Cement burn of the skin during hip replacement

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ABSTRACT

We present the first reported case of a partial thickness burn to the skin from discarded bone cement during a routine total hip replacement (THR). The patient required plastic surgical attention for 5 months before the skin was healed. We summarise the reported incidents of cement burns to various other structures and the circumstances in which these injuries can potentially occur.

KEYWORDS

Cement – Burn – Skin – Hip replacement

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A 63-year-old female was admitted for elective total hip replacement (THR) for osteoarthritis of her right hip. She underwent hybrid fixation with an uncemented Harris Galante cup (Zimmer; Warsaw, IN, USA) and a cemented CPT stem (Zimmer), using Palacos R cement (Biomet; Warsaw, IN, USA) through a posterior approach. During cementing of the femoral component, discarded excess cement came into contact with the patient's skin for several minutes during the exothermic phase of polymerisation. This resulted in partial thickness burns to both her right

lower leg and her right popliteal fossa. The presence of these burns was not noticed until the end of the surgery. Postoperatively, the patient complained of severe pain in the affected areas, requiring opiate and NSAID analgesia. The larger of the two deep dermal defects measured 2 cm x 3 cm. Initial treatment consisted of hydrocolloid dressings, followed by regular dressing changes, which continued in the community following the patient's discharge on the fifth postoperative day. A plastic surgical opinion was sought, who felt that a non-operative approach should be followed. The wounds progressively reduced in size, and were healed by 20 weeks after the injury. The area of scar tissue remained hypersensitive for the following 6 months, eventually resolving with simple massage. Although relieved, the patient was left with significant concerns regarding the cosmetic appearances of her lower limbs. She is delighted with the result of her THR.

Discussion

The exothermic phase of bone cement polymerisation liberates as much as 13 kcal (55 kJ) per 100 g,¹ and the temperature can reach over 100°C in the laboratory.^{2,5} However, the rate of setting, the volume of cement, the time of contact and the thermal properties of the surrounding structures all potentially influence the actual peak temperature that is reached.⁴ *In vivo*, most of the heat is dissipated to the surrounding tissues and implants so that the temperature probably only reaches about 40°C (range, 38–56°C),^{4–6} and cement mantles are typically only 2–3 mm thick. Cell injury from heat is also time dependent: 5 s at

Figure 1 Cement discarded from routine THR.

60°C, 30 s at 55°C, and 5 min at 50°C. Hence, the potential for thermal damage is unlikely during standard THR;^{5,6} however, it does exist and has been implicated as a potential factor in aseptic loosening by some authors.²

Larger volumes of cement, not normally encountered in standard THR, can reach much more dangerous temperatures. Meyer *et al.*⁷ showed that the surface temperature of setting cement varied with setting time and thickness of cement, with a 10 mm specimen reaching 107°C at room temperature (25°C). A larger piece of cement can, therefore, cause severe burns to structures in direct contact. We measured the maximum thickness of discarded cement during routine primary THR at our institution (Fig. 1) and found that an average of 5 pieces of cement per THR were at least 10 mm thick. Hence, there is considerable potential for skin burns to occur if these are not diligently discarded.

In the literature, burns from bone cement to the sciatic nerve,⁸ femoral nerve,¹ obturator nerve,⁹ intrapelvic vasculature,¹⁰ and ureter¹¹ have been described, but the present report is the first description of a skin burn by this mechanism.

Conclusion

Care should be taken to discard excess cement carefully in order to prevent this potentially common complication.

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