Keeping the WOLLF from the door or WHISTful thinking?

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The use of subatomspheric pressure on wounds in general has been on the march from the middle of 1990s. The technology started life in the world of pressure sores and diabetic feet. By 2010, it had become the defacto wound management choice in a wide range of 'complex' wounds. Never one to be left behind, the trauma and orthopaedic community embraced the suction dressings with gusto.

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The black foam system could soon be found on and all soft tissue defects associated with fractures. It even made it in to national guidance on treating open fractures[1]. To be sure, these high-tech dressings had ridden the wave of indication creep to the pinnacle of soft tissue management for surgeons across the land. Everyone agreed, Negative Pressure Wound Therapy (NPWT) was the way to go[2].

But it was not to last, NPWT found itself in the evidenced based crosshairs of the Cochrane group[3]. Their approach was more reserved; we don't have the evidence they said. So the orthopaedic trauma community responded and the WOLLF trial was born[4]. Twenty four centres across the UK participated in the study of patients with severe open fractures and asked whether suction dressing made any difference to patient disability. Four hundred and sixty patients took part, and despite its popularity, the dressings didn't seem to be effective in improving patient reported outcome measures[5].

This was not the only pertinent observation from the trial. Happenstance meant the WOLLF trial took place as the Major Trauma Network was born. Now orthopaedic trauma surgeons and plastic surgeons were working more closely than ever. Dedicated, dual specialty, 'orthoplastic' lists were cropping up across the networks. The paradigm had evolved. Where before 2012, NPWT had been used as temporising soft tissue coverage after initial debridement, patients with open fractures were now being treated definitively in a single sitting of 'fix-and-flap'[6]. Even those wounds which could not be closed or covered at the first wound debridement were to be covered within 72 hours – according to 'policy'.

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What did patients think of all this? In a break with tradition, they were actually asked. Amidst the wholly understandable turmoil of a major injury, patients in the WOLLF trial who received NWPT were very positive about it. The 'experiential knowledge' of NPWT was associated with a strong preference for the treatment[7].

Despite the patient feeling, the WOLLF data were clear. Negative pressure wound therapy was not cost effective. Was this the death knell of the suction dressings in orthopaedic trauma?

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No! Channelling a 'Schumpeterian gale', NPWT was reimagined but for use on closed incisions - incisional Negative Pressure Wound Therapy (iNPWT). A series of dedicated devices for use on 'high risk incisions' made the technology as relevant as ever to the fragile soft tissues covering the trauma surgeons' handiwork. The new devices built on the improvised efforts that had been seen in the previous decade. What is more, studies were appearing suggesting that these new devices were effective at reducing the ultimate nemesis of the surgeon - wound infection[8]. Outside of the orthopaedic trauma, groupings of studies also pointed towards a benefit in terms of infection for abdominal, breast and cardiac wounds[9].

The reviewers at Cochrane were, as ever, not convinced – they spoke of; 'low certainty' for reducing SSI in primarily closed wounds. Clearly, bigger and better studies were needed[10]. Much of the literature judges iNPWT by proxy measure such as wound healing questionnaires or seroma formation[11-13]. These are important considerations no doubt, but surely the ultimate practice-determining outcome must be SSI. After all, if iNPWT do not reduce infection can we justify their use? But judging SSI - and an interventions' ability to reduce it is no small task. The relatively low infection rates seen in elective and emergency orthopaedic care present dizzying sample size considerations for big trials.

When using binary outcomes, even studies of over 400 patients can have the venerated p value swayed by the addition of a single case to one of the treatment arms. The fragility of even seemingly large studies still make formal widespread adoption of promising but unproven technologies difficult to warrant[14].

The possibility of reducing infection without the need for antibiotics is a highly prized contribution in any field of surgery, but how could we be sure?

Once again the call to arms was answered by the orthopaedic trauma surgeons of the UK. Enter the WHIST study. Like the WOLLF trial before it, the trial would use the Major Trauma Network. This time focussing on the primarily closed lower limb wounds of the severely injured undergoing internal fixation[15]. The study also chose to determine effectiveness by measuring infection as its primary outcome. A more complex parameter, needing over 1500 patients to participate. The results of WHIST will be ready for the BOA Congress 2019, but if the effectiveness seen in smaller studies is replicated, the surgeons can add with confidence the incisional dressings to the locker of treatments employed to reduce their most dreaded complication.

Other research in the pipeline includes the WHISH study[16]. This piece of work ran along similar lines to WHIST, but looked at iNPWT and infection after hip fracture surgery. This study was a feasibility trial, so there may be some wait for definitive answers.

So, NPWT was not the panacea. Will 2019 be the year of the iNPWT? The king is dead, long live... ■

References

References can be found online at www.boa.ac.uk/publications/JTO.