Functional Recovery After Direct Anterior and Minimally Invasive Posterior Approaches for Total Hip Arthroplasty, A Prospective Study

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Abstract

Direct anterior approach to the hip offers an attractive alternative to the posterior approach for total hip arthroplasty as it exploits an internervous plane, which may result in a faster functional recovery with less post-operative complications. There is a limited amount of data in the literature directly comparing the two surgical exposures, especially with respect to functional outcome. We hope to analyze patients prospectively before and after total hip arthroplasty via either a direct anterior approach or a posterior approach and compare hip strength, clinical exam, attainment of recovery milestones, as well as validated outcomes scores.

Introduction and Background

The direct anterior approach to the hip has been steadily gaining popularity as an alternative option for total hip replacement. This approach utilizes an internervous plane as opposed to the muscle-splitting posterior (Kocher-Langenbach) approach, which is more classically employed for total hip arthroplasty. [[1](#_ENREF_1)] The direct anterior approach has been demonstrated to be a safe, effective approach for total hip arthroplasty, although a steep learning curve does exist for the community surgeon. [[2](#_ENREF_2)] A number of studies have attempted to elucidate differences between the posterior and direct anterior approaches. It is thought that the direct anterior approach results in less muscle damage as compared to the posterior, especially to the hip abductors which are critical for effective gait. [[3-5](#_ENREF_3)] The applicability of these findings to clinical outcome has shown promising results, but requires further study. [[6](#_ENREF_6), [7](#_ENREF_7)]

Objectives

This project hopes to elucidate differences in functional outcome after total hip replacement via direct anterior approach as compared to mini-posterior approach. We hope to demonstrate differences in abductor strength, times to attainment of key milestones in recovery, as well as validated outcome measures of both hip function and general health.

Study Design and Methods

Patients who present for total hip arthroplasty by two attending surgeons within the same academic orthopaedic practice will attempt to be enrolled in the study should they fulfill all inclusion and exclusion criteria. These two attending surgeons’ practices are both limited to a single hospital, have standardized postoperative protocols, use the same total hip arthroplasty implants and the same algorithm for head ball size. Patients’ choice of surgeon will dictate the approach to be performed. Patients will be followed pre-operatively and at 1, 3, and 12 months post-operatively. Data from validated outcome measures for total hip arthroplasty (Hip Dysfunction and Osteoarthritis Outcome Score) as well as a validated generalized outcome measure (SF-12) will be obtained preoperatively and at 1, 3, and 12 months postoperatively. In addition, a measure of activity level (UCLA Activity Index) will be collected at the preoperative visit in order to compare preoperative activity levels between the 2 groups. Length of stay, BMI, ASA class, race, gender, age, weight, tobacco use, comorbidities, total anesthesia time, total surgical time, implants employed, post operative day in which patient first ambulated, post operative day in which patient cleared physical therapy, pre and post operative hemoglobin, and the need for transfusion will be collected from the inpatient record. The patient will be asked to record the time required for the patient to: discontinue walker/crutches/cane, discontinue all walking aids, carry out activities of daily living (when pt felt safe to be left at home all day with no additional help), discontinue all narcotic pain medication, discontinue the use of an elevated toilet seat, drive a car (may drive when ambulating well with a cane, no longer taking narcotic pain medication, and comfortable enough to safely drive), return to work, ascend and descend stairs, and walk one-half mile. This information will be collected from the patient at the three month visit. Hip abduction and flexion strength will be measured by the presence of Trendelenburg's sign as well as by hand held dynamometry. All complications including wound dehiscence, infection, nerve injury, need for revision, fracture, and dislocation will be recorded within the first year. At the 1 year visit, patients will also be asked to answer direct questions regarding their satisfaction with surgery as well as the approach and incision used, if they would prefer this incision and approach for the other side, if they are satisfied with the cosmetic result, and if any numbness or pain at or distal to the incision is a concern.

Participant Selection

All patients 20-85 years of age who present for total hip arthroplasty for the treatment of primary osteoarthritis by two attending surgeons (TB, JR) within the same academic orthopaedic practice will attempt to be enrolled in the study. Exclusion criteria will include a BMI of 35 or greater, an inability or unwillingness to comply with the postoperative rehabilitation or follow up protocols, severe bone deformity (Crane III or IV dysplasia), substantial neurologic or musculoskeletal disorder which would affect gait or weight bearing post-operatively, metastatic cancer, congenital, developmental or other bone disease, osteomyelitis or other prior hip joint infection, presence of retained hardware, or prior arthrodesis of affected hip. A total of 400 patients will attempt to be enrolled, with 200 in each group.

Adverse Event Reporting

As the performance of this procedure both via anterior and posterior approach is commonplace, adverse events are unlikely, but in such a case, enrollment would be immediately stopped and the IRB notified by telephone and/or email.

Data and Safety Monitoring Plan

Although this study is prospective, the treatments that the patients will receive will not vary as a result of enrollment in the study. The data will be collected and analyzed on a monthly basis. Should one treatment prove significantly superior the study will be halted and further evaluation regarding continuation of the study will be performed. Should any adverse events occur, the IRB will be contacted immediately and the study halted until the issue is resolved.

References and Appendices

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