Non-ununion following bilateral simultaneous Ganz trochanteric osteotomy

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Abstract

Between January 2003 and December 2004, 13 patients underwent bilateral resurfacing arthroplasty via a Ganz trochanteric osteotomy. This bilateral group was mobilised fully weight-bearing with crutches. During the same period 139 Ganz trochanteric osteotomies were performed for unilateral hip resurfacing. These patients were mobilised with crutches, weight-bearing up to 10 kg on the operated leg. Nine osteotomies (32%) in the bilateral group subsequently developed a symptomatic non-union requiring revision of fixation. This compares with 10 patients (7%) in the unilateral group. Applying the Fisher’s exact test, the difference reached significance (P=0.0004). In two patients a second revision was required to achieve union. In one patient, revision of trochanteric fixation precipitated a deep infection. Protected weight-bearing following a Ganz trochanteric osteotomy is important to the success of the procedure. Simultaneous bilateral hip arthroplasty through a Ganz approach should be avoided. If it is undertaken, we recommend that patients should be non-weight-bearing for 6 weeks following surgery. Non-union following a Ganz trochanteric osteotomy for arthroplasty carries a significant morbidity.

Introduction

The trochanteric flip osteotomy was popularised by Ganz in 2001. It provides a safe and reliable approach for hip dislocation without injury to the blood supply of the femoral head and neck. This makes it an attractive approach for hip resurfacing although the benefits remain unproven.

Non-union following a trochanteric flip is a recognised complication. To minimise this risk, weight bearing on the operated side is restricted post-operatively, typically for 6-8 weeks. Early in our experience with this approach, it was used to perform a number of simultaneous bilateral femoral resurfacings. For practical reasons, these patients were allowed to bear weight fully on both legs post-operatively. We report the outcome in this cohort of patients.

Materials and Methods

This was a retrospective cohort study of patients undergoing resurfacing arthroplasty of the hip between January 2003 and December 2004 via a trochanteric flip osteotomy. Bilateral simultaneous resurfacing was performed in 13 patients who were mobilised fully weight bearing with crutches. Obese patients were not considered for a bilateral procedure.

During the same period 139 patients underwent unilateral resurfacing arthroplasty. These patients were mobilised with crutches, weight-bearing up to 10 kg on the operated leg while walking. In this unilateral group, patients were also allowed to stand unsupported provided their weight was distributed equally between both lower limbs. Surgery was performed at 3 hospitals in our region by 2 experienced hip surgeons carrying out an excess of 200 hip arthroplasties per year. The implants were Corret 2000 metal on metal resurfacing components manufactured by Corin (Corin Medical, Cirencester, UK). All the acetabular components were hydroxyapatite backed and uncemented. The mean acetabular component size was 56 mm in both groups. Of the resurfacing heads, 75% in the bilateral group and 49% in the unilateral group were cemented. The remainder were hydroxyapatite backed and uncemented. Trochanteric fixation was with fully threaded (bi)cortical screws.

Results

Nine osteotomies (32%) in the bilateral group subsequently developed a symptomatic non-union requiring revision of fixation (Figure 1). This compares with 10 patients (7%) in the unilateral group. Applying Fisher’s exact test, the difference reached significance (P=0.0004). In 2 patients a second revision was required to achieve union. In 1 patient, revision of trochanteric fixation precipitated a deep infection. These results are summarized in Table 1.

![Figure 1. Radiograph showing bilateral trochanteric non-union.](image)

Table 1. Patient data and results.

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<th>Non union</th>
<th>Mean age (range)</th>
<th>Male (%)</th>
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<tbody>
<tr>
<td>Bilateral osteotomy</td>
<td>13</td>
<td>9 (32%)</td>
<td>56 (48-66)</td>
<td>64</td>
</tr>
<tr>
<td>Unilateral osteotomy</td>
<td>139</td>
<td>10 (7%)</td>
<td>56 (24-68)</td>
<td>68</td>
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</tbody>
</table>

Discussion

Use of the Ganz trochanteric flip approach for resurfacing arthroplasty is justified by its preservation of the blood supply to the femoral head. Perfusion of the femoral head neck junction during resurfacing has been shown to be significantly better preserved during a trochanteric flip as compared to a posterior approach. Where resurfacing is carried out through a posterior approach, significant neck thinning (>10%) has been identified in up to 27% of patients, although the significance of this remains unclear. Neck fracture is reported to be the most common indication for revision following a posterior approach at 2%. In our institution following resurfacing via a Ganz trochanteric flip, the incidence of significant neck thinning is 1.5% and the neck fracture rate is 0.4% (unpublished data). Lower rates of...
neck thinning and fracture following a Ganz osteotomy, are likely to be a result of the preservation of the medial femoral circumflex artery during this approach. The anterolateral approach to the hip may also preserve head blood supply but impairs abductor function. The trochanteric flip approach is not exempt from complications however, the most common of which is non-union. Gluteus medius remains attached to the osteotomised trochanteric fragment. It is a powerful muscle, with its more vertical lateral fibres active in maintaining the height of the contralateral hip, during the stance phase of the gait cycle. During the same phase of the gait cycle, its more anterior and horizontal fibres are active in rotating the pelvis to bring the contralateral leg forward. This explains the observation that if the osteotomy displaces, it tends to displace antero-superiorly. To avoid disruption of the osteotomy fixation and subsequent non-union, patients’ weight-bearing is restricted postoperatively. Our experience with bilateral trochanteric flips reinforces this need to limit abductor activity by preventing single stance weight-bearing on the operated limb. While the BMI of patients in the study was not available, obesity was a contra-indication to bilateral resurfacing. Furthermore, there was no significant difference in the sizes of the implants used between the two groups. A systematic difference in weight or loading of the trochanteric fixation is therefore unlikely to be a confounder in the study.

Conclusions

Protected weight-bearing following a Ganz trochanteric osteotomy is important to the success of the procedure. Simultaneous bilateral hip arthroplasty through a Ganz approach should be avoided. If it is undertaken, we recommend that patients should be non-weight bearing for 6 weeks following surgery. Non-union following a Ganz trochanteric osteotomy for arthroplasty carries a significant morbidity.

References