Outcome prediction after total hip replacement surgery

Goran Garellick

1Department of Orthopaedics, Sahlgrenska University Hospital, Molndal, Sweden; 2Department of Orthopaedics, Sahlgrenska University Hospital, Molndal, Sweden; 3Department of Orthopaedics, Malmo University Hospital, Lund, Sweden; 4HOBBL, Massachusetts General Hospital, Boston, MA

Introduction: Total hip replacement (THR) is a successful intervention to decrease pain and improve function in patients with disabling hip disease. Annually, 13,800 hip joint replacements are performed in Sweden and twenty times more in US to an increasing yearly cost. However, in spite of patient adequate symptoms and radiographic changes and despite technically satisfactory result, approximately 10 to 20% of the patients express discomfort (1, 2). Lately, patient-related factors have gained increased focus in assessing outcome in total joint replacement surgery. The Swedish Hip Arthroplasty Register assesses patient satisfaction and pain relief and health related quality of life (EQ-5D) (3, 4). The progress in general medical practice and the development of implants now allows operation on both younger and older patients and the increasing life span of the patient has lead to an increasing population of THR patients. In a world of scarce health resources, these resources should be optimally allocated to provide the maximum output is the essence of the subject of health economics. To optimize the cost effectiveness in a health care system, expensive interventions should be reserved for patients that gain substantial utility of the treatment. However, so far attempts to predict the outcome of joint replacement surgery in order to identify non-responders have not satisfactorily explained the factors responsible for the failures. Furthermore, co-morbidity gives worse outcome compared to patients only suffering of a unilateral hip disease measured with disease-specific as well as with generic assessment tools. In the present study we hypothesized that anxiety/depression (one of the five dimensions of EQ-5D) is a significant variable with respect to patient satisfaction and pain relief after THR surgery. Theoretically treatment of anxiety/depression before THR surgery could result in an improved outcome and cost effectiveness of the intervention.

Materials and Methods: The Swedish National Hip Arthroplasty Register, initiated in 1979, is a nation-wide prospective observational study (3, 4) (www.jru.orthop.gu.se). The rapid growth of new surgical techniques in conjunction with an accelerating development of new hip implant technology warrants a continuous and objective monitoring of the results paralleled with precise educational efforts. All THR-operated patients complete a self-administrated questionnaire containing 10 items including Charnley categories A, B and C (A: unilateral hip disease, B: bilateral disease and C: multiple joint disease or intercurrent disease impairing walking capacity), a pain and satisfaction visual analogue scale (disease-specific questions) and the EQ-5D as a generic measurement preoperatively and at 1 year postoperatively. The EQ-5D is a health-related quality of life instrument that evaluates subjects in the five dimensions mobility, self-care, usual activities, pain/discomfort and anxiety/depression. It can be presented as a health profile or as a global health index with a weighted total value for health; the minimum value is -0.594 and the maximum value is 1.0. One frequently used measure is quality adjusted life years (QALY), a utility index that weights the consequences of survival and the quality of life. QALYs are constructed by multiplying the number of life years gained with a utility value for the level of health status. The utility value ranges between 0 (dead) and 1 (full health; ie, EQ-5D index 0.0–1.0). The current study includes 6,871 THR patients from 37 different hospitals followed prospectively for 1 year and reported to the Registry between 1.1 2002 and 15.5 2004. The included patients have answered the self-administrated questionnaire preoperatively and 1 year after the operation. We analysed the predictive effects of each of the five dimensions on pain (VAS), satisfaction (VAS) and EQ-5D VAS using a linear model, which included Charnley classification as proxy for case-mix.

Results: Patients with other diseases (Charnley classification C) had a significant worse outcome, however, the multivariate analysis showed that a change in patient’s pain (VAS), satisfaction (VAS) and EQ-5D VAS one year after surgery was most strongly related to the 5th dimension anxiety/depression (p<0.01–0.001).

Discussion: Previously, co-morbidity, assessed as the Charnley classification, has been shown related to total joint arthroplasty outcome assessed by disease specific and generic quality of life questionnaires, whereas preoperative radiographic severity, pain and function have not. The present study confirms co-morbidity to be an important variable to consider in THR surgery, however, the pre-operative EQ-5D dimension anxiety/depression was the strongest predictor for patient satisfaction after surgery. This finding demonstrates that a factor previously not focused on in hip surgery may explain some patients discomfort after total joint replacement. In a recent study of predicting outcome in knee replacement surgery, the mental health status of the SF-36 was related to the WOMAC outcome at one and two years after surgery (5). Generally, these results suggest that studies that more specifically examine psychometric variables are urgently needed in interventions aimed to improve health-related quality of life in patients with disease that include pain. The number of patients included in our study makes it unlikely that seldom occurring factors like prosthesis dislocation and infection have influenced the results. In conclusion, cost-utility in hip surgery may improve if patients with psychometric disorder, that are less likely to improve in patient satisfaction after surgery, could be identified pre-operatively.


Paper No. 162 • 6th Combined Meeting of the Orthopaedic Research Societies