We compared patient satisfaction with surgeon satisfaction after total hip arthroplasty (THA) in a group of 193 patients (200 THAs, mean follow-up six years) using a visual analogue scale (VAS), and two objective and two subjective scoring systems. We also determined the survival rate with different endpoints. For the 121 hips available for clinical follow-up, we did not find a significant difference in satisfaction between patient and surgeon. In a subgroup with low patient satisfaction, the surgeon was more satisfied than the patient (p = 0.04). The correlation between the patient satisfaction VAS and the different subjective and objective scoring systems suggests that pain during activity is the most important factor for the patient. The survivorship at six years decreased from 96.6% to 83.7% if dissatisfaction (VAS >20) was added to revision as an endpoint in the survival analysis. The patient satisfaction VAS provides additional information to evaluate the outcome of THA. We recommend the use of both subjective and objective scoring systems to evaluate the outcome of THA.

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The primary goal of total hip arthroplasty (THA) is to reduce pain and the functional limitations caused by osteoarthritis (OA) of the hip. Most studies evaluating the results of THA have used objective methods which are based on the assessment of pain and functional disability, scored by the orthopaedic surgeon.\textsuperscript{1,2} It is important to include the patient’s opinion in the outcome assessment of THA, since he or she is the most prominent participant.\textsuperscript{3} Recent studies which have used self-assessed questionnaires have suggested that patients and orthopaedic surgeons do not share the same definition of success and satisfaction after THA.\textsuperscript{4,5}

In our study we have compared patient satisfaction and surgeon satisfaction using a visual analogue scale (VAS) and two objective and two subjective scoring systems. The aim was to investigate whether or not there was a significant difference in satisfaction after THA between patient and surgeon.

Patients and Methods

Between January 1995 and April 1996, 200 primary cemented THAs were carried out on 193 patients. The mean age at the time of operation was 73 years (46 to 91). There were 152 patients (156 hips) with OA, 19 (19 hips) with fracture of the femoral neck, 11 (11 hips) with osteonecrosis, six (7 hips) with rheumatoid arthritis and five (7 hips) with hip dysplasia. Of the 13 hips which had undergone earlier surgery, nine had osteosyntheses for fracture of the femoral neck and four intertrochanteric osteotomies for hip dysplasia. All patients received the Charnley Elite Plus total hip prosthesis (DePuy/Johnson & Johnson, Leeds, UK) which is a modular cemented hip system, modified from the early Charnley low friction arthroplasty, with a stainless-steel femoral stem, a modular 28 mm femoral head and an all-polyethylene acetabular cup. In all patients, the posterolateral approach was used.

At a mean follow-up of 5.9 years (5.4 to 6.4), 56 patients (59 hips) had died, and five hips (five patients) had been revised. A further 13 patients (13 hips) were excluded because they had dementia or were too ill to undergo the examination, and two patients (2 hips) refused further examination; these 15 patients had no complaints about their THA and had not required revision surgery. A total of 97 hips (93 patients) was assessed clinically and radiologically.

R. B. G. Brokelman, MD, MS, Resident in Orthopaedic Surgery
C. J. M. van Loon, MD, PhD, Consultant Orthopaedic Surgeon
W. J. Rijnberg, MD, PhD, Consultant Orthopaedic Surgeon
Department of Orthopaedic Surgery, Rijnstate Hospital, PO Box 9555, 6800 TA Arnhem, The Netherlands.

Correspondence should be sent to Dr C. J. M. van Loon.

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instructions by the physiotherapist the patients scored a VAS for pain during rest and activity, and satisfaction. A consultant orthopaedic surgeon (CJMvL) who had not been involved in the surgery and had no information from the medical records or from the physiotherapist, examined them. He asked about pain during rest and activity, walking ability, the ability to climb stairs, walking aids and assessed the walking pattern of the patient. After assessment of the radiographs he completed the surgeon satisfaction VAS form. The 24 patients (24 hips) who were examined at home were assessed by the same physiotherapist and orthopaedic surgeon.

Clinical scoring systems. Objective clinical data were obtained and scored according to the Merle d’Aubigné and Postel score before the operation and at the time of follow-up and the HHS at follow-up.

Pain visual analogue scale. The VAS evaluated pain, which was felt in the groin or hip region at rest and during activity. The scale consists of a 100 mm horizontal line ranging from 0 (no pain) to 100 mm (intolerable pain). Patients were asked to mark the line vertically at a point which matched their pain.9,10 The distance was measured in millimetres and was converted to the same number of points.

Satisfaction visual analogue scale. The VAS system used to evaluate patient and surgeon satisfaction at follow-up was similar to that used to measure pain.9,10

WOMAC. The WOMAC index is a self-administered health questionnaire specifically designed for patients with OA of the hip or knee. This questionnaire contains three subscales, pain (5 items), stiffness (2 items) and physical function (17 items). The questions are ranked on a five-point (none, slight, moderate, severe, extreme) Likert scale.6 The scores are added up for each category. To facilitate comparisons between the WOMAC scores and the VAS scores, the former were transformed from 1 (best) to 5 (worst) points in each item to a system of 0 (best) to 100 (worst) points per subscale.

Radiological assessment. We examined anteroposterior (AP) radiographs of the pelvis and lateral views of the operated hips for the position of the component, bone resorption, fracture of cement and radiolucent lines.11,12

Results

Clinical scoring systems. The mean difference in the preoperative and postoperative Merle d’Aubigné and Postel score was 6.0 (3.0 to 10.4). The mean HHS at follow-up was 88.9 (CI 58.9 to 100).

Analysis of VAS. The mean follow-up pain VAS score was 7.9 (CI 0 to 39.0) at rest and 14.0 (CI 0 to 57.6) during activity. A pain VAS of less than 20 points was recorded in 107 of 121 hips (88.4%) at rest and in 90 of 121 hips (77.4%) during activity. At the time of follow-up the mean patient satisfaction VAS was 9.9 (CI 0 to 53.9) and the mean surgeon satisfaction VAS was 9.9 (CI 0 to 42.5).

A patient and surgeon satisfaction VAS of less than 20 points was recorded in 101 of 121 hips (83.5%) and 106 of 121 hips (87.6%), respectively. In the subgroup of patients with a satisfaction VAS of more than 20, the difference between patient and surgeon satisfaction increased significantly, with a mean difference of 16.0 (CI 0.7 to 31.0). The surgeon satisfaction was significantly higher than the patient satisfaction (p = 0.04; paired t-test).

WOMAC. The mean WOMAC scores, divided into three subscales, were 85.0 (CI 59.0 to 100) for pain, 75.5 (CI 39.6 to 100) for stiffness, and 71.8 (CI 40.0 to 100) for physical function. The combined score was 77.4 (CI 40.8 to 100).

Radiological assessment. Four femoral stems were in a varus position of more than 15˚ on the postoperative radiograph. The remaining hips showed components in a neutral position. There were no hips with massive bone resorption or fracture of the cement, but 15 hips showed radioluencies of 1 mm around the femoral component in a total of 42 zones of Gruen et al12 (zone 1, 8; zone 2, 5; zone 3, 6; zone 4, 4; zone 5, 7; zone 6, 6; zone 7, 6). Radiolucent lines of more than 2 mm in width were seen around two stems (hip 1, zone 1; hip 2, zones 2, 3, 4 and 5). The radiolucent lines were progressive in both hips.

Survival analysis. The survival rate at six years with revision as the endpoint was 96.9% (CI 92.4 to 98.1; Table I) and decreased to 83.7% (CI 76.4 to 98.9) with revision or satisfaction VAS of more than 20 as the endpoint. A survival rate at six years of 69.7% (CI 61.3 to 77.1) was found with revision or satisfaction VAS of more than 20 or pain during activity VAS of more than 20 as the endpoint.

Statistical analysis. The mean difference between the patient and surgeon satisfaction VAS was -0.75 (CI -34.1 to 33.2), which showed that there was no significant difference in satisfaction after THA (p = 0.57). The correlation of the satisfaction VAS between the patient and the orthopaedic surgeon was 0.70. The method of Bland and Altman13 showed that patient and surgeon satisfaction were not in good agreement for the satisfaction VAS. The patient satisfaction VAS varied from 34.1 below to 33.2 above the surgeon satisfaction VAS (Fig. 1). The correlation between the patient satisfaction VAS and the other scoring systems varied between 0.32 and 0.69 (Table II). Pain during activity had the highest correlation with the patient satisfaction VAS.
Complications. In three hips, a haematoma was evacuated a few days after surgery. In one patient neurapraxia of the femoral nerve resolved within three months of surgery with conservative management. Two superficial wound infections were controlled by antibiotics. Five hips were revised for deep infection (2 hips), fracture of the stem (1 hip), and aseptic loosening of the stem (1 hip) and cup (1 hip).

Discussion

The outcome after a THA can be scored using different systems and is considered to be excellent.\(^1,2\) The patient’s evaluation of THA was not taken into account in these scoring systems. Knahr et al\(^4\) and Lieberman et al\(^5\) suggested that patients may have a different opinion of success after THA than surgeons. Our study showed no significant difference between the overall satisfaction VAS of the patient and surgeon. Analysis using the method of Bland and Altman\(^13\) however, showed that the patient and surgeon satisfaction VASs do not agree in the individual case. This is probably because of the group of patients with a satisfaction VAS of more than 20. That is, if the satisfaction of the patient is low, the difference in satisfaction between the patient and surgeon increases as occurred in our study. The surgeon was significantly more satisfied than the patient. A similar pattern was reported by Lieberman et al.\(^5\) A possible explanation could be that it is difficult for a surgeon to comprehend the degree and nature of a patient’s pain.

In our study, we found a moderate correlation between the satisfaction VAS of the patient and the surgeon. This suggests that patients and surgeons may evaluate the outcome after THA from different perspectives. The difference in expectation of the outcome may be the cause for this moderate correlation. The correlation between the patient satisfaction VAS and the other subjective and objective scoring systems for the evaluation of the outcome of THA varied between 0.32 and 0.69 (Table II), which was in the

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Table I. Life table, with revision as the endpoint after THA

<table>
<thead>
<tr>
<th>Years since operation</th>
<th>Number of THAs at start</th>
<th>Number of failures</th>
<th>Number withdrawn</th>
<th>Number at risk</th>
<th>Annual failure rate (%)</th>
<th>Annual success rate (%)</th>
<th>Survival rate (%) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 1</td>
<td>200</td>
<td>1</td>
<td>8</td>
<td>196.5</td>
<td>0.51</td>
<td>99.49</td>
<td>99.49 97.1 to 100.0</td>
</tr>
<tr>
<td>1 to 2</td>
<td>191</td>
<td>1</td>
<td>7</td>
<td>187.5</td>
<td>0.53</td>
<td>99.47</td>
<td>98.96 96.2 to 99.8</td>
</tr>
<tr>
<td>2 to 3</td>
<td>183</td>
<td>1</td>
<td>13</td>
<td>176.5</td>
<td>0.57</td>
<td>99.43</td>
<td>98.39 95.2 to 99.6</td>
</tr>
<tr>
<td>3 to 4</td>
<td>169</td>
<td>0</td>
<td>11</td>
<td>163.5</td>
<td>0.00</td>
<td>100.00</td>
<td>98.39 95.0 to 99.6</td>
</tr>
<tr>
<td>4 to 5</td>
<td>158</td>
<td>0</td>
<td>10</td>
<td>153</td>
<td>0.00</td>
<td>100.00</td>
<td>98.39 94.8 to 99.6</td>
</tr>
<tr>
<td>5 to 6</td>
<td>148</td>
<td>2</td>
<td>24</td>
<td>136</td>
<td>1.47</td>
<td>98.53</td>
<td>96.92 92.4 to 98.9</td>
</tr>
</tbody>
</table>

Table II. Correlation between the satisfaction VAS of the patient and the different scoring systems after THA

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHS</td>
<td>0.43</td>
<td>0.27 to 0.56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Merle d’Aubigné and Postel score</td>
<td>0.44</td>
<td>0.28 to 0.57</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pain VAS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest</td>
<td>0.63</td>
<td>0.52 to 0.73</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Activity</td>
<td>0.69</td>
<td>0.59 to 0.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>WOMAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined</td>
<td>0.42</td>
<td>0.26 to 0.55</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>Pain</td>
<td>0.47</td>
<td>0.32 to 0.59</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>Stiffness</td>
<td>0.32</td>
<td>0.15 to 0.47</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Physical function</td>
<td>0.35</td>
<td>0.19 to 0.50</td>
<td>&lt;0.002</td>
</tr>
</tbody>
</table>

Fig. 1

Agreement of satisfaction VAS between patient and surgeon using the method of Bland and Altman\(^13\) after THA.

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same range as a study of satisfaction after total knee arthroplasty.\textsuperscript{16} The pain VAS at rest and during activity, and the WOMAC pain, had the highest correlation with the VAS satisfaction. This suggests that pain is the most important factor in patient satisfaction. Murray and Frost\textsuperscript{17} showed that pain as an indicator could discriminate between knee implants while revision could not. A possible explanation for the low correlation between satisfaction VAS of the other scoring systems could be that satisfaction is determined by many factors, including pain, functional ability, the patient’s expectation of the outcome of THA and their emotional state.

Most follow-up studies, using revision as the endpoint in survival analysis of THA, found a survivorship of 90% to 99% at five to ten years. We used patient satisfaction as an endpoint in the survival analysis of THA. It appeared that the survivorship of THA at six years decreased from 96.6% to 83.7% if dissatisfaction was added to revision as an endpoint. The six-year survivorship decreased even further to 69.7% with revision, patient satisfaction VAS of more than 20, or pain VAS of more than 20 during activity as endpoints. This suggests that revision as an endpoint alone is not a sensitive criterion for the outcome of THA. Our study shows that if the satisfaction of the patient is low, the surgeon is more satisfied than the patient. This difference highlights the need for self-assessment questionnaires by patients for evaluating the results of THA.

We recommend using different scoring systems, which include a standard combination of subjective and objective outcomes for the patient, with self-assessment questionnaires for the patient and an objective scoring system for a surgeon in order to evaluate the success of THA. Further research could establish if a given threshold satisfaction VAS could identify hips at risk.

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References