Introduction

Local application of gentamicin-containing collagen implant in the prophylaxis and treatment of surgical site infection

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The development of surgical site infection (SSI) can be a serious issue for patients, surgeons and healthcare providers due to the negative impact on post-operative morbidity and recovery time. SSIs are estimated to prolong the length of hospital stay and significantly increase the cost of care. Mandatory surveillance programmes and improvements in surgical and aseptic technique have led to a considerable reduction in the incidence of SSI in many countries and areas of surgery. However, this progress should not lead to complacency as significant challenges remain in the fight against SSI such as the increasing number of high-risk patients undergoing surgery and the growing problem of antibiotic resistance.

In an ageing society, a growing number of patients with one or multiple co-morbidities will require surgery. The presence of conditions such as diabetes and obesity in patients has been demonstrated to increase the risk of SSI in many areas of surgery and therefore the rising prevalence of these conditions is of great concern to surgeons and healthcare providers. The World Health Organisation estimates that by 2030 the number of patients worldwide with diabetes will reach 366 million compared to the figure of 171 million in 2010.1

The mainstay of SSI prevention in addition to strict aseptic surgical technique has been the use of systemic antibiotic prophylaxis. However, long-term administration of intravenous antibiotics may lead to a risk of antibiotic resistance and toxicity. The emergence of local antibiotic-eluting products such as resorbable gentamicin-containing collagen implants (GCCIs) which deliver high local concentrations of gentamicin with corresponding low serum levels may help to solve this issue. Local use of gentamicin delivers a bactericidal concentration that is much higher than that allowed by systemic injection, so antibiotic blood concentrations remain low and reduce the chance of adverse effects while the local drug concentrations are kept high (above the minimal inhibitory concentration) for at least 48 h. In this way, resistance to antibiotics caused by low drug dosage is avoided and gentamicin behaves like a broad-spectrum antibiotic. Furthermore gentamicin-resistant bacteria are killed by the high local concentration of gentamicin.

This supplement contains detailed overviews of the prophylactic and therapeutic use of GCCI in gastrointestinal, cardiac, vascular and orthopaedic surgery. The authors have carefully reviewed the data and rated the evidence to provide surgeons with a balanced view of the efficacy and cost-benefit of GCCI with specific focus in high-risk procedures and patients.

Two recent randomised studies, failed to show a beneficial effect of GCCI in the prevention of SSI.2,3 In the two studies the sponges were immersed in saline before use. This supplement contains new pharmokinetic data concerning the elution of gentamicin from the collagen sponge.4 These data clearly show that gentamicin is highly water-soluble and is easily rinsed from the collagen matrix by saline within seconds following immersion. This is an important piece of work by Lovering and colleagues as it provides a rationale for dry use of GCCI in line with the manufacturer’s recommendations.

Minimising the development of SSI in high-risk patients is key to optimising patient outcome and controlling the increasing costs of healthcare. The development of antibiotic resistance, is still an issue of major concern despite the introduction of new antibiotics. Therefore the local route may be an important weapon in the war against SSI and antibiotic resistance.

Conflict of interest

Harm Rutten has received an honorarium from EUSA Pharma.

References


Harm J.T. Rutten
Department of Surgery, Catharina Hospital, Eindhoven, The Netherlands
E-mail address: harm.rutten@catharinaziekenhuis.nl

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