative pressure has become one of the most influential wound healing technologies in recent times (Harding, 2009). The impact of negative pressure on wounds has revolutionised the way that we treat patients and, above all, has helped in the management of large, heavily exuding wounds, where traditional dressings may not have coped.

The growth of this method of wound management has led to a number of systems becoming available, and this, in turn, has led to the development of new dressing techniques.

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The use of gauze as the interface material is relatively new to the mass market, although clinicians have been using gauze-based negative pressure for a number of years (Chariker et al, 1989). The first negative pressure systems to be mass produced were used with a foam-based wound interface material. KCI adopted a dressing technique which involved the insertion of drainage tubes into the foam dressing, with a seal being created around the entry site (Argenta and Morykwas, 1997). Despite the obvious value of the therapy and good clinical outcomes, this early technique was difficult to carry out and could lead to problems in getting a seal.

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Over time, KCI developed the T.R.A.C.® Pad system which allowed suction to be applied using a single tube which is placed over a small hole cut in the drape. This is sealed to the dressing, creating an easier to apply leak-proof drainage system (Jones et al, 2005).

As this technology evolved, a number of centres were active in the application of gauze-based therapy using drains as part of the dressing technique (Chariker et al, 1989).

The use of gauze has been pioneered by Dr Mark Chariker, who, along with senior nurse Katherine Jeter, developed a unique way to apply negative pressure to a variety of wound types using gauze as the interface. The principle gauze used is Kerlix™ AMD (Covidien), which is coated with polyhexamethylene biguanide (PHMB). This is an antiseptic agent which has been shown to have a broad spectrum with low toxicity. No resistant organisms are known (Consensus document, 2010).

The gauze has traditionally been applied to the wound, wrapped around a drain, most commonly a Jackson Pratt flat drain, then covered with a film dressing to achieve a seal. Suction is applied to the wound and the gauze layer acts as a medium for fluid transport into the drain.

There are a number of advantages of using gauze-based negative pressure dressings, including:

- They do not need to be cut but

naturally fill the contours of the wound bed (St Mart et al, 2009)
- They do not adhere to the wound bed
- Gauze is more conformable to the smaller, confined areas in the wound, and thus is easier to treat undermining
- Gauze can be wrapped around a channel drain and inserted into fistula for drainage, and is also more conformable to fit into small apertures.

These advantages have been highlighted previously (Jeffery, 2009).

Gauze-based wound interfaces are now recognised as viable options to foam dressings for certain wound types, particularly where the wound bed and edges are irregular in shape, as the gauze can simply be placed into the wound without having to be cut (Jeffery, 2009). In addition, Malmsjo et al (2009) have demonstrated in laboratory studies that similar blood flow and pressure distribution can be achieved by using either gauze or foam wound interfaces.

New techniques

To simplify negative pressure dressing techniques further, Smith and Nephew have developed the Renasys™ Gauze and Port system (*Figure 3*). A small hole is cut in the drape and the Port (suction tubing) is placed directly over. The combination of gauze, which does not have to be cut, and the Port application device, leads to a technique that is quick and easy to apply. As there is no need to use a hydrocolloid paste or to track a drainage tube from the wound site, a seal is more easily created than previous dressing methods.

Wounds which have massive tissue loss and large areas of undermining, as seen in the subsequent case reports, will achieve better exudate management with the use of a drainage device (Jeffery, 2009).

Case reports using the Renasys Gauze and Port system

The following case reports demonstrate the use of gauzed-based negative pressure wound therapy (NPWT) using the Renasys Gauze and Port system to achieve suction.

The combination of gauze, which does not have to be cut, and the Port drainage device, leads to a technique that is quick and easy to apply.

Case report one

An elderly female patient presented with a chronic ulcer on the upper surface of her left foot and chronic leg ulcers. She had a history of vascular disease and had been offered amputation due to the longstanding nature of the foot ulcers.

The ulcer measured approximately 5x3cm (*Figure 1*). There was a thin layer of fibrin on the wound, which also had a layer of silver fibre from the previous dressing remaining on the wound bed. There were no signs of infection, however, exudate levels were heavy and difficult to manage. The sole of the patient's foot was becoming macerated due to exudate leaking onto the good skin. There was also a degree of malodour from the wound which was affecting the patient as she still had an active social life.

After three days of negative pressure wound therapy at -80mmHg, the gauze dressing was removed to reveal a noticeable improvement in the granulation tissue on the wound bed.

Despite the awkward site of the wound, the Gauze and Port application system were relatively easy to apply,

Figure 1. Image of chronic ulcer on the foot at initial presentation.

Figure 2. Application of thin hydrocolloid AMD gauze and drape to seal the wound.

Figure 3. Application of the Port application device.

Figure 4. Following three days of therapy the dressing was removed to reveal noticeable improvement in granulation tissue on the wound bed.

Figure 5. The wound after nine days of treatment.

and there was no need to cut the dressing to fit the wound.

A thin hydrocolloid dressing was applied around the wound edge to help provide a seal for the drape (*Figures 2* and *3*).

After a further three days of negative pressure therapy at -80mmhg, the dressing was removed. There was no pain or trauma on removal. *Figure 4* shows the improvement in the wound bed. Granulation tissue was now present and the small sloughy areas were reducing further in size. Most importantly, the exudate from the wound had been managed appropriately and had not leaked onto the sole of the foot.

The patient found the dressing comfortable and was pleased with the result.

The wound continued to improve and after 10 days the wound bed was re-epithelialising and had areas of healthy granulation tissue (*Figure 5*).

Case report two: IED injuries

The following patients were treated at the Queen Elizabeth Hospital, Birmingham following injuries sustained by improvised explosive devices (IEDs). The injuries were significant and the patients required major surgical intervention. Following wound debridement, the patients' wounds were treated with gauze-based NPWT. This involved the application of AMD gauze, clear drapes and the Renasys Gauze and Port system was used to achieve suction. Due to the size of the wounds and the volume of fluid, the Renasys™ Ez Plus device was used. This is a larger therapy system which is able to cope with greater volumes of fluid and extensive wounds. It also has a 40-hour battery life, which is beneficial when patients are being transferred from areas of conflict.

Figure 6 shows a patient in theatre following extensive debridement of limb injuries, while *Figure 7* shows the Renasys Gauze and Port system in place with the gauze wound interface. The patient also has drains *in situ* to manage exudate from the deeper cavities in the wound.

Figure 8 demonstrates the application

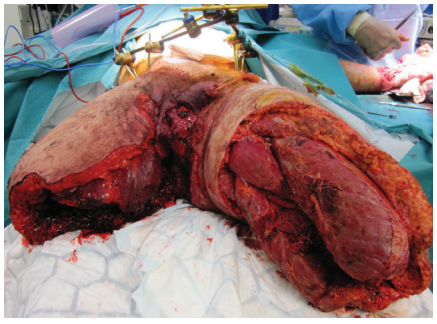

Figure 6. Patient in theatre following extensive debridement of limb injuries.

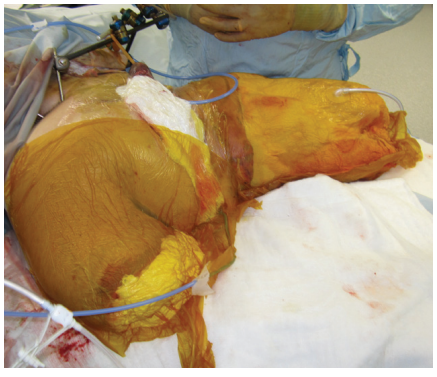

Figure 7. Renasys Port in place with the gauze wound interface.

Figure 8. Application of Gauze and Port in another patient following IED trauma.

of the Renasys Gauze and Port system in another patient following IED trauma. The improvement in the wound when using this negative pressure therapy system can be seen in *Figure 9* with the development of granulation tissue to the wound bed.

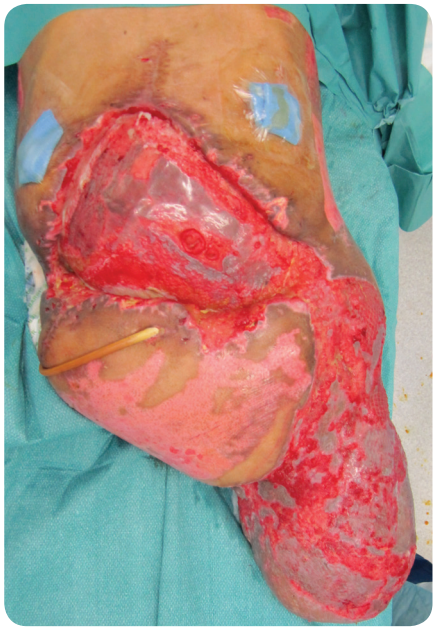

Figure 9. Wound showing signs of granulation and general improvement.

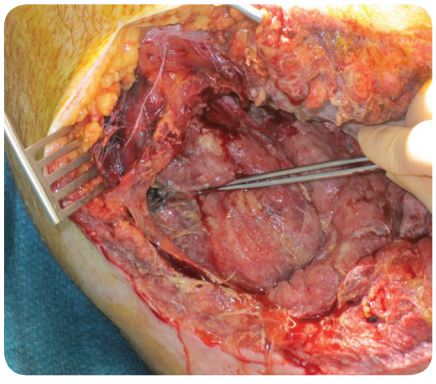

Figure 10. Removal of debris from a bullet wound.

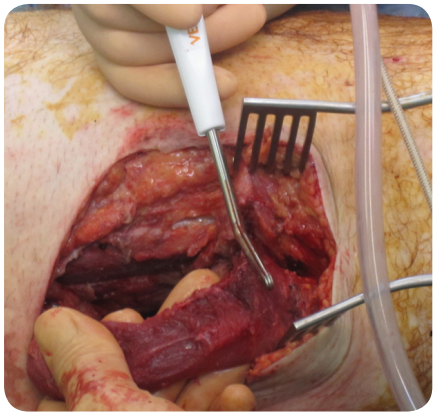

Figure 11. Versajet debridement of the wound.

Figure 10 shows the removal of debris from a bullet wound followed by debridement using Versajet™ (Smith and Nephew) (*Figure 11*), and finally the application of Renasys Gauze and Port (*Figure 12*). This system managed

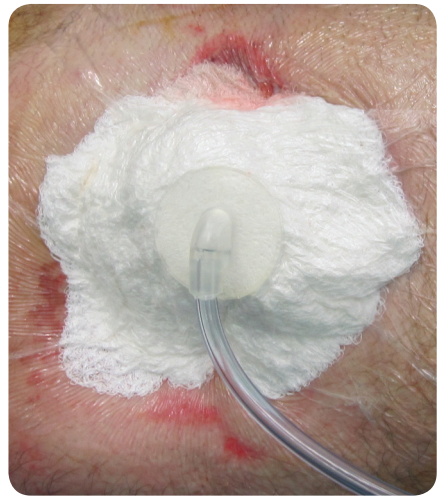

Figure 12. Application of Renasys Gauze and Port.

the exudate from the wound, while also allowing for rapid granulation of the wound bed.

Conclusion

The evolution of dressing interfaces in NPWT has led to an increase in the number of patients who can benefit from the therapy. As more clinicians gain experience with the products and new applications are developed, techniques become simpler to apply, thereby reducing the time taken to carry out the procedure.

The Renasys Gauze and Port system has reduced the time taken to apply negative pressure to patients' wounds, and has also made the application simpler. The clinical outcomes in these cases are visible and the authors found an improvement in symptom management with respect to exudate and odour control.

As experience with this type of therapy progresses, more positive developments will be seen with the potential to benefit patient care and make life easier for the clinician. WUK

Key points

- Negative pressure dressings have the potential to help patients with a variety of wound types.
- By managing large wounds with heavy levels of exudate, negative pressure helps to improve patients' quality of life.
- Developing dressing techniques that make application simpler and quicker is a key part of improving care for patients and reducing staff time when applying dressings.
- The Renasys Gauze and Port dressing system is a simple way to apply effective NPWT.

References

Argenta LC, Morykwas MJ (1997) Vacuum assisted closure: a new method for wound control and treatment: clinical experience. *Ann Plast Surg* **38**: 563–76

Chariker ME, Jeter KF, Tintle TE, Bottsford JE (1989) Effective management of incisional and cutaneous fistulae with closed suction wound drainage. *Contemp Surg* **34**: 59–63

Consensus document: *PHMB and its potential contribution to wound management*. Wounds UK, Aberdeen. Available online at: www.wounds-uk.com/downloads/phmb_consensus_document.pdf

Harding KG,Morris HL, Patel GK (2002) Healing chronic wounds. *Br Med J* **324**: 160

Jeffery S, Lt Col, (2009) Advanced wound therapies in the management of military lower limb trauma: a new perspective, open access. *J Plastic Surg, Eplasty* July 2009: 266–77

Jones SM, Banwell PE, Shakespeare PG (2005) Interface dressings influence the delivery of topical negative pressure. *Plast Reconstruc Surg* **116**: 1023–8

Malmsjo M, Ingemmansson, R, Martin R, Huddleston E (2009) Negative pressure wound therapy using guze or open cell polyurethane foam: similar effects on pressure transduction and tissue contraction in an experimental porcine wound model. *Wound Rep Regen* **17**: 200–5

St Mart J-P, Jeffery S, Clark J (2009) Using negative pressure wound therapy to manage severe military trauma wounds. *Wounds UK* **5(2)**: 56–64