THE RESULTS OF REVISION OF TOTAL HIP ARTHROPLASTY

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The results of 140 total hip revision procedures for “non-septic” loosening, dislocation, and fracture of the femoral stem or shaft have been personally reviewed and rated by the Harris method. The minimum follow-up period was six months: thirty-three (24 per cent) showed excellent or good results, seventy-two (51 per cent) showed fair or poor results. Subsequent excision arthroplasty was performed in thirty-one patients. The infection rate for these revision procedures was very high, suggesting that many were already infected at the time of revision, and that every “loose” hip must be assumed to be infected until proved otherwise.

The mortality rate of 3 per cent was surprisingly low after more than one major surgical procedure in these elderly patients.

It has been estimated that approximately 80,000 total hip replacements were performed in the United States of America alone in 1976 (Hori et al. 1978) and that a 1 per cent per annum revision rate will be necessary (Müller 1975). We are now faced with an ever-increasing number of revision procedures for loosening of either the femoral stem or acetabular cup (Dandy and Theodorou 1975; Nolan et al. 1975; Eftekhar 1976; Beckenbaugh and Ilstrup 1978); for dislocation of the total hip replacement (Dandy and Theodorou 1975; Nolan et al. 1975; Carlsson and Gentz 1977; Beckenbaugh and Ilstrup 1978); for fracture of the femoral stem (Charnley 1975; Galante, Rostoker and Doyle 1975; Collis 1977); and for fracture of the femoral shaft (Scott et al. 1975; Khan and O’Driscoll 1977).

The natural history of an infected total hip replacement (Hunter and Dandy 1977) and the results of revision of the implant after sepsis (Buchholz and Gartmann 1972) have already been reported. What are the results, however, of revision procedures for “non-septic” loosening, dislocation and fracture of the femoral stem or shaft? Are they as good as the long-term results reported for primary total hip replacement (Charnley and Cupic 1973; Beckenbaugh and Ilstrup 1978)?

Dandy and Theodorou (1975) reported on eighty-three first revision procedures for loosening of the McKee-Farrar prosthesis without infection: ten of these procedures were excision arthroplasties, but seventeen of the remaining seventy-three hips (23 per cent) were eventually treated by excision; of 105 secondary operations not done for infection eighteen (17 per cent) subsequently became infected. Eftekhar (1976) reported on thirty revision procedures for mechanical failure of total hip replacement. There was no infection or recurrence of loosening in this series. There was a recurrence of dislocation in only one hip; perforation of the shaft of the femur was a complicating factor in three patients.

We decided to review the results of revision procedures in our Centre, and from one other surgeon (WHB), in an attempt to answer these questions. In this paper, we will deal only with the replacement of the cup or the femoral prosthesis, or both. Subsequent publications will discuss the management of dislocation of the prosthesis, fractures of the femoral stem and shaft and the value of revision after sepsis of the joint.

CLINICAL MATERIAL
There were 140 revision procedures carried out between 1968 and 1978. The minimum follow-up was six months. All patients were personally reviewed and given a Harris rating (Harris 1969). Where possible, radiographs taken after operation were analysed and will be the subject of another study.

RESULTS
The results were assessed with reference to which component was replaced at the revision procedure, and are shown in Tables I and II.

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Table I. Results according to Harris rating after revision of one or both components

<table>
<thead>
<tr>
<th>Harris rating</th>
<th>Both components replaced (57 hips)</th>
<th>Femoral prosthesis replaced (61 hips)</th>
<th>Cup replaced (22 hips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>9</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>4</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Fair</td>
<td>9</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Poor</td>
<td>21</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>Excision</td>
<td>10</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Dead</td>
<td>4</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Table II. Overall results of 140 revision procedures according to Harris rating

<table>
<thead>
<tr>
<th>Harris rating</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Excellent or good</td>
<td>33</td>
</tr>
<tr>
<td>Fair or poor</td>
<td>72</td>
</tr>
<tr>
<td>Excision</td>
<td>31</td>
</tr>
<tr>
<td>Dead 0–6 months after revision</td>
<td>4</td>
</tr>
</tbody>
</table>

DISCUSSION

It was apparent that the assessment before operation of which component was loose did not coincide with the operative findings, and subsequent surgical procedure. This is the reason why the results were assessed on the basis of which component was replaced at the second operation. The Harris rating gives strict criteria for evaluation after operation (Andersson 1972). Many patients appeared to be quite happy with a result that we assessed as fair or poor, and no patient in this group requested a third operation to relieve pain.

One of the most alarming findings was that forty-five (32 per cent) of these revised hips were subsequently found to be infected, often requiring a further operation resulting in excision arthroplasty. In a review of patients with infected hip replacements (Hunter and Dandy 1977), fifty-one hips out of 188 (27 per cent) had required revision before the definitive diagnosis of sepsis. As it is often surprisingly difficult to distinguish between the effects of loosening and those of infection, perhaps some of these hips were already infected at the time of revision procedure. Dandy and Theodorou (1975) reported a rise of infection rate from 2 to 17 per cent after revision procedures, and many surgeons report a high incidence of positive culture at the time of the initial operation (Nelson 1977). However, in the unlikely event that all the revised hips in this series were infected at the time of revision, our results (Table II) do not bear comparison with the 69 per cent of successes reported by Buchholz and Gartmann (1972), or with the 71 to 86 per cent reported by Buchholz et al. (1979). Another reason for the high infection rate may have been the number of surgeons concerned, increased operating time and operative difficulties with a high contamination rate. Many of these patients may have demonstrated unrecognised sensitivity to metal or cement (Sweetnam 1974). From these results, every “loose” total hip prosthesis must be assumed to be infected until proved otherwise.

Regardless of whether the hips were subsequently found to be infected or not, 22 per cent of revision procedures eventually resulted in excision arthroplasty, because of pain, recurrent dislocation, fracture of the femur or prosthesis, loss of bone stock of the femur or acetabulum or deep sepsis. These findings are similar to those reported by Dandy and Theodorou (1975).

In spite of two or more major operations, the mortality rate up to six months after the revision procedure was surprisingly low. This may be because many of the patients, who may have required revision operations and were not included in this series, had associated medical problems and were considered too sick for further procedures.

The results of revision procedures in this series are disappointing. Approximately one hip in three was subsequently found to be infected, and one in five eventually required excision arthroplasty. Each patient with a loose painful hip should therefore be carefully assessed to exclude infection before a revision procedure is considered. The patient should be informed of the possible disappointing results, and should be encouraged to accept pain or limitation of function. In the presence of severe pain or obvious sepsis, an excision arthroplasty should be advised.

In view of the increasing number of patients undergoing total hip replacement, and an increased incidence of loosening of the cup (DeLee and Charnley 1976) and of the femoral prosthesis (Beckenaungh and Ilstrup 1978), it is wise to advise caution about the indications for primary total hip replacement in the initial assessment of the patient with a painful hip, and to maintain a critical attitude towards the results of secondary revision procedures.

Our thanks are due to the surgeons in the University Hospitals in Toronto who helped in this survey by allowing their revision procedures to be reviewed. We would particularly like to thank Dr Ian Macnab for his continued support of this project, and Miss Jocelyn Macnab, Miss Carol Redmond and Miss Julia Seed for their valuable help in the completion of this survey. These medical students were financed by a Government of Ontario summer student scheme.

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REFERENCES


