BRIEF REPORTS

THREE-DIMENSIONAL CT IMAGING IN HIP DYSPLASIA

P. A. BUTLER-MANUEL, R. L. GUY, D. A. REYNOLDS

Careful patient selection, based on accurate clinical and radiological assessment, has been shown to be important in achieving good results from pelvic osteotomies in adult hip dysplasia (Reynolds 1986). We report on the use of three-dimensional computed tomographic reconstruction (3-D CT), which provides the surgeon with important anatomical detail not readily obtainable from conventional radiographs.

Technique. The patients are scanned in the supine position using a Siemens Somatom DR H scanner. A 4 mm contiguous axial scan is made through the hip region using a low (210) mAs technique to minimise the radiation dose (Gholkar et al 1988). Three-dimensional images are then reconstructed around the mid-sagittal x-axis, the mid-coronal y-axis and the longitudinal z-axis by the scanner's own computer utilising a surface imaging technique (Marsh and Vannier 1983; Herman 1988).

Case report. A 32-year-old woman had first presented aged three years with bilateral congenital dislocation of the hip. She was treated by closed reduction followed by abduction splintage for two-and-a-half years. She remained pain free until the age of 29 years, when she began to complain of increasing pain from the right hip. She had a nearly full range of movement of both hips although there was a positive Trendelenburg sign on the right. The pre-operative 3-D CT images of the right hip (Figs 1a and b) demonstrate the full extent of the deficiency of the acetabular roof. Only the posteromedial quadrant of the head is adequately covered. The shape of the femoral head is abnormal with a large anterolateral prominence.

A Chiari medial displacement pelvic osteotomy was then performed which has given a satisfactory early result. The postoperative 3-D CT images (Figs 2a and b) show the improvement in the anterior as well as the

superolateral cover. The site and the line of the osteotomy are also clearly demonstrated.

Discussion. Although careful consideration of the plain radiographs gives some impression of three-dimensional acetabular cover, this information is incomplete. By reconstructing images in any chosen plane, 3-D CT enables all aspects of acetabular cover to be clearly demonstrated. This technique has also led to better assessment of the amount of displacement likely to be achieved at surgery by demonstrating the thickness of ilium available to create a shelf (Fig. 1b). In a dysplastic hip where there has been proximal migration, the thickness of the ilium just proximal to the femoral head may appear misleadingly substantial on the anteroposterior radiograph. This is because the iliac wing is seen *en face* rather than in profile.

Three-dimensional CT is also valuable in assessing the 3-D effect of a Chiari osteotomy on pelvic relation-

Fig. 1a

Fig. 1b

Fig. 2a

Fig. 2b

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ships. It shows how the distal fragment is displaced posteriorly as well as medially (Benson and Jamieson Evans 1976). The line of the osteotomy and the improvement in acetabular cover are also far better demonstrated than by simple radiographs. We find that the additional information provided by 3-D CT justifies its cost and that its use improves pre- and postoperative evaluation of these difficult cases.

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EXTREME THROMBOCYTOSIS AFTER ORTHOPAEDIC SURGERY

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An elevated platelet count (thrombocytosis) has long been known to occur after surgery. Extreme thrombocytosis, however, usually regarded as a platelet count over 900 000/mm³, which may be life-threatening, has so far been reported only after splenectomy (Williams and Warren 1957). We describe its occurrence after orthopaedic surgery.

Materials and methods. Platelet counts were obtained prospectively for 206 consecutive patients in the Spaulding Rehabilitation Hospital, Boston, between May 1987 and July 1988, following recent fracture or orthopaedic surgery. There were 49 men and 157 women with a mean age of 76 years (range 22 to 104); 124 patients had femoral neck fractures and 43 had other fractures; 39 had had elective replacement of the hip or knee.

Results. Figure 1 shows the distribution of highest platelet counts: the peak occurred at 400 to 450 000/mm³ (normal range 150 to 400 000/mm³). Seven patients had platelet counts over 900 000/mm³; three were men and four women with a mean age of 65.8 years, younger than the rest of the patients ($p < 0.01$). Six of these seven patients had had operations for hip fractures, and one had had a Girdlestone arthroplasty for an infected hip replacement. Four patients were admitted alcohol abusers, and two were suspected of alcohol abuse. One other patient developed acute diverticulitis and was transferred to an

Fig. 1

acute care hospital; the rest were discharged electively. One patient developed a wound haematoma. There were no clinically apparent thromboses, but four patients received anti-platelet drugs and one was on Warfarin.

The mean platelet counts for the major surgical groups and a group of 17 patients who did not have surgery were: total knee replacement (11 patients) 553 000 ± 163 000/mm³; subcapital hip fracture (56 patients) 512 000 ± 216 000/mm³; total hip replacement (28 patients) 511 000 ± 158 000/mm³; intertrochanteric hip fracture (68 patients) 474 000 ± 205 000/mm³; no surgery (17 patients) 379 000 ± 165 000/mm³. The differences between each surgical group and the no surgery group are significant ($p < 0.05$); the differences between the surgical groups are not significant.

Serial platelet counts to determine a peak count were obtained for 31 patients; the peaks occurred from nine to 22 days (mean 14 ± 3.0) following injury or surgery. For 18 patients the counts were followed until they

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