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LETTER TO THE EDITOR - INFECTION

Ensuring safe surgery is more than just tackling antimicrobial resistance: making the case for a skin preparation trial

In response to "The implementation of an infection bundle reduces surgical site infections following cranial surgery" (23 Oct 2018)

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Dear Editor,

The recent Public Health England report [12] has refocused UK attention on the impeding perils of antibiotic resistance, generating headlines such as "3million operations could be deadly if antibiotic resistance worsens" [9]. Whilst the mainstream narrative has focused on strategies to reduce resistance, including specific government funding of £30million [6], it is also important attention is given to strategies that reduce our reliance on antibiotics; in the case of safe surgery, this includes skin preparation. With this in mind, we welcomed the work of Jörger et al. in further contributing to the effort to significantly reduce surgical site infection [SSI] in neurosurgery using a peri-operative bundle. This contained five steps; pre-operative octenadine wash by the patient, double octenadine pre-operative skin preparation, staff training, no prophylactic peri-operative cortisol administration and skin closure with glue. They achieved an impressive 50% reduction in SSI [7].

As the authors outline in their discussion, bundled SSI interventions are popular strategies, but they have had mixed efficacy, particularly when replicated by others [3]. The main difficulty for the wider field therefore is in interpreting which, if any, of the interventions are significant and transferable to their practice [3]. The 'if any' statement is a recognised concern in SSI research, as the most consistent strategy for reducing SSI is simply to undertake SSI surveillance; for example, if you consider the higher-level SSI intervention trials, the observed event rate is lower than the expected event rate. [5]

Consequently, whilst we commend any successful interventions, we believe is important to examine the key, individual steps that drive improvement, in order to promote efficient changes in practice. Reading this article, the stand out feature of interest is the sole use of Octenadine.

Currently, Octenadine is not in widespread usage. Popular agents instead include chlorhexidine (CHG) and povidone-iodine (PVI), in equal usage, with or without alcohol [2]. Whilst there is a mechanistic basis to show the superiority of Octenadine over CHG or PVI [8], there are no higher-level studies demonstrating its superiority in reducing SSI. We believe this is instrumental in driving a change in practice [2].

For example, of PVI and CHG, available clinical evidence suggests CHG is more effective than PVI, although this is influenced by a single RCT [4]. We have recently demonstrated through meta-analysis [11] that CHG in combination with PVI is more effective at reducing SSI than a single agent alone. This is reinforced with mechanistic precedent that CHG and PVI have different mechanisms of action and efficacy against bacterial and fungal pathogens and have a theoretical synergistic effect. [1] Therefore, whilst UK clinical guidelines [10] recommend solely CHG or PVI, in either alcoholic or aqueous preparations, the literature points towards a benefit of alcohol-CHG, and more recently, alcohol-CHG in combination with PVI. This has not entered routine clinical practice [2].

As suggested by the latest Cochrane Review, a definitive skin preparation RCT is required to crystallise these observations, but more importantly, it is RCTs which are more likely to change practice [2].

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This is pertinent for all surgeons, but within neurosurgery, we need to take a particular interest, for whilst our infection rate is low (~3%), its impact is significant, including high rates of readmission (98%) and reoperation (53%) [3]. Furthermore, we have few antibiotics capable of penetrating the blood-brain barrier. Therefore, a rise of antibiotic resistance should be a pressing concern for neurosurgery.

With this in mind, we undertook a community consultation, using a survey advertised to a number of brain tumour support groups ($N = 20$) on Facebook. Brain tumour groups were chosen as they spanned both paediatric and adult neurosurgical practice, were numerous, and included groups for carers as well as patients. The principal aims of the survey were to determine interest in a trial of skin preparation in neurosurgery and whether surrogate consent would be acceptable to patients and their children. Children and emergency surgery are two challenging groups to involve in clinical research, owing to the additional difficulties of consent. For a trial of skin preparation, these are important areas to consider; firstly, to ensure results are generalizable and secondly, owing to the large sample size required to power such a study. The results of this community consultation were recently presented at the annual Society for British Neurosurgical Conference and are reflected here.

One hundred six individuals took part, 29% had undergone neurosurgery and 80% surgery previously. Preventing SSI was ranked extremely important by 95% of participants ($n = 100$). 89.5% ($n = 94$) of participants would consent to participating in the RCT. 86.8% of those with children ($n = 61$) would allow their child to participate. In the emergency setting, 83.3% ($n = 90$) would accept emergency entry into the RCT, provided retrospective consent was offered, preferably immediately. Ninety-five percent ($n = 60$) would allow emergency participation of their child provided consent was gained retrospectively. 94.4% ($n = 90$) of participants would accept consent by a proxy, such as a close relative. Older patients (> 46 years, median age) were less likely to participate in the trial compared with younger participants ($P = 0.04$). No other demographic parameter affected willingness to participate, including educational status, previous infection history, and previous surgical history.

In conclusion, a community consultation found there is a public interest and acceptance to participate in a skin preparation trial for neurosurgery, for adults and their children, and surrogate consent is acceptable.

Despite this, establishing widespread professional or funding-body interest for SSI research remains challenging; currently, the overall incidence is low, and its impact tempered by effective antibiotic therapies. However, the recent forecasts from PHE should serve as a grave reminder and therefore preventative research should be given as much attention as treatment research. In the case of skin preparation for example, if such a simple change could produce even a small benefit, when extrapolated across surgery as a whole, surely it is worth greater consideration.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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