NONUNION OF INTERTROCHANTERIC FRACTURES OF THE FEMUR

TREATMENT BY MODIFIED MEDIAL DISPLACEMENT AND VALGUS OSTEOTOMY

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Nonunion of intertrochanteric fractures is uncommon but its effects are disabling. We describe a modification of the medial displacement and valgus osteotomy of Dimon and Hughston (1967) which we used in seven fractures, six of which united within 16 weeks. Postoperatively, hip function was good. The method provides good initial stability, a source of cancellous bone graft, good postoperative hip abductor function and reliable healing of the nonunion without the need for intraoperative imaging.

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Intertrochanteric fractures of the femur are among the commonest of major bone injuries. Nonunion is uncommon, but gives rise to severe disability. We present our experience in the treatment of nonunion by medial displacement and valgus osteotomy.

PATIENTS AND METHODS

Seven patients with established nonunion of an intertrochanteric fracture were treated at our hospitals between February 1991 and November 1992. There were six men and one woman, with an average age of 55.5 years (23 to 60) (Table 1).

A diagnosis of nonunion was made if, at least 15 weeks after the fracture, there was radiological evidence of a fracture line with either no callus (atrophic) or with callus which did not bridge the fracture site (hypertrophic) and mobility of the fragments on examination under image intensification.

All patients underwent a femoral osteotomy to achieve medial displacement of the shaft of the femur and a valgus position of the proximal fragment. The procedure was carried out on an ordinary operating table without image intensification or radiographic control.

The patient is placed supine with a sandbag under the ipsilateral buttoc. The anterolateral approach, as described by Watson-Jones, is used to expose the fracture site and the hip capsule. Osteotomy of the greater trochanter is done in two steps: the first separates a portion of the trochanter with the hip abductors attached; the second is sited 1.5 to 2.0 cm below the first at the level of lesser trochanter (Fig. 1). After removing the intermediate segment of the trochanter, the site of the nonunion can be directly visualised and fibrous tissue excised from between the fracture fragments.

A T-shaped capsulotomy exposes the inferior, anterior and superior surfaces of the femoral neck and a rim of the femoral head below the labrum acetabulare. Retractors maintain this view while a 130° angled blade plate is introduced under direct vision into the centre of the fractured surface of the proximal fragment, going into the inferior part of the femoral head (Fig. 2). Using the plate as a lever, and adducting the thigh, the calcar of the proximal fragment is wedged into the medullary canal of the distal fragment. The side plate is brought into contact with the lateral cortex of the femur and fixed with screws. Bone grafts taken from the excised wedge of the greater trochanter are placed around the osteotomy site, especially medially. The proximal trochanteric fragment with the abductors is reattached over the angle of the plate, using 18-gauge stainless-steel wire in a figure-of-eight, tension-band configuration (Fig. 3).

RESULTS

In six patients the fractures united satisfactorily (Fig. 4). The remaining patient had reactivation of a deep infection and the nonunion persisted. The implant was removed and antibiotic-impregnated cement beads were implanted. The patient later underwent a successful total hip arthroplasty.

All patients were allowed to walk with crutches within 48 hours of operation, bearing as much weight as pain

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would allow. Four patients were discharged from hospital within five days. At three weeks, all patients could actively abduct the lower limb to 20°.

The average time to clinical and radiological union (excluding the failure) was 13 weeks (10 to 16). By the tenth postoperative week four patients were able to return to light work, involving desk jobs and no manual labour.

At 16 weeks the six successful hips had flexion to more than 90° and abduction to more than 30°. All the patients could sit cross-legged on the floor, a movement which requires abduction and external rotation in flexion; this is an important social and religious requirement in India.

Follow-up has varied from 12 months to 36 months and is ongoing. No patient has suffered avascular necrosis of the head of the femur and no knee problems have developed. The length of the operated limbs varies from +1 cm to -2 cm compared with the normal side and no patient has required modified footwear. The position of rotation at rest
was within 15° of the position of the opposite limb (with a tendency to relative internal rotation).

DISCUSSION

Dimon and Hughston (1967) originally designed their medial displacement and valgus osteotomy for the primary treatment of unstable intertrochanteric fractures. Their method and that described by Sarmiento and Williams (1970) have been used by previous authors to treat nonunion with varying results. Ballmer et al. (1992) reported success in six of ten patients at the first attempt, but Mariani and Rand (1987) described the need for repeated internal fixation using various implants and methods with an eventual success rate of 82% at six months. The implants used have included angled blade plates, compression screws and side plates, intramedullary nails, and external fixators.

Our modification of the method of Dimon and Hughston has several advantages. The trochanteric wedge is a rich source of bone graft. This contributed to healing as most of our patients had atrophic nonunion. The osteotomy diminishes the lengthening of the femur that results from valgus positioning of the head. It also exposes the site of the nonunion and allows effective clearance of fibrous tissue. The trochanteric fragment with the abductors attached is wired back into place with some distal displacement. In the original procedure the trochanter was allowed to fall into place. Distal reattachment allows effective abduction and resulted in a nearly normal gait in the postoperative period. Prominence of the trochanter is avoided, a problem which we experienced when we reattached the entire trochanter. Our method makes it unnecessary to use image intensification, a costly technique which is often not available in developing countries. The fixed-angle blade plate which we use costs six times less than a compression screw and has proved effective in this situation.

Possible drawbacks to the method include the risk of avascular necrosis of the head of femur, the technical difficulty of later conversion to total hip arthroplasty and the risk of lateral compartment arthritis in the knee due to medial displacement of the femur. Our patients have not yet had any of these problems.

Five out of our seven patients had Tronzo (1973) type-4 fractures (with a large posteromedial fragment). The distal fragment had to be rotated internally or externally to provide an intact medial buttress and to prevent the calcar from slipping out medially. This resulted in the external or internal rotational deformities recorded. None of our patients, however, noticed or complained about this. Our results convince us that the modified method of medial displacement and valgus osteotomy is an effective way of treating nonunion of intertrochanteric fractures.

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REFERENCES


