TIMING THE SURGICAL INTERVENTION: OPTIMIZING OUTCOME

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RELEVANCE TO MUSCULOSKELETAL DISEASE: The precise timing for elective joint replacement in the natural history of arthritis of the hip and knee remains elusive. We compared surgical outcome one year after intervention in patients with different preoperative scores. Patients that have surgery with a low score have the same one year scores as patients with high preoperative scores.

INTRODUCTION: Severe joint pain and functional limitation are characteristic signs of end-stage arthritis. Joint replacement has been a surgical alternative to arthritis unresponsive to medical treatment. This surgical intervention has been shown to decrease pain and increase function in a large percent of patients. Several outcome instruments have been used in arthroplasty surgery to assess the results of the intervention. The decision of when to perform the surgical intervention is left to the surgeon. Investigators have reported that patients with pre-intervention scores in the low end can only improve a fixed amount after the surgery. These groups have reported that early surgical treatment would be of greater benefit to the patient. Our objective was to assess the surgical outcome one year in patients undergoing joint replacement surgery with respect to their initial severity of illness as measured by validated outcome instruments.

MATERIALS AND METHODS: A prospective comprehensive joint registry has been kept at our joint replacement unit for the last 6 years. One hundred ninety eight patients undergoing primary unilateral total hip (83) or knee (115) replacement were assessed included in the analysis. These patients were treated by the same surgeon and the same conservative protocol prior to the surgical intervention was followed. Each patient was assessed by a trained interviewer preoperatively, with the QWB, SF-36 and WOMAC. Surgery specific, orthopedically accepted, instruments included the modified Harris and Postel D’Aubigne hip scores as well as HSS and KS knee scores. In addition to the standard pain questions in the above described instruments, all patients filled out visual pain analog scales. Patients were reassessed with the same outcome measures at the one year mark. Prior to any analysis, the normality of the distribution of the continuous variables was assessed and, if necessary, either the data were statistically transformed or non-parametric methods were used. Independent groups were compared using either the t-test, Analysis of Variance (ANOVA) or the non-parametric counterparts of these tests, the Mann-Whitney or the Kruskal-Wallis test. A p < .05 was considered significant.

RESULTS: The patients were divided in 2 groups based on preop orthopedic scores. For the hips, data was compared for patients 1 SD below our cohort mean (32 ± 11 SD) (70 vs 13 pats). For the knees data was compared for patients 1 SD below the mean (46 ± 11 SD) (101 vs. 14). For the hips, patients under 1 SD had a statistically significant difference in preop QWB mobility domain (0.29 ± 0.003 SE vs. 0.18 ± 0.005 SE; p = 0.03), preop SF-36 physical function domain (13.81 ± 1.52 SE vs 3.46:1.64 SE; p = 0.004) and in Harris pain subscore (12.14 ± 0.79 SE vs 5.38 ± 1.44 SE; p = 0.001) when compared to the other group. At the one year mark, patients with lower scores continued to have worse mobility QWB scores (0.02 ± 0.003 SE vs. 0.04 ± 0.008 SE; p = 0.19). The mean increase in QWB (delta QWB) was not statistically significant. A statistically significant difference was seen in postop Harris hip total and pain scores (83.53 ± 1.7 SE vs 70.3 ± 6.4 SE; p < 0.007 and 41.20 ± 1.04 SE vs 32.92 ± 3.97). However, no significant difference was seen in delta harris hip score (48.4 ± 1.8 SE vs 55.07 ± 6.6 SE; p = 0.2). For the knees, a trend toward worse preop total QWB score (0.52 ± 0.006 SE vs 0.49 ± 0.001 SE; p = 0.08) and physical activity and mobility domains was seen. A statistically significant difference was seen in Knee Society and HSS knee total scores and pain and function subscales. A statistically significant difference at one year was seen in QWB (0.60 ± 0.01 SE vs 0.54 ± 0.01 SE; p = 0.03) with no difference in SF-36 domains or in knee society pain (82.05 ± 1.38 SE vs. 82. ± 4.14; p = 0.2) or function score (60.20 ± 2.2 SE vs 50.71 ± 6.1 SE; p = 0.1). A statistically significant difference was also seen in delta HSS (28 ± 13.2 vs 43 ± 13.4; p < 0.001) and delta KS pain score (38.1 ± 2.0 SE vs. 60. ± 6.5 SE; p < 0.001) but not in delta KS function score.

DISCUSSION: Our data demonstrates that patients undergoing THA that start with lower scores (1 SD below the mean) have statistically similar improvement in hips scores than those with with better preop scores thus resulting with lower scores at one year. In patients undergoing TKA, our data seems to demonstrate that patients with HSS scores 1 SD below the mean have no statistically significant difference in scores at one year based on a higher improvement in KS knee pain score and HSS total scores. However, there is a statistically significant difference in the function domain of the KS at the 1 year mark. The optimal point for intervention in surgical arthritis is an important question for most surgeons. Intervening too early is difficult since most patients are afraid of the surgical procedure. Data reported at the 1997 AAOS indicates that late intervention produces suboptimal outcome. The observed statistically significant difference in score preop with suboptimal postintervention scores in low functioning patients compared to those patients that had higher function and pain hip scores, clearly demonstrates that early surgical intervention is of benefit to the patient. On the other hand, with respect to the knees, waiting for a total knee replacement may not be detrimental unless preoperative function as measured by the KS score is already very low. Waiting can allow improvement in surgical technology Caution should be taken when interpreting these results, since certain conditions around the knee progress rapidly and make the outcome suboptimal. The orthopedic severity of illness was not taken into account and will be study of further work.

CONCLUSIONS: Our data suggests that waiting for the preoperative score to be at their lowest point might be of greater benefit for the patients.

Figure 1: Preoperative and Postoperative Hip Scores for Patients 1 SD Below the Mean or More Vs. the Remaining Cohort

Figure 2: Preoperative and Postoperative Knee Society Scores.
(Delta KS Pain score p = 0.001; Delta KS Function Score > 0.05)