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CASE REPORT

Explosion of Fixion[®] humeral nail during cremation: Novel “complication” with a novel implant

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Introduction

New technology may lead to unexpected complications. We have been using a novel nail to treat pathological humeral fractures. The Fixion[®] (DicO-Tech, Tel Aviv, Israel) nail can be inserted through a small incision with a deltoid splitting approach, and in middle to distal third fractures, locking is achieved by expanding the nail without locking screws. The procedure is therefore, quick, and is excellent for palliation. However, using this device we have experienced an unexpected “complication” (Fig. 1).

Case report

A 79-year-old man presented with worsening back pain diagnosed as an osteoporotic vertebral collapse at T12. For the previous 2 weeks his mobility had been declining with generalised limb weakness. He had reported 5–10 kg of weight loss over the previous year. He had signs of clonus in the left leg and an upgoing plantar on the same side indicating possible early cord compression. The patient was started on dexamethasone and an urgent MRI requested which demonstrated multi-

ple vertebral lesions and cord impingement at T12. Vertebral biopsy indicated a probable lymphoma, but a diagnosis of non-secretory metastatic myeloma was made on clinical grounds. The patient also complained of severe left shoulder pain and a lytic lesion was identified in the proximal humerus. Unfortunately the patient sustained a pathological fracture at this site 2 weeks into his admission. This was successfully treated using the Fixion nail, but the patient died 2 weeks post-operatively.

The patient was certified arrangements were made for him to be cremated. The nail was noted but not removed, as it was not normal practice. At the crematorium, one of the staff was overseeing the firing of the oven through a transparent observation port when the coffin exploded. This was felt and heard by other staff elsewhere in the building. Extensive damage was caused to the oven, and considerable distress to the staff. It transpired that the cause of the explosion was the humeral nail.

Discussion

The Fixion nail is an intramedullary (IM) device that is “locked” in place hydraulically. It comprises four external longitudinal bars connected by four

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Figure 1 On the left is an intact Fixion[®] nail inflated and on the right the exploded nail (proximal half) recovered from furnace.

thin membranes and is inflated via a unidirectional valve using saline.^{2–4} It is introduced into the bone in the deflated state and inflated to a pressure of 70 bar.³ Once inflated the resultant press fit with the endosteum ensures no further rotation or displacement of the fracture can occur.³ Pressure can be distributed evenly throughout the entire length of the nail, thus preventing localised forces that would be generated by conventional screws used in interlocking nails.² This method of locking is particularly beneficial for bones that have sustained a pathological fracture. It is recommended by the manufacturers that after inflation the pressure is released.

Modern cremators operate at a temperature of between 800 and 1000 °C and once the coffin is committed the temperature rises quickly to this level.⁵ In the UK crematorium regulations insist that coffin fittings should be made of a combustible material with handles and nameplates being made of hard plastic. The Fixion nail, when in situ, represents a metal container filled with saline. The sudden increase in temperature of the cremator caused this nail to explode with repercussions being felt throughout the building and damage occurring to its interior.

It is already well known that pacemakers may explode when subjected to the extreme environment of a cremator.¹ Hospital cremation forms specifically question the doctor filling them out about whether pacemakers have been fitted, and subsequently removed. However, there is no comprehensive list of other materials that may be surgically introduced in vivo and become potentially hazardous after death.

Eleven Fixion nails have been used for palliation in pathological humeral lesions at our hospital over the last year. We are aware of a second nail that has exploded during cremation. We now remove the nail in our mortuary prior to release to the crematorium. Patients and their relatives, as well as medical staff, need to be aware of this problem.

References

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