

Topical antiseptics in wound care: time for reflection

Next year is the centenary of the death of Lord Joseph Lister which is being celebrated by the Royal College of Surgeons of Edinburgh, 8–11 February 2012. It was Lord Lister who left us the legacy of antiseptic surgery in the 1860s which was largely replaced by the principle of aseptic surgery a few decades later. The antiseptic principle was devised after Lister learnt of Pasteur's experiments, which showed that bacteria were the cause of spoilt wine, and the public engineers of Carlisle, who had used phenol to treat their stinking sewage. His introduction of a carbolic spray significantly reduced the risk of, what was then, almost certain mortality after progression of infection after treatment of open fractures (1). Although phenol is now considered to be far too toxic, the pre-operative ritual of the modern antiseptic "scrub" of the surgical team's hands and patients' skin is still a critical step in operative surgery (2). It is critical that the use of antiseptics as topical antimicrobials is not confused with the use of disinfectants (3) (such as EUSOL, Milton or Dakin's solution) which are much more cytotoxic and should be reserved for cleaning surfaces or sterilising baby feeding bottles, although some plastic surgeons anecdotally argue that these hypochlorites are able to efficiently prepare the beds of chronic wounds prior to skin grafting.

The use of aqueous topical antiseptics for irrigation of contaminated, or open, wounds and lavage of soiled cavities, particularly the peritoneum, has fallen out of favour because of a clinically unsubstantiated fear of toxicity, mostly based on experimental and laboratory based data. It has to be remembered that antiseptics have been used in wound management in several forms for centuries; this has included the use of silver and more recently iodine, in its various forms, chlorhexidine and polyhexamethylene biguanide (PHMB). In currently

available dilute solutions, which are used for wound irrigation, and in modified forms, such as the pyrrolidone-iodine preparations, in film, paste and bead dressings, little clinical evidence of toxicity has been reported (4–10).

Disappointingly, the trend away from antiseptic use in wound care has also been strengthened by unhelpful meta-analyses which claim that the evidence-base is too weak to justify the cost of topical antiseptics in chronic wound care, particularly the widely appraised silver and polyhexamethylene biguanide dressings (information which falls into the hands of our procurement managers who are always ready to quote the findings of meta-analyses which are used to give "gold standard" evidence based medicine and make inappropriate decisions on wound dressing choices!). Although the clinical evidence base of the value of antiseptics is strong there is a lack of appropriately powered, randomised clinical trials (RCTs), probably related to the heterogeneity of wounds, difficulties of recruitment and, of course, their cost. The Cochrane Collaboration has made several unhelpful analyses into the field of wound care but always come up with "more research is needed" (11,12). Some otherwise adequate studies have squandered opportunities, and considerable grant funding, to show that antiseptic dressings do not enhance healing. Their role is to reduce colonisation and prevent progression to infection. The VULCAN study examined the role of several silver dressings in clean, healing venous ulcers; this was inappropriate and included no microbiology (13,14).

The use of topical antimicrobials, specifically the use of antiseptics rather than antibiotics, must be regarded as logical for many reasons. All open wounds become contaminated but if this is unchecked through inadequate control or a missed underlying pathology, this

can progress to "critical" colonisation (or pre-infection); finally leading to local and systemic infection which usually does need antibiotic therapy. The rise of antibiotic resistant organisms, meticillin-resistant staphylococci in particular, together with the acute decline of new antibiotic research and introduction, is a major reason to revisit the use of topical antiseptics. In addition to controlling the progression of colonisation through a reduction of bioburden, there is evidence that antiseptic lavage and antiseptic dressings can also reduce the risk of biofilm formation, aid in debridement, prepare the wound bed prior to healing and act in infection prevention (15).

A further development, of increasing concern, is a theoretical concept currently being presented that antiseptics may lead to the development of widespread antimicrobial resistance of pathogenic organisms; not only to antiseptics but also to antibiotics. This is extremely unlikely as the disruptive mechanisms of antiseptics on micro-organisms' cellular metabolism are multifactorial; unlike the many types of antibiotic action which are very specific and relate to transmissible resistance. No such resistance has been seen to human pathogens after prolonged and widespread antiseptic use over many decades. In some Scandinavian countries, antiseptic irrigants and dressings are inappropriately being banned from use in wound care formularies. The EU Scientific Committee on Consumer Safety has undertaken an extensive review of antimicrobial resistance related to the phenolic antiseptic triclosan (the most studied antiseptic overall) and found no evidence of human pathogen resistance, although in fairness they did suggest that its non-medical use ought to be more restricted (16). Triclosan is the antimicrobial currently incorporated into surgical sutures, whose efficacy is being supported by increasing numbers of RCTs (17,18). The findings clearly relate to the whole group of topical antimicrobials which are classed as antiseptics.

Antiseptic use is an established, effective element of wound care which cannot be ignored. When part of protocols/guidelines, of which there are many national and international examples (19–25), it is cost effective and has a considerable evidence base. There should be a reversal of the trends away from antiseptic use, in all aspects of acute and chronic wound

care, because of the perceived extra cost of antiseptics and hypothetical concern of their ability to induce resistance. Antiseptics have much to offer in open wound care, lavage and dressings, impregnated incise drapes and coated antimicrobial sutures and devices.

Professor David Leaper
International Wound Journal

REFERENCES

- 1 Leaper DJ. Lord Joseph Lister: the rise of antiseptic surgery and the modern place of antiseptics in wound care. *EWMA J* 2007;7:39–42.
- 2 Leaper DJ. Leading article. Surgical site infection. *BJS* 2010;97:1601–02.
- 3 Leaper DJ. Eusol. *BMJ* 1992;304:930–31.
- 4 Durani P, Leaper DJ. Povidone-Iodine: use in hand disinfection, skin preparation and antiseptic irrigation. *IWJ* 2008;5:376–87.
- 5 Leaper DJ, Durani P. Topical antimicrobial therapy of chronic wounds healing by secondary intention using iodine products. *IWJ* 2008;5:361–8.
- 6 Leaper D, Nazir J, Roberts C, Searle R. Economic and clinical contributions of an antimicrobial barrier dressing: a strategy for the reduction of surgical site infections. *J Med Econ* 2010;13:447–52.
- 7 Gray D, Barrett S, Battacharya M, Butcher M, Enoch S, Fumerola S, Stephen-Haynes J, Edwards-Jones V, Leaper D, Strohal R, White R, Wicks G, Young T. PHMB and its potential contribution to wound management. *Wounds* 2010;6:40–46.
- 8 Sibbald RG, Leaper DJ, Queen D. Iodine made easy. *Wounds Int* 2011;2:s1–6.
- 9 Dissemmond J, Assadian O, Gerber V, Kingsley A, Kramer A, Leaper DJ, Mosti G, Piatkowski de Grzymala A, Riepe G, Risse A, Romanelli M, Strohal R, Traber J, Vassel-Biergans A, Wild T, Eberlein T. Classification of wounds at risk and their antimicrobial treatment with polihexanide: A practice-oriented expert recommendation. *Skin Pharmacol Physiol* 2011;24:245–55.
- 10 Leaper DJ. An overview of the evidence on the efficacy of silver dressings. The silver debate: a new consensus on what constitutes credible and attainable evidence. *JWC* 2011;20:8–14.
- 11 Leaper DJ. Editorial: Evidence-based wound care in the UK. *IWJ* 2009;6:89–91.
- 12 Leaper DJ. A systematic review of silver in wound care: the need for guidelines. *WCET* 2008;28:23–24.
- 13 Michaels JA, Campbell B, Palfreyman SJ, Shackley P, Stevenson M. Randomised controlled trial and cost-effectiveness of silver-donating antimicrobial dressings for venous leg ulcers (VULCAN trial). *BJS* 2009;96:1147–56.
- 14 Leaper D, Drake R. Should one size fit all? An overview and critique of the VULCAN study on silver dressings. *IWJ* 2011;8:1–4.

- 15 Leaper DJ, Meaume S, Apelqvist J, Teot L, Gottrup F. Debridement methods of non-viable tissue in wounds (chapter 24). In: Farrar D, editor. *Advanced wound repair therapies*. Cambridge, UK: Woodhead Publishers, 2011.
- 16 Directorate General for Health and Consumers. 2010. Opinion on triclosan. Antimicrobial resistance. Scientific Committee on Consumer Safety. URL: ec.europa.eu/health/scientific_committees/consumer_safety/index_en.htm. [accessed 2010].
- 17 Leaper D, Assadian O, Hubner N-O, McBain A, Barbolt T, Rothenburger S, Wilson P. Antimicrobial sutures and prevention of surgical site infection: assessment of the safety of the antiseptic triclosan. *IWJ* 2011;8:556–566.
- 18 Leaper D, McBain AJ, Kramer A, Assadian O, Alfonso Sanchez JL, Lumio J, Kiernan M. Healthcare associated infection: novel strategies and antimicrobial implants to prevent surgical site infection. *Annals of the Royal College of Surgeons of England* 2010;92:453–8.
- 19 Clinical Guideline CG78. 2008. Surgical site infection: prevention and treatment of surgical site infection. National Institute for Health and Clinical Excellence. www.nice.org.uk.
- 20 Franz MG, Robson MC, Steed DL, Barbul A, Brem H, Cooper DM, Leaper D, Milner SM, Payne WG, Wachtel TL, Wiersema-Bryant L. Guidelines to aid healing of acute wounds by decreasing impediments of healing. *Wound Repair Regen* 2008;16:723–48.
- 21 Identifying criteria for wound infection. Management of wound infection. In: *European Wound Management. Association Position documents*. London: Medical Education Partnership, 2005.
- 22 Wound infection in practice: shaping the future. A consensus document London: Medical Education Partnership, 2008.
- 23 Grey JE, Harding KG, editors. *ABC of Wound Healing* Oxford, BMJ Books: Blackwell Publishing, 2006.
- 24 Venous leg ulcers. Infection diagnosis and microbiology investigation. Quick reference guide for primary care, 2010 revision. Association of Medical Microbiologists/Health Protection Agency, 2010.
- 25 Leaper D, Harding K. Antimicrobials and Antiseptics. *J Wound Technol* 2010;7:34–5.