The outcomes of patients returned to general practitioner after being declined hip and knee replacement

Toni Anitelea, Ella Iosua, Ayaaz Ebramjee, David Gwynne-Jones

ABSTRACT

AIM: To determine the outcome of patients waitlisted for hip and knee replacement surgery who were returned to GP due to resource constraints.

METHODS: Prospectively gathered data of all patients returned to GP was analysed, including demographics, clinical prioritisation scores and patient-reported scores. Subsequent outcome was collected from departmental records and the National Joint Registry.

RESULTS: Between November 2013 and December 2015, 374 patients were returned to GP care. At minimum 12-month follow-up, 215 (57.5%) had undergone or had certainty for surgery, 36 patients (9.6%) had been re-referred and again declined surgery and 123 (32.9%) remained in GP care. The factors influencing the likelihood of a patient subsequently qualifying for surgery were need for hip rather than knee replacement, time from initial FSA and initial NZOA score. The mean waiting time for those patients who underwent publicly-funded surgery was 14.7 months.

CONCLUSION: Returning patients to GP delays treatment rather than reducing the need for surgery. This delay results in waste, added costs to the patient, healthcare system and society, and may reduce the benefit of surgery. There needs to be a significant increase in capacity to meet this demand.
procedures in the private sector. Preliminary research findings suggest that at least 25% of patients returned to GP are re-referred soon after being declined.3,4

The primary aim of this study was to determine the outcome of the return to GP group at minimum 12-month follow up after their initial orthopaedic outpatient appointment. Secondary outcome measures were to determine predictors of re-referral and the time from initial clinic appointment until surgery if subsequently undertaken.

**Methods**

In November 2013 we commenced a system whereby all patients waitlisted for hip or knee replacement by an orthopaedic surgeon at a first specialist assessment (FSA) were independently scored by a single prioritisation nurse using the New Zealand Orthopaedic Association hip and knee priority scoring tool (NZOA score).3 Details of the tool and process have been previously described.3,4 The threshold score was set at 71 points (0 best to 100 worst) based on the expected capacity of the orthopaedic service. Any patients who scored above the threshold would be given certainty for surgery with an expectation that the surgery would be completed within four months. If a patient scored below the threshold score they could be given a clinical over-ride by their surgeon, or were returned to GP for ongoing care. A decision had been made that no patients were to be classed as active review. The NZOA score has been compared with patient-reported outcome scores and found to be an effective tool, though patients just below the threshold score may not have a clinically important difference from those above threshold.3

Pre-operative patient-reported outcome scores (Oxford Hip or Knee Score (OHS, OKS)7 and a Reduced Western Ontario and McMaster Osteoarthritis Index (WOMAC) score (RWS)8,9 were collected prospectively as part of the prioritisation process. The Oxford score has 12 questions and is scored 0 to 48 where 0 is worst, The RWS has 5 pain and 7 function questions and is scored 0 to 48 where 48 is worst.

The cohort of patients returned to GP between November 2013 and December 2015 was identified via a record kept prospectively by the prioritisation nurse. Their subsequent outcome was determined from this database with further information, including gender and ethnicity collected from Southern District Health Board’s (SDHB) patient record software and clinical notes. There was a minimum 12-month follow-up period after the date of their FSA. Patient details were cross-referenced with the New Zealand Joint Registry, which has 98% compliance in New Zealand to check whether TJR was performed in other hospitals.1

The outcomes of these patients were categorised to one of four categories: remain with GP, below threshold, private or surgery. Patients classified as remain with GP were those that had been declined surgery and had not been re-referred by their GP for reassessment. Those classified as below threshold were those that had been re-referred but still did not meet the threshold for elective surgery and were again returned to GP. The private group were those who had been declined through the public system, and self-funded surgery in the private sector. Patients classified as surgery were those that had received publicly-funded surgery after being returned to their GP.

The wait times of the surgery group from their initial FSA to eventual certainty decision, and from FSA to surgery, were collected. Comparisons were made between the first and second year of the study period, and between hips and knees.

Statistical analysis was performed with the help of a biostatistician. Associations of sex and age with the outcome group were assessed using the chi-square test for independence and Analysis of Variance (ANOVA) respectively. ANOVA was also used to investigate associations between the outcome group and each of the NZOA, OHS or OKS score and WOMAC scores. Chi square tests were used to compare outcomes between sub-groups.

Ethics approval was obtained from the University of Otago Ethics committee (Health).

**Results**

During the period covered by this study, 374 patients were returned to GP after being waitlisted for THR or TKR and scored by the prioritisation nurse. Demographic details are given in Table 1. The mean age across
all groups was 67.5 years with patients requiring THR on average almost four years younger than those requiring TKR. The mean time from FSA to the time of this review was 24.2 months (12 to 37 months). The same number of patients (187) had been returned in each of the two years of the study. During the same period, 832 primary elective hip and knee replacements were performed at our institution.

Table 1: Demographic details of the 374 patients returned to general practitioner (GP).

<table>
<thead>
<tr>
<th>Number</th>
<th>374</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>67.5 (sd 10)</td>
</tr>
<tr>
<td>Gender</td>
<td>Male 171 (45.7%)</td>
</tr>
<tr>
<td></td>
<td>Female 203 (54.3%)</td>
</tr>
<tr>
<td>Joint</td>
<td>Hip 156 (41.7%)</td>
</tr>
<tr>
<td></td>
<td>Knee 218 (58.3%)</td>
</tr>
<tr>
<td>Scores at initial FSA</td>
<td>NZOA (0–100) 63.1 (6.5)</td>
</tr>
<tr>
<td></td>
<td>OKS (0–48) 14.5 (5.5)</td>
</tr>
<tr>
<td></td>
<td>OHS (0–48) 14.0 (5.3)</td>
</tr>
<tr>
<td></td>
<td>RWS (0–48) 31.2 (7.2)</td>
</tr>
<tr>
<td>Duration of follow up from initial FSA (mean, range, months)</td>
<td>24.2 (12–37)</td>
</tr>
<tr>
<td>Year 1 (n, mean, range, months)</td>
<td>187 30.7 (25–37 months)</td>
</tr>
<tr>
<td>Year 2 (n, mean, range, months)</td>
<td>187 17.6 (12–24 months)</td>
</tr>
</tbody>
</table>

FSA; First specialist assessment, NZOA; New Zealand Orthopaedic Association hip and knee prioritisation score, OHS; Oxford hip score, OKS; Oxford knee score, RWS; Reduced WOMAC score.

Of the 374 patients, 122 (32.6%) remained in the community without any further contact. A further 36 (9.6%) patients had been re-referred by their GP to see the specialist for another clinical assessment and had again failed to meet the financial threshold for elective surgery. Two patients had died: one in each of the above groups. Over half of the sample had received or were awaiting surgery across either public or private sectors. One hundred and ninety-four patients (51.9%) had undergone or were awaiting public elective surgery with 22 patients (5.9%) electing to self-fund private surgery (Table 2). Patients awaiting hip replacement were significantly more likely than those awaiting knee replacement to have subsequently qualified for public surgery [100 of 156 (64%) vs 94 of 218 (43%) (Chi square 19.7, p<0.0001)]. Conversely, knees were more likely than hips to remain in GP care without re-referral: [87 of 218 (39.9%) vs 35 of 156 (22.2%) chi square 12.6, p<0.0001)]. An equal number of hips and knees had their surgery in the private sector (Table 2).

Table 2: Outcomes of patients initially returned to general practitioner (GP) at minimum 12-month follow up.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>All patients (%)</th>
<th>Hips</th>
<th>Knees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remain with GP</td>
<td>122 (32.6%)</td>
<td>35 (22%)</td>
<td>87 (39.9%)</td>
</tr>
<tr>
<td>Below threshold</td>
<td>36 (9.6%)</td>
<td>10 (7%)</td>
<td>26 (12%)</td>
</tr>
<tr>
<td>Private</td>
<td>22 (5.9%)</td>
<td>11 (7%)</td>
<td>11 (5%)</td>
</tr>
<tr>
<td>Surgery</td>
<td>194 (51.9%)</td>
<td>100 (64%)</td>
<td>94 (43%)</td>
</tr>
<tr>
<td>Total</td>
<td>374</td>
<td>156</td>
<td>218</td>
</tr>
</tbody>
</table>

Patients in the surgery group had follow-up of 26.4 months compared to 20.7 months in the remain with GP group. Patients seen in year 1 were more likely to have certainty for surgery (121/187, 64.7%) than those in year 2 (73/187, 39%) (chi square 24.7, p<0.0001). Conversely, significantly more patients remained in GP care from year 2 (86 of 187 (46%) compared with year 1 (36 of 187, 19.3%) chi square 30.4, p<0.0001). There was no significant association between sex and patient final outcome (p=0.31) nor age and patient final outcome (p=0.77).

The surgery group had the highest mean initial NZOA score, as well as the worst mean Oxford and reduced WOMAC (RWS) scores. There was a significant association between mean patient NZOA score and
patient final outcome (p<0.01). Any association between patient outcome and mean Oxford (p=0.10) or RWS (p=0.08) did not reach significance (Table 3).

### Table 3: Scores at time of initial first specialist assessment (FSA).

<table>
<thead>
<tr>
<th>Outcome</th>
<th>NZOA mean (sd)</th>
<th>RWS/48 (sd)</th>
<th>OHS, OKS/48 (sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remain with GP</td>
<td>61.8 (6.4)</td>
<td>30.4 (7.3)</td>
<td>15.1 (5.6)</td>
</tr>
<tr>
<td>Below threshold</td>
<td>60.4 (9.2)</td>
<td>29.6 (8.1)</td>
<td>15.1 (5.3)</td>
</tr>
<tr>
<td>Private surgery</td>
<td>62.4 (8.2)</td>
<td>30.6 (8.8)</td>
<td>14.4 (7.4)</td>
</tr>
<tr>
<td>Surgery</td>
<td>64.2 (5.8)</td>
<td>32.4 (6.6)</td>
<td>13.4 (4.9)</td>
</tr>
</tbody>
</table>

NZOA; New Zealand Orthopaedic Association hip and knee prioritisation score, OHS; Oxford hip score, OKS; Oxford knee score, RWS; Reduced WOMAC score.

Of the 115 patients with an initial NZOA score of 70 points (a common score just below the threshold), 76 (66%) subsequently gained certainty compared with 88 of 201 (44%) with a lower score (chi square 14.6, p<0.0001).

The mean waiting time from initial FSA to certainty date was 11 months (sd 6.6, median 10 months) (range 1–30 months).

The mean time from FSA to surgery was 14.7 months (sd 6.9, median 14) (range 4–33 months). Thirteen people had received certainty but were yet to undergo the proposed surgery. The mean time from the certainty decision to surgery was 3.7 months (sd 3.3, range 1–23 months) (Figure 1).

### Discussion

In this study over a two year period, 374 patients who were recommended TJR by their surgeon were declined for surgery due to capacity constraints in the public health system and therefore returned to GP care. This equates to approximately 31% of patients waitlisted for surgery and has not changed from our previous paper.³ This is supposed to give patients certainty and allow them to make choices. These are essentially limited to: wait until they deteriorate, go private or request reassessment. Only 22 (5.9% of all patients returned) elected to self-fund in the private sector, which reflects the demographic of this population with few patients having the funds for a private operation. Those who can afford to self-fund tend to bypass the public system altogether. Two hundred and thirty (61.5%) were re-referred during the study period of which 194 (51.9% of all returns) went on to receive surgery and 36 (9.6%) again failed to meet the financial threshold.
for elective surgery. Only a third (122, 32.6%) remained in the community without any further referral.

The factors that had the greatest influence on the likelihood of a patient subsequently qualifying for surgery were initial NZOA score, hip rather than knee disease and the length of time from initial FSA. This is not surprising and reflects the natural history of these conditions, which is to slowly deteriorate. Patients with hip osteoarthritis are typically more disabled than those with knee osteoarthritis and less likely to respond to non-operative interventions. The surgery group had the worst patient-reported scores (OHS, OKS and RWS) at initial assessment but the trend did not reach statistical significance. The patient-reported scores of the patients (OHS 14.0, OKS 14.5, RWS 31.2) are a level similar to those who had received surgery between 2006 and 2010 in our institution and worse than the average scores reported in the literature for primary hip and knee replacement in other centres in New Zealand or overseas. However, during the period of the study the mean scores of patients undergoing surgery in our institution were OHS 9.9, OKS 10.6 and RWS 34.8. This demonstrates that those patients returned to GP were a slightly less severe group than those qualifying for surgery, confirming that the prioritisation was robust.

Prior to this study we had used active review (AR) widely with 162 patients waiting for TJR on AR in August 2012. Patients remained within the system and could be assessed by use of experienced nurses and patient-reported questionnaires. This created an increasing amount of work for the service and their visibility was a potential embarrassment for DHB management, the Ministry of Health and politicians. It was decided when we commenced nurse prioritisation that active review was no longer to be used. As two-thirds of patients scoring 70 points subsequently qualified for surgery the continued use of AR would have been justified and it would have avoided the additional delay, cost and administration of re-referral from a GP. The majority of patients (63%) in the surgery group got certainty for surgery within 12 months of initial FSA. Most of these patients have waited until their initial decline decision, waited and paid for a further GP appointment and potentially waited 4–6 months for a further FSA.

The demand for TJR is increasing in New Zealand and around the world. However, between 2007 and 2013 there was there was no increase in the rate of publicly funded elective primary hip and knee replacement in New Zealand although the total numbers of joint replacements increased. The demand for TJR in our area appears to be higher than the New Zealand average but the problems we are seeing are not unique. The reduction of the Ministry of Health’s target from six months to four months does little to facilitate patient care. While those accepted onto the waitlist will get their surgery sooner, it does not increase the numbers of procedures done. Because failure to meet the target may be associated with financial penalties to the DHB, the unintended consequence is that more patients are being returned to GP purely to meet the target. They do not show up on waiting lists so are invisible.

In this study the mean time from certainty to surgery was 3.7 months. However, the real wait time for those patients initially returned to GP who ended up qualifying for public surgery was 14.7 months. The remaining patients are still waiting at an average of 21 months following FSA. Waiting for surgery has an adverse effect on outcomes. Studies have consistently shown that worse pre-operative scores are associated with poorer post-operative results, though the improvement in score may be greater. Waiting longer than six months can cause a 50% decrease in the odds of achieving a better than expected functional outcome compared with those who waited less than six months. It is not clear if this is happening in our practice as we have no comparable controls. Following introduction of an enhanced recovery programme, our post-operative Oxford hip scores compared to the New Zealand average are worse (38.8 vs 40.4) but the OKS is a little better (39.8 vs 37.5) despite poor pre-operative scores (11.1). Total hip replacement and total knee replacement are two of the most cost-effective procedures in orthopaedic surgery. By returning patients back to
the care of their GP rather than operating, there is a substantial and avoidable loss of quality-adjusted life years.16 There may be increased medical costs for non-operative treatment and its complications, such as gastro-intestinal bleeds from non-steroidal anti-inflammatory use, and increased in-patient costs due to increased complexity of surgery, length of stay and risk of complications. In addition there are personal costs to the patient and societal costs, which are harder to quantify.26,27

Rolfson et al estimated the cost of waiting for hip replacement in Sweden as US$7,666 per patient per year.26 Fielden et al calculated the mean cost was NZ$1,030 (US$688) per person per month waiting (2005 figures).27 Societal costs made up over 70% of this even in those who were not in paid employment. If we extrapolate these figures (but still using 2005 values and exchange rates) to our cohort then the additional cost of waiting more than six months for surgery in those who were initially returned but who subsequently underwent publicly funded surgery was NZ$1.6 million (US$1.1 million). The cost of those still waiting is a further NZ$2.6 million (US$1.7 million). Index-linking would increase these figures by 26% to NZ$2 million and NZ$3.25 million.28 As the current costing for an uncomplicated publicly funded hip or knee replacement is approximately $16,000 using WIESNZ15 cost-weights, this could have funded an additional 328 joint replacements at 2015 values.29

A limitation of this study is that it is not clear what has happened to the third of patients who remain in primary care without re-referral or surgery. The natural history of the condition is a slow deterioration. They may have given up, modified their expectations or developed intercurrent medical problems that preclude surgery. Only two patients had died. Further research would be helpful in this area but was outside the initial scope of this project. We had hoped to look at outcomes among Māori and Pacific patients. However, only three of the 374 were of Pacific ethnicity, and six were Māori, meaning ethnic specific analyses were not possible. We have previously shown higher rates of publicly funded TJR provision in Māori than New Zealand European and slightly lower rates in Pacific people.2 It appears that Māori and Pacific people are not over-represented in the return to GP group. Finally, the NZOA hip and knee prioritisation score used in this study has recently been superseded by a new generic score that includes a patient impact on life score. Patients with hip and knee OA will now be scored directly against patients with other orthopaedic conditions. This is likely to have an effect on the numbers and mix of patients returned to GP.

Conclusion

In our district and across New Zealand, the demand for TJR has increased, there has not been a corresponding increase in service provision and the target time allowed by the Ministry of Health for surgery has decreased. This has resulted in many patients being declined surgery despite reaching the clinical threshold for joint replacement. Those qualifying for surgery are more severely affected than in past years. Returning patients to GP delays treatment rather than reducing the need for surgery. Over half of patients returned to GP care in order to meet the four-month target will end up qualifying for surgery with a mean waiting time of 14.7 months from initial FSA. This delay results in waste, added costs to the patient, healthcare system and society and may reduce the benefit of surgery. Only 5.9% of patients returned to GP elected to pay for private surgery. Less than a third of patients remain in primary care without further referral or surgery. Further work is required to determine the fate of this group. There needs to be a significant increase in capacity in our district to meet this demand.
Competing interests:
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