NICE clinical guideline: prevention and treatment of SSIs — is it enough?

In 2008 the National Institute for Health and Clinical Excellence (NICE) launched their clinical guideline 74 on the prevention and treatment of surgical site infections (SSI). Clinical guideline 74 predominately advocates and advises on SSI prevention and treatment. This article explores some of the questions raised by this clinical guideline around the areas of SSI surveillance, gaps in the evidence, and the management/effectiveness of clinical guidelines in practice. It is posited that these questions create exciting challenges for wound care clinicians in the quest to answer them.

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Surgical site infections (SSIs) are identified as carrying an increase to both mortality, morbidity and length of hospital stay (Coello et al, 2005; Wilson, 2007). Alongside this is the discomfort and psychological distress caused by an SSI to patients and their families. The Department of Health (DH) in the UK are active in producing SSI prevention strategies such as the 'Saving Lives' 2007 document, which looked at high impact interventions for the prevention of SSIs. In 2008, the National Institute for Health and Clinical Excellence (NICE) launched their clinical guideline 74 on the prevention and treatment of SSIs (NICE, 2008). This guideline predominately advocates and advises on SSI prevention and treatment. NICE (2008, p5) states that this is 'based on rigorous evaluation of the best available published evidence'. However, in many areas of SSI prevention and the wound management of SSIs, there is a lack of robust evidence with regard to dressing wear time, skin pre-solution, the best way to debride, use of antimicrobial agents, etc.

... do individual trusts know, with confidence, what their actual SSI rates are? If trusts do know their actual SSI rates, how are they collected? If SSI surveillance is carried out, which surveillance scheme is adopted?

In the author's opinion from discussions with other tissue viability nurses, it appears that the NICE (2008) clinical guideline 74 has been embraced by healthcare providers in the UK. This is commendable. However, the guideline provokes many more questions than just the areas covered within its text. For example:

- Do individual trusts know, with confidence, what their actual SSI rates are?
- If trusts do know their actual SSI rates, how are they collected?
- If SSI surveillance is carried out, which surveillance scheme is adopted?
- Is it useful for trusts to compare SSI rates via the national surveillance scheme in England (Health Protection Agency [HPA]) and in Scotland (Health Protection Scotland)?

Another concern related to SSI surveillance is SSI identification. This is a particular area where clinicians are poor at recognising the signs and symptoms of wound infection in clinical practice and, thus, the final diagnosis of wound infection (Gardner et al, 2001; Bamberg et al, 2002). This, in turn, may have an effect on surveillance of SSIs and the subsequent rate reported. Other areas to consider are the ownership of such clinical guidelines by the clinicians using them. For example, how are they incorporated into local practice, and who manages and updates these guidelines? Do they lead to increased audit taking place around SSI prevention? The guideline needs to be a live document that incorporates new evidence as it surfaces.

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SSI surveillance

In the author's opinion, there appear to be three main problem areas within SSI surveillance. These include:

- Several SSI definition systems in use
- The variability of how SSI definitions are interpreted
- SSI surveillance is often carried out for only a short period of time and is rarely continuous — does this just give a 'snapshot' of the SSI rate? It must therefore be questioned if this gives a true indication of the size of the problem?

There are inconsistencies between the definition tools used for (SSI) surveillance. This was revealed in two papers looking at this topic (Mishriki et al, 1993; Wilson et al, 2004). Mishriki et al (1993) undertook a prospective survey of postoperative surgical patients (n=702) to determine whether clinicians showed consistency in their interpretation of signs and symptoms of wound infection. This study, although crude in design, reached similar conclusions to that of a more recent study by Wilson et al (2004), which identified that there were inconsistencies between clinicians on how they diagnosed and defined SSI. The study by Wilson et al (2004) compared several definitions of infection in the same group of patients (n=5804 surgical wounds). The definitions used were: centres for disease control (CDC); nosocomial infection national surveillance scheme; and the ASEPSIS scoring method.

The ASEPSIS scoring method was originally developed specifically for use in cardiothoracic surgical patients (Wilson et al, 1986). This single centre study ran over three years and found a large variation in reported infection with a range of 6.8% ASEPSIS scoring system (score>20), to 19.2% with the CDC definition. The major conclusion of this large study is that there is a significant range of variation between the widely used scoring systems. This highlights that the differences in interpretation do not appear to

facilitate comparison of SSI rates between different centres if the SSI definition tool used is not universal.

In the author's opinion, if we want to move forward in the area of accurate SSI surveillance, there is a real need for a universally accepted method for defining/classifying SSIs. Presently, this only exists in the diabetic foot speciality in the form of two evaluated classification systems for grading foot infections developed by the international working group on the diabetic foot and the infectious diseases society of America (Gottrup et al, 2010). One way forward for the UK, in the absence of one recognised method for defining/classifying SSIs, is for SSI surveillance to become mandatory for all types of surgery, and the HPA surveillance scheme/definitions employed for this. If this became the case, it may also be necessary to add in speciality-specific risk factors. This has the potential for facilitating true comparisons between centres. In addition, such an approach has the capability to identify statistically significant risk factors implicated in the development of SSIs, which in turn would enable centres to look in detail at their own individual group of patients, and, if necessary, put in place specific preventative strategies pertinent to their speciality area.

An additional issue with SSI surveillance is how accurately clinicians identify wound infection. ... even with a robust SSI definition system in place, it still has to be interpreted locally by clinicians in practice.

An additional issue with SSI surveillance is how accurately clinicians identify wound infection. This is the crucial element of SSI surveillance because, even with a robust SSI definition system in place, it still has to be interpreted locally by clinicians in practice. An element of user-error has to be recognised and accounted for, and this can result in both over- and under-reporting of SSI rates. This inaccuracy of diagnosing wound infections has long been recognised in the literature. Bamberg et al (2002) carried out an extensive survey using a 34-item questionnaire on the practices of multidisciplinary wound care professionals in the USA. This well-constructed, multidisciplinary (MD) and multicentre survey looked extensively at identifying signs of infection in the wound. The study highlighted that even in a group of wound care specialists, there were differences in their clinical practice in the identification of wound infection. There appeared, in this study, to be no consistent rationale for sampling in a wound for possibly infected microorganisms.

A similar UK audit looking at non-wound care specialists, showed that in both a primary and an acute care trust, there too appeared to be no consistent rationale for performing a wound swab, i.e. identifying if a wound may be infected (Kingsley and Winfield-Davies, 2003). The apparently obvious solution to this problem of SSI identification is the provision of education for the personnel carrying out SSI surveillance. However, as Bamberg et al (2002) identified, even multidisciplinary wound care professionals do not always get it right.

In the UK, infection control teams mainly carry out SSI surveillance after undertaking education in the role. This education generally includes attendance at an HPA SSI surveillance training day, with an extensive session looking at the SSI definitions used in the HPA surveillance scheme. Despite often extensive training, in the author's experience SSI surveillance personnel still find it difficult to identify and classify SSIs, perhaps because their previous experience is not in wound management. One possible solution is for infection control personnel carrying out SSI surveillance to work in tandem with tissue viability nurses/teams encompassing both specialities' knowledge and expertise in the area, with both disciplines having been through specific training before starting SSI surveillance. Further enhancement of getting the diagnosis correct can be illustrated in the common scenario where SSIs are difficult to categorise, i.e. is it superficial or deep? This type of scenario should be further discussed with the surgical team and microbiology. In the author's opinion, it is vital that SSI identification/diagnosis should have a multidisciplinary approach if accurate rates of SSI are to be recorded.

As SSI surveillance for all types of surgery is not mandatory in the UK, it is difficult to state the actual rates of SSI. Many trusts in the UK undertake SSI surveillance, some employing the HPA definitions/scheme and others reporting internally, only using locally adapted SSI definitions. Frequently, such surveillance is for a short period, either for one or two quarters per year. This raises the question of how representative these rates of SSI can be if they are not recorded continuously. Studies looking at related topics with SSI as a study outcome measure often identify and report infection rates higher than expected or previously reported in that speciality. A recent example of this is the Darouiche et al (2010) study which looked at the effect of skin preparation in theatres, using chlorhexidine alcohol versus povidone iodine, on the rate of SSIs. This group comments on higher rates of SSIs than they expected, perhaps highlighting that an SSI will be found if actively looked for. However, without proactive and accurate collection of SSI rates, the extent of the real problem will never be truly understood, perhaps limiting how we resource the prevention of SSIs. In addition, there are reported benefits of continuous SSI surveillance.

Wilson (2007) identifies a fall in SSI rates in cardiac surgery where long-term surveillance is employed. He quotes feedback to surgical teams on SSI rates and changes in practice, such as skin preparation, as being the positive influences in lowering the rates of SSI.

Continuous SSI surveillance at first appears resource-intensive, but an overall reduction of SSI rates, of even 1%, would lead to cost-savings for a trust (Wilson, 2007).

Again, continuous SSI surveillance over five years in breast cancer surgery (n=2338) was shown to reduce SSI rates from 33.3% in 2000 to 18.9% in 2005 (Vilar-Compte et al, 2009). In addition, the Vilar-Compte et al (2009) group reports that continuous surveillance facilitates the identification of SSI-associated risk factors and helps to improve the quality of care offered to patients undergoing surgery.

Continuous SSI surveillance at first appears resource-intensive, but an overall reduction of SSI rates, of even 1%, would lead to cost-savings for a trust (Wilson, 2007). This is not only the tangible cost-saving of an SSI prevented, but also a more hidden saving on the potential revenue lost because of the increase of length of stay when a patient has an SSI which, in turn, prevents the admission of another patient into that bed. In addition to the financial/resource savings, there is the real benefit of patients not suffering an SSI. Other benefits of continuous SSI surveillance are that it facilitates benchmarking and comparison of rates against other centres and, perhaps more importantly, allows comparison of rates year on year in individual centres.

Finally, when discussing SSI surveillance, the question of post-

discharge SSI surveillance must be raised. To have a clear picture of the actual SSI post-discharge rate and the subsequent impact this has on community services, a robust post-discharge SSI surveillance scheme is needed. Presently, the HPA has a post-discharge SSI surveillance questionnaire and they advocate that trusts taking part in the scheme call patients post-discharge to check if they have had an SSI (Health Protection Agency [HPA], 2009). This is not yet mandatory and in practice it is fairly resource intensive.

Vowden and Vowden (2009) carried out a wound care survey reporting the occurrence of wounds in patients receiving health care across Bradford. This survey included 1735 people who had a reported wound. Interestingly, 244 of these people had surgical wounds and at the time of the survey they were receiving their care in the community. Of course, not all of these surgical wounds included in the survey will have been infected. However, this survey fuels the argument that there is a need for SSI surveillance post-discharge. How such a scheme would work is difficult to say, but it would need committed involvement from both GPs and community nurses who, in turn, would link into surveillance personnel from the discharging hospital.

Preventing SSIs by the use of dressings

The NICE clinical guideline 74 (2008) gives a clear account of what clinicians need and should be doing to try to prevent SSIs in their area of practice. Much of this guidance is based on long-established evidence for practice including:

- Preoperative skin preparation
- Clipping and showering
- The use of asepsis at all times
- Hand hygiene
- The need to re-scrub in theatre if gloves/hands are contaminated, etc (Cruse and Foord, 1980).

As previously stated, production of such guidelines should be applauded and embraced by clinicians. However, conversely, the production of rigorously researched guidelines also establishes where the evidence to support practice is lacking. Sadly, there remain gaps in the evidence around often basic areas of wound care.

One such area is that of post-operative dressings and their effectiveness in the strategy of preventing SSIs. It is yet to be proven if dressings on postoperative wounds help prevent infection. NICE (2008) have extensively looked at the evidence behind this and conclude that the existing current studies are not adequate to show any convincing differences between dressing types in SSI prevention. One such study reviewed by NICE for guideline 74 (2008) was a randomised controlled trial (RCT) (n=300) by Cosker et al (2005), which compared three dressings — a polyurethane membrane versus an absorbent versus a hydroactive, with SSI rates as a study outcome. This study was not conclusive as to which dressing may be effective in preventing an SSI. In the author's opinion, to go somewhere near to answering this question, an adequately powered RCT study with a clear outcome measure of the effect of the dressing on SSI rates is needed. Before contemplating this type of study it should be decided which dressing group should be reviewed.

In the absence of definitive evidence around which dressing and how long to keep it in place, clinicians have to take a pragmatic approach and look at what evidence is available and adapt it locally to their area of practice.

Do we need comparative dressing studies in the area of SSI prevention? Perhaps a common sense approach could be used and only vapour-permeable barrier dressings included in the investigation. The SSI definition tool used needs to be clarified and all investigators trained in its use, and blinded to the dressing used. This may go some way to producing a reliable and valid study that could help clinicians make an informed decision in the future on which dressing to use postoperatively.

Interestingly, there has been debate recently about the benefits of RCTs in the area of wound management (White et al, 2010). A recent European Wound Management Association (EWMA) patient outcome group document presented recommendations on the conduct and reporting of wound care research (Gottrup et al, 2010). This group discusses that RCTs may not always be achievable in wound management research. Ashby et al (2010) refute this in an editorial response to EWMA (Gottrup et al, 2010) recommendations stating, 'we need to dispel the myth that wound care RCTs are somehow different or more difficult to undertake than in other areas'. This puts the onus onto wound care clinicians, to design and carry out the research needed to fill the gaps where evidence is still to be found. However, it must be recognised that it takes time for research to be completed and thus knowledge increased. Of course, for such a study to be carried out, it would need to be noted what the rates of SSI were before the start of the study — another reason for continuous SSI surveillance.

This much needed research in SSI prevention is not just about which dressing type may help to prevent or reduce the rate of SSIs, but also about how long the dressing should be in place before removal. Once again, NICE (2008) looked at the available evidence in this area. Two studies were identified that looked at length-of-wear time and its influence on SSIs (Chrintz et al, 1989; Heal, 2006). Neither found conclusive evidence that would recommend an ideal time to keep postoperative wounds covered. And, what about antimicrobial dressings? Do they have

a place as the routine dressing choice for postoperative wounds? Before such a large, potentially expensive step is taken, we would need to investigate the risk of bacterial resistance if antimicrobial dressings were in regular prophylactic use. Also, are such dressings cost-effective or indeed necessary? The NICE guideline 74 (2008) has classified the range of dressings available into 'passive, interactive and active'. These terms are not necessarily helpful or in common usage with clinicians in practice — anecdotally, clinicians appear slightly confused by the terms. In reality, these terms possibly mean different things to different clinicians/specialities. There is a need for a consensus on how we classify dressings, and this consensus needs to be international. In the absence of definitive evidence around which dressing and how long to keep it in place, clinicians have to take a pragmatic approach and look at what evidence is available and adapt it locally to their area of practice.

The gaps in evidence around prevention and management of SSIs do not stop at which dressings are suitable and how long they should be kept in place. There remain other areas around wound management that require further clarification. For example: wound cleansing, especially while in hospital, tap water versus sterile saline; the use of topical antimicrobial agents; secondary intention healing – packing versus topical negative pressure (TNP); and, if debridement is necessary, which is the most effective? There is much more evidence to be sought, and clinicians working in wound management, have a responsibility to carry out and subsequently publish this research.

NICE clinical guideline 74 — is it enough?

Clinical guidelines are seen as a way of promoting evidence-based practice, ensuring resources are used equally and effectively, and are easy to audit and aid evaluation of practice (Rycroft-Malone and Duff, 2000). In principle, clinical guidelines are useful

tools for clinicians working in practice. While this may be true, there are several considerations to make in individual healthcare settings around the management of any clinical guidelines introduced. These include:

- Do staff know the content of these guidelines?
- Do staff practise them?
- Are they adapted for local use?
- Are the guidelines live — do they have review dates?
- How is new evidence incorporated?
- Do they facilitate an audit cycle?

Thus, the practical implications of the NICE (2008) guidelines on preventing SSIs is not simply placing these guidelines into clinical areas and asking staff to adhere to them. It is much more complex.

Before the launch of the NICE (2008) guidelines, many trusts had their own clinical guidelines on preventing SSIs. Is it therefore practical for trusts to simply adopt the NICE (2008) guidelines in their entirety? The answer is probably not. For trusts that had previous guidelines in place, it was realistic to combine the two sets of guidelines. In all probability, these two sets of guidelines will only have had slight differences. The combination approach enables an update process of existing guidelines based on current evidence at the time the NICE (2008) guidelines were written. Assuming most trusts carried out this approach to implementing the NICE (2008) guideline 74, it is their responsibility to ensure the above considerations are addressed and managed.

For clinical guidelines to be positively influential they have to be owned by the staff using them. To assume ownership staff need to see these guidelines as credible and workable. One approach to guaranteeing this is to ensure that the guidelines are a live working document. For this to be achievable, it is probably necessary to have a local MD steering group responsible for establishing the guidelines and attaching review dates to the guidelines. This MD group would also be accountable for scrutinising pre, peri and postoperative care utilising audit and surveillance. The auditing of related practice is essential in providing evidence that guidelines are having a positive effect on practice. Audit will also identify areas of practice that may require changing or need further research. It is also essential that any change of practice advocated in clinical guidelines, or as a result of audit findings, has an attached education programme/session for staff to attend (Kelly and Kopp; 2001; Lloyd Jones, 2007).

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An additional strategy that may be helpful in ensuring that clinical guidelines are followed is incorporating clinical guideline recommendations, based on evidence, into care pathways, i.e. preoperative checklists dictating skin preparation and timing of prophylactic antibiotics. Chadwick et al (2009) report this approach in the use of advanced wound care therapies in the diabetic foot patient. Following the results of their preliminary evaluation, this group hypothesises that a dynamic care pathway which incorporates up to date evidence guiding staff, could possibly lead to improved quality of care, better patient outcomes and potential cost-savings.

A criticism of clinical guidelines is that they may only be valid for a short period of time, and, in fact, may be out of date before they are even published. Thus, a crucial area that needs to be addressed in the adoption of clinical guidelines is how new evidence is incorporated? The obvious way is as discussed previously — having review dates and a steering group who can review such evidence and decide if it should be included. An example of new evidence being published since the launch of the NICE (2008) guideline 74 is the Darouiche et al (2010) study. This study demonstrated that preoperative cleansing of patients' skin using chlorhexidine-alcohol is superior to cleansing with povidone-iodine in the prevention of SSIs after clean-contaminated surgery (n=849). The NICE (2008) guideline 74, based on the evidence available at the time of publication, advocates both chlorhexidine and povidone-iodine as choices for preoperative skin cleansing. Clearly, this is now not best practice and if the NICE (2008) guidelines were written today, this new evidence would be included and the guideline would read differently. In addition, as this

Key points

- In 2008 NICE launched their clinical guideline 74 on the prevention and treatment of SSIs.
- The NICE 2008 guideline provokes many more questions than just the areas covered within its text.
- For accurate SSI surveillance to happen, there is a real need for a universally accepted method for defining/classifying SSIs.
- The production of rigorously researched guidelines also establishes where the evidence to support practice is missing.
- Evidence gaps offer exciting challenges to wound care clinicians.

new evidence is revealed, such as the Darouiche et al (2010) study, it raises new and interesting questions. Iodised theatre drapes are also advocated by NICE (2008) in their guideline 74. This poses the question that if chlorhexidine-alcohol is used as preoperative skin preparation, are the use of iodised drapes actually necessary? Once again, in the absence of any robust evidence to prove this, in either direction, the pragmatic approach must be taken with both chlorhexidine-alcohol skin preparation and iodised drapes utilised.

Clinical guidelines are useful resources for clinicians, but for them to remain useful and credible there must be a system for regular review and updating. Alongside the review process, a robust audit cycle must also be in place. For all of this to happen, it is essential that clinical guidelines are managed and policed by a designated MD steering group.

Conclusion

The NICE (2008) clinical guideline 74 on the prevention and treatment of SSIs is a welcome guideline into clinical practice. This guideline highlights gaps in the evidence, which offer exciting challenges to wound care clinicians who should take the lead in carrying out the research needed to base their practice on evidence. The gaps identified in this paper are not only about wound management issues, but also around SSI rates. There are several issues around SSI prevention, for example, what exactly is the rate of SSIs for individual specialist surgical areas?

In the author's opinion, there needs to be a discussion around international consensus on continuous surveillance, and which SSI definition scheme is adopted. The aim of continuous SSI surveillance is to identify clearly SSI risk factors, and ultimately reduce the rates of SSI.

Finally, for clinical guidelines to be effective and credible, they need to be managed, preferably by an MD team that can review regularly and ensure the audit cycle takes place. **WUK**

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