Self-compressive osteotomy of the greater trochanter

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Accepted: 12 July 1996

Summary. *We have designed a dihedral osteotomy of the greater trochanter which is V-shaped with the apex infero-medially. A single screw is used for fixation. The osteotomy was used in 24 hips (23 patients), as part of a transtrochanteric approach for acetabular reconstruction, carried out for dysplasia or in complicated acetabular fractures. There were no cases of nonunion or painful bursitis at an average follow up of 20 months. The method provides a stable reduction and bony union because of the self-compressive effect of the abductor muscles.*

Résumé. *Nous présentons une nouvelle ostéotomie à angle dièdre du grand trochanter, qui est une ostéotomie en V avec l'apex en situation médiale. La fixation trochantérienne fut effectuée avec une vis unique. Une approche transtrochantérienne utilisant cette méthode fut employée pour une reconstruction acétabulaire sur 24 hanches consécutives de 23 patients qui souffraient d'une dysplasie résiduelle des hanches ou d'une fracture acétabulaire compliquée. Durant la surveillance d'une moyenne de 20 mois (12 à 33), il n'y eu pas de désunion ou de bursite douloureuse. Cette méthode facilite à la fois une réduction solide et la coaptation osseuse grâce à l'effet auto-compressif des muscles abducteurs.*

Introduction

Osteotomy of the greater trochanter provides an excellent exposure of the hip joint, but is associated with an appreciable incidence of nonunion. Weakness of the abductor muscles caused by separation or migration of the trochanteric fragment may produce a Trendelenberg gait with increasing disability [1, 6]. Painful trochanteric bursitis is another problem associated with breakage of wires used for fixation [3, 7].

We have designed a new type of dihedral osteotomy to overcome these difficulties and this paper reports the results.

Patients and methods

The osteotomy was used as part of a modified Ollier's approach in 24 hips in 23 patients between April 1993 and January 1995. Twenty hips in 19 patients had residual dysplasia of the hip being treated by a transposition osteotomy of the acetabulum [5]. The remaining 4 patients underwent open reduction for complex acetabular fractures caused by road traffic accidents.

There were 5 men and 18 women with a mean age at operation of 41 years (range 18 to 54 years).

Operative technique

The patient is placed on the side with the affected hip uppermost. The modified Ollier approach is used for wide exposure of the acetabulum [5, 8]. The greater trochanter is exposed, and the external rotators and the tendon of piriformis muscle are divided at their insertion into the proximal femur. The vastus lateralis is detached subperiosteally from the femur for 1 cm distal to the abductor tubercle. The osteotomy is carried out in two stages with a side-cutting reciprocating power saw and is started distal to the abductor tubercle. The first osteotomy is an oblique cut from distal to proximal towards the femoral head and stopped on the way from the tubercle to the inter-

Fig. 1. Diagram showing the V-shaped osteotomy of the greater trochanter. The first cut is made obliquely from distal to proximal. The second is vertical from proximal to distal from the tip of the trochanter until it meets the first cut

trochanteric crest (Fig. 1). The blade of the saw is then inserted between the capsule of the hip joint and the tendons of the abductor muscles. The second osteotomy is a vertical cut from proximal to distal until it reaches the first cut. The V-shaped osteotomy is completed with its apex medially and the trochanteric fragment is then retracted proximally. When the operation on the acetabulum is completed, the trochanter is reduced to its original position and fixed with a single screw.

Results

It took only a few minutes to carry out the osteotomy in most cases, and reduction and fixation was easy to perform. Neither the operating time nor blood loss was increased. The oblique os-

teotomy line was always visible in the post-operative radiograph, but the vertical line was difficult to identify at 6 months after operation.

The average follow-up was 20 months (range 12 to 33 months). All the patients had radiographic evidence of bony union at 6 months (Fig. 2). There were no cases of trochanteric bursitis.

Discussion

In the conventional single plane osteotomy, the trochanteric cut is parallel to the direction of abductor pull, and displacement of the osteotomy site is likely during muscle contraction.

The force exerted by the abductor muscles has transverse and longitudinal components. The transverse compresses and stabilises the vertical plane of our osteotomy, which makes anatomical reduction and bony union easier. This is supported by the disappearance of the vertical osteotomy line in postoperative radiographs.

An adequate blood supply to the site of the osteotomy must be preserved to achieve bony union. The greater trochanter receives its major blood supply from the extraosseous gluteal vessels, and there is a line of demarcation with few anastomoses between the trochanteric and the diaphyseal vessels [2, 4]. This line runs along the closed epiphyseal plate which is usually the plane of standard osteotomies and this could be a reason for the incidence of nonunion. Another advantage of our method is the promotion of revascularisation

Fig. 2. a Radiograph of a woman, 18 years of age, who had symptoms from dysplasia of the right hip. There is slight narrowing of the apparent joint space. **b** She has no pain and bony union is present 6 months after osteotomy of the greater trochanter and fixation with a single screw

because the section extends across the vascular demarcation line.

In other dihedral osteotomies, the anterior and posterior cuts are made obliquely so that a ridge is formed on the trochanteric bed [9, 10]. Both planes are parallel to the direction of the abductor pull and are close to the vascular demarcation line. Further, the fragment is potentially weak and may fracture because the groove is made in its long axis, and is much smaller than in our method. Complicated wiring for fixation is another disadvantage of conventional methods.

In our dihedral technique the bony surface are is increased and fixation is simple with a single screw. Stable fixation and early union is achieved by the self-compressive effect of the abductor muscles.

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