Commentary

Perioperative hypothermia: turning up the heat on the conversation

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Consistent through my time in general and specialty surgery, significant efforts are routinely taken to protect against intraoperative hypothermia. Generally hypothermia has been viewed as an easily preventable factor with a diverse range of adverse outcomes. Albeit considered "common knowledge", the severity of these adverse effects was debatable and the conditions under which they occurred were poorly defined.

The importance of maintaining perioperative normothermia has been emphasized in the World Health Organization (WHO) 'Guidelines for Safe Surgery 2009', as a mechanism by which surgical site infections (SSI) can be reduced.

A randomized controlled trial by Kurz *et al*. (1), has been pivotal in informing the WHO's guidelines (2). This study (n~200), published in *the New England Journal of Medicine* in 1996, investigated the consequences of intraoperative hypothermia on a number of outcome measures. Kurz and colleagues discovered approximately 3 times as many SSIs in the hypothermic group (mean temperature 34.7 ℃) as the control (mean temperature 36.6 ℃). Additionally hypothermia was found to increase vasoconstriction, delay suture removal and increase length of hospital stay.

Recently, in the June 2015 issue of *JAMA Surgery*, a study by Baucom and colleagues (3) sought to review current thinking surrounding intraoperative hypothermia. They assessed how intraoperative hypothermia impacts rates of 30-day SSIs. This retrospective study looked at 868 patients who had undergone segmental colectomies (laparoscopic and open) over a period of 5 years (1 Jan, 2005 to 31 Dec, 2009). Strict criteria were employed to exclude non-elective operations, procedures complicated by postoperative stoma and patients with inflammatory bowel disease. Eventually, 296 (34%) were assessed in the study. Their work concluded that patients who sustained a period of intraoperative hypothermia were no more likely to develop an SSI than those who were normothermic.

Although both studies had similar overall rates of SSI (~12%), there are important differences in the conditions under which patients were assessed. While only patients in the normothermic group in the study by Kurz *et al*. were warmed intraoperatively, all patients in the study by Baucom *et al*. underwent active warming as per routine practice. This reflects an important change in practice as the studies enrolled patients who were treated over a decade apart. It should be noted that the practice of intraoperative warming is now routine and expected in many institutions today. As a result of this practice, it is inevitable that the spread of temperatures among participants would be limited. In fact, in the latter study, approximately 93% of patients achieved the Agency for Healthcare Research and Quality (AHRQ) metric for normothermia, with a final intraoperative temperature of 36 ℃ or greater. Additionally, as an average across all patients, only ~50% of the intraoperative time was spent with a core temperature less than 36 ℃.

Baucom and colleagues went further to investigate various definitions of hypothermia, including temperature nadir, mean intraoperative temperature, percent of time spent at nadir, and percent of time spent hypothermic. I believe that this approach is very useful because intraoperative hypothermia can be, and is often, interpreted in many different ways. However, none of these definitions yielded any significant increase in the rates of SSI.

Dimensions of time and severity are both vital in understanding the consequences of perioperative hypothermia. It is well known that hypothermia can exist at different levels of severity beyond the operative period (4,5). Dividing the patient cohort by severity may reveal that SSI becomes more significant at severe degrees of hypothermia.

This would, however, require a larger sample of patients to study.

So how does all of this affect our everyday practice? Before we make any conclusions, we must remind ourselves that perioperative hypothermia has many consequences that extend beyond SSI. Prolonged hypothermia exerts additional physiologic stress upon the body and can have negative implications on a patient's health outcomes through increased anaesthetic risk, cardiovascular morbidity and coagulation disturbance (6-8).

While I cannot dismiss the correlation of perioperative hypothermia to SSIs based on this study, it certainly makes me question the relevance of intraoperative hypothermia as a contributor to SSI in today's environment. Perhaps, intraoperative active warming that we routinely implement is sufficient in order to prevent increased rates of SSI. If this truly is the case, we must turn our attention to addressing other factors in the perioperative environment that may affect SSI.

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Footnote

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