CARDIAC ARREST DURING NAILING

Sir,
We read with interest the brief report in your November 1993 issue by Kerr, Jackson and Atkins on ‘Cardiac arrest during intramedullary nailing for femoral metastases’ (1993; 75-B:972-3).

In our series of 52 reconstruction nailings we have had one death in a patient with metastatic sarcoma who had bilateral closed femoral nailing under one anaesthetic. The first nailing was uneventful but towards the end of the second procedure the patient became hypotensive and subsequently had a cardiac arrest in the recovery room. Post-mortem revealed widespread metastatic disease and a pulmonary embolus.

We have now modified our technique for such cases, and have performed five bilateral reconstruction nailings for tumour using Russell-Taylor Delta unreamed reconstruction nails (Smith and Nephew Richards, Cambridge, UK). Minimal hand reaming precedes slow insertion of the unreamed nail. Bilateral surgery is separated by a two-week interval.

This method has shown no cardiopulmonary complications; we recommend it as an alternative to the use of a vent or a reamed reconstruction nail.

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LOOSENING AND MIGRATION OF EXETER THR

Sir,
We would like to comment on the paper in your November 1993 issue by Rockbom and Olsson entitled ‘Loosening and bone resorption in Exeter hip arthroplasties’ (1993; 75-B:865-8).

First, we must emphasise that the matt-surfaced Exeter femoral component was taken out of use in 1986, because it became obvious between 1980 and 1985 that its performance was greatly inferior to that of the original polished Exeter stem used until 1975 (Fowler et al 1988).

The original polished stems, manufactured from ENS8J stainless steel, now have a follow-up of 23 years, have rarely required revision for aseptic loosening, and have been associated with benign radiological appearances (Timperley et al 1993). They were, however, not strong enough for heavier and more active patients, and stem fractures have occurred in 3.0% (to date). The Exeter stem introduced in 1976 addressed this problem by extending the range of stem sizes, with a slight increase in AP section. For no good reason other than it had by 1976 become the fashion among manufacturers, the stem surface was changed from polished to matt. This proved to be a profoundly retrograde step, but its recognition unfortunately took some years. Rockbom and Olsson criticise the introduction of the matt stem as it ‘was not preceded by biomechanical analysis or by testing’. The introduction of the original polished Exeter stem in 1970 was preceded by a series of comparative loading tests performed in the School of Engineering of the University of Exeter. The stem was, at the time, a radical design and preliminary static loading tests showed that it was as capable as any other contemporary design of transmitting load into the femur. No biomechanical tests existed then, or exist now, that would have identified the reasons for the higher failure rate from loosening of the matt as opposed to the polished versions of this stem.

We know now that there are two basic reasons: the matt surface produces debris by fretting against the inside of the cement mantle (Anthony et al 1990; Hale et al 1990; Lee et al 1993), and it has an adverse effect on load transmission, producing a relative increase in shear and a relative reduction in compression (Miles, Clift and Bannister 1990) by comparison with the polished surface. Subsidence of matt-surfaced Exeter stems nearly always carries the cement with the stem, thus compromising the cement-bone interface. By contrast, the polished version always subsides within the cement mantle. This corresponds to the engagement of the stem taper (Timperley et al 1993), which is necessary for load transmission by this type of stem. Such subsidence does not adversely affect the cement-bone interface.

The combination of an incomplete cement mantle, usually due to oversizing the stem, and debris production by fretting of the matt surface against the inside of the cement may have serious consequences (Anthony et al 1990). These are greatly magnified by defective cement technique, and particularly by the inappropriate use of reduced viscosity cement.

The Swedish multicentre study (Malchau, Herberts and Ahnfelt 1993) has confirmed the difference that we have observed between the matt- and polished-surfaced Exeter stems, and Dall et al (1993) have reported a striking difference between the aseptic loosening rates of the polished Charnley ‘flatback’ stem and the subsequent generations of Charnley stems, all of which have had a matt surface. Excellent long-term results were reported by Schulte et al (1993) with the polished Charnley ‘flatback’. Stem surface finish and debris production may prove to be much more important than has hitherto been recognised.

Finally, the shape of the Exeter stem was originally adopted as being the most appropriate for the extrusion of cement into the endosteal bone of the femur during insertion. The ‘Exeter concept’ evolved from the continuing study, over years, of the behaviour of the polished Exeter stem, coupled with laboratory work on the time-dependent properties of acrylic cement (Lee, Perkins and Ling 1990). It is in one sense serendipitous, and does not apply to matt-surfaced Exeter stems.

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Authors’ reply:

Sir,

We agree with Hashemi-Nejad, Manktelow and Eastwood that the Harris classification of radiographic loosening is not adequate for the assessment of Exeter arthroplasties where distal migration of the stem within an intact cement mantle is accepted.

There is, however, no agreement regarding this mechanism. We therefore used two assessment methods (Table 1): the method of Harris, which presents a ‘worst case’ scenario, and also a method which we have used in previous medium-term studies of THR, referred to in our article. This separates hips with pure distal migration into a separate ‘suspected loosening’ group, and thus allows different interpretations with respect to the specific behaviour of the Exeter stem.

In all 15 hips with ‘definite loosening’ according to our classification, there was migration of both stem and cement and resorption of bone adjacent to the cement. This made it obvious that cement-bone fixation had failed by any definition.

The distinction of pure subsidence of the stem within the cement, in contrast to other types of change in position, may be inadequate for the specific stem design used in our series. The matt surface and the distal metal centraliser both interfere with the potential for distal migration of the stem within the intact cement mantle.

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MRI OF AVASCULAR NECROSIS

Sir,

I read with interest the article in your May 1993 issue by Fordyce and Solomon entitled ‘Early detection of avascular necrosis of the femoral head by MRI’ (1993; 75-B:365-7) which reported that some patients showed spontaneous resolution. This has been described in a larger series of patients by Kopecky et al (1991); they detected evidence of AVN in 25 hips of 14 patients and seven hips had shown spontaneous resolution by 16 months.

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SURVIVAL ANALYSIS

Sir,

We read with interest the article in the September 1993 issue by Murray et al entitled ‘Survival analysis of joint replacements’ (1993; 75-B:697-704). The authors correctly identify the pitfalls of this type of analysis and make recommendations as to how they may be avoided. What disheartened us was their oversight in not including our study on ‘Survivorship of cemented knee replacements’ which was published in the Journal of Bone and Joint Surgery in 1989. We reported 1430 primary total knee replacements over a 15-year period and came to conclusions which were similar to those of Murray et al.