Advanced wound healing and NPWT: overcoming the challenges

Nicholas Bunce, Editor of *Nursing and Residential Care*, discusses some highlights of the recent Hartmann LINK for Wound Healing Congress, which was organised in collaboration with the *Journal of Wound Care*

The Hartmann LINK for Wound Healing Congress took place in Belfast, Northern Ireland, on 19 September. Attended by almost 300 delegates from around the world, this event sought to promote the latest advances in wound care and management. Hartmann's acronym, LINK, stands for the values of learning, informing, networking and knowledge-building in the wound-care community, and the day's talks certainly helped promote these.

Clinical challenges

Dr Sabine Eming, professor of dermatology at the University of Cologne, Germany, opened the first scientific session with a discussion on the clinical challenges seen in wound bed preparation. She started with an overview of the dynamics of the wound healing response, from host defence to tissue and scar formation, before launching into what she felt was the biggest challenge in practice: understanding the differing roles of the body's immune cells in the wound bed over the first 2 weeks after injury. Eming stressed that if clinicians are to maximise their potential to help wounds heal, they first need to recognise and appreciate how immune cells interact throughout the healing process.

To date, Eming's work has focused on trying to understand the impact of uncontrolled protease activity in wound healing, as it is not only harmful to the exposed tissue, but actively contributes to wounds becoming chronic. This led to a discussion on the importance of wound bed preparation, and the real need to interrupt what she described as the 'vicious cycle of chronicity'—proteases slowing healing, the subsequent inflammatory response, and the proteases production that follows. Her approach to overcoming this challenge was to look at wound exudate samples from different stages of the wound-healing process. They were heavily analysed for gene expression and proteomics (among other '-omics'), in order that the findings may be translated into drugs that will help the patient.

One of the key targets that Eming et al worked on in this area was vascular endothelial growth factor A (VEGF-A). It was discovered that plasmin in the exudate was cleaving the growth factor in the heparin-binding domain, which was slowing the healing process. A mutated form of the growth factor was produced that protected against this cleavage; accelerated healing was seen when testing the mutant growth factor in porcine models, and the potential for similar work in other growth factors was noted.

Managing moisture

After a quick break, the congress split into two streams: advanced wound healing and negative pressure wound therapy (NPWT). The morning's advanced wound healing session featured a presentation from Professor Karen Ousey, director of the Institute of Skin Integrity and Infection Prevention at the University of Huddersfield, titled 'HydroTherapy: the importance of hydration in wound healing'.

Ousey discussed the main challenges in managing hydration levels in a wound—specifically, the importance of making sure a wound is neither dry (stalling healing) nor flooded with exudate (leading to maceration and tissue damage). Dry skin in wound healing is a significant problem; a moist wound bed enhances angiogenesis and reduces tissue breakdown and necrosis. From the patient's perspective, this is important in that it reduces pain and the risk of scar tissue formation.

TIME (tissue management, infection control, moisture balance, and edge of wound) was the next point of note. As Ousey noted, wound healing is more than just 'slapping a plaster on it'—it relies on finding the priorities in a particular wound and taking steps to manage those given problem areas first. The HydroClean Plus and HydroTac products, Ousey explained, address this in cleaning the wound bed, removing excess moisture, and optimising the wound bed by enabling an environment where there can be a higher concentration of growth factors in the periwound area. She offered a case study of an adult male patient with diabetes presenting with a large lesion on his heel. Two weeks after his operation, necrotic tissue had formed in the wound, and the edges of the wound were dry. The clinician decided to try HydroClean for the first time, and after 6 days, noted that the wound was both moist and less deep than it had been previously. After another 7 days, the wound flap had adhered and while the wound was moist, it was not macerated. In fact, the wound edges were coming together—something the clinician and the patient were both satisfied with. This, of course, was presented as anecdotal evidence; Ousey pointed delegates towards the *Journal of Wound Care*, where she has published several papers presenting evidence as to the effectiveness of this form of therapy, for further information (Ousey et al, 2016; Rippon et al, 2016).

After her talk concluded, Ousey invited the delegates to ask questions. A delegate asked her whether she recommended using a silver dressing with the HydroClean; her response was that while some people follow a 'just-in-case' mentality and feel safer using silver, it is not always clinically needed. She then mentioned how there is an effort now to cut back on the use of medical silver in the UK, partly due to overuse as a result of fear of infection in the hospital setting, and partly because of the cost of using silver dressings more often than clinically needed. One anecdote illustrated how out of hand the situation is: the retailer Marks & Spencer sells pyjamas with a silver lining to protect patients from hospital-acquired infections.

Congress speakers Dr Sabine Eming (top) and Professor Karen Ousey

Negative pressure

The afternoon sessions picked up after lunch and poster viewing. The stream on NPWT featured an interesting talk on the management of wound-healing complications of above-knee amputation stumps, by Rita Lages, on behalf of her team at the Aveiro Hospital Surgery Department, in Aveiro, Portugal. Lages reported on how most people with above-knee amputations often experience complications as a result of diabetes or peripheral vascular disease, or sometimes a combination of the two. Both of these conditions are notorious for their impact on wound healing times. NPWT, on the other hand, can accelerate wound healing by, among other things, promoting blood vessel formation (angiogenesis) and neovascular maturation.

Lages described how the literature suggests that 11% of patients with amputations above the knee have complications, and experience a high mortality rate as a result. These complications include physical ones, such as contractures and infections, and psychological ones, including phantom pain. Regardless of the cause of the complication, treatment is both expensive and time consuming.

Lages stated that her clinic had performed 135 amputations between January and June 2017. The mean patient age was 81.5 years, and there was a 17% complication rate following surgery. She offered a case study of a 79-year-old male presenting with a right-foot ischaemic necrosis, a urinary tract infection, and a respiratory infection. The necrosis was such that the patient required an amputation, as well as antibiotics to manage a systemic infection. However, the amputation site had complete dehiscence and bone exposure following surgery. Lages and her team decided to try NPWT to help the patient, using a silicone sheet between the bone and muscle, once the wound had stabilised. The dressing was changed every 3 days, and 120 mmHg of continuous pressure was applied.

After granulation tissue had formed, and partial bone coverage was complete, Lages' team performed surgical myoplasty and achieved almost-complete wound closure. Unfortunately, the patient's respiratory infection was so severe that he passed away as a result of further complications.

It was seen that NPWT had a complementary function in that it accelerated wound healing and optimised blood flow and tissue perfusion. The benefits of this treatment modality were instantly recognisable. Both in- and outpatients had excellent results with regard to pain control, recovery time, and cost of treatment. There are, however, limitations to using NPWT, as with any therapeutic technique. In this case, the limitations are mostly a result of poor technique: pain and discomfort from the suction and irritation from the foam dressings were the most commonly cited problems, in Lages' experience. As such, she reiterated how vital it is to discuss the importance of adherence with the patient (and given their mean age, their family or carers as appropriate). Lages finished by adding that she believed 'these [NWPT] devices should be available in every institution'.

Summary

The Hartmann LINK for Wound Healing Congress was a unique opportunity for professionals working in wound healing from across the globe, and a thoroughly enjoyable event from start to finish. The delegates, who travelled from as far as China and the US to hear about the latest advances in NPWT and healing techniques, had a great opportunity to learn and plenty of chances to network with international colleagues. It is hoped that future LINK congresses will offer a similar quality of learning and entertainment. **BJN**

Ousey K, Cutting K, Rogers AA, Rippon MG. The importance of hydration in wound healing: reinvigorating the clinical perspective. J Wound Care. 2016; 25(3): 122–130

Rippon MG, Ousey K, Cutting K. Wound healing and hyper-hydration: a counterintuitive model. J Wound Care. 2016; 25(2): 68–75