The Journal of Arthroplasty 31 (2016) S73–S77

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Health Policy and Economics

Impact of Anterior vs Posterior Approach for Total Hip Arthroplasty on Post-Acute Care Service Utilization

Coles E. L'Hommedieu, MD [a], James J. Gera, MBA [a], Gerald Rupp, PhD [a,*], Jeffery W. Salin, DO [a], John S. Cox, MD [b], Paul J. Duwelius, MD [c]

[a] Signature Medical Group, Inc, St. Louis, Missouri
[b] Oregon Health and Science University, Portland, Oregon
[c] Orthopedic and Fracture Specialists, Portland, Oregon

ARTICLE INFO

Article history:
Received 3 December 2015
Received in revised form
17 June 2016
Accepted 28 June 2016
Available online 6 July 2016

Keywords:
total hip arthroplasty
surgical approach
anterior total hip arthroplasty
posterior total hip arthroplasty
total hip outcomes
economics of total hip arthroplasty

ABSTRACT

Background: Controversy exists as to which surgical approach is best for total hip arthroplasty (THA). Previous studies suggested that the tissue-sparing anterior approach should result in a more rapid recovery requiring fewer postacute services, ultimately decreasing overall episodic cost. The purpose of this cross-sectional study was to determine if any significant differences exist between the anterior vs posterior approaches on postacute care service utilization, readmissions, or episodic cost.
Methods: Claims data from 26,773 Medicare fee-for-service beneficiaries receiving elective THAs (Medical Severity-Diagnosis Related Groups (MS-DRGs) 469/470) were analyzed. Claims data were collected from the 2-year period, January 2013 through December 2014. The posterior surgical approach was performed on 23,653 patients while 3120 patients received the anterior approach.
Results: Data analysis showed negligible effect sizes in postacute care service utilization, readmission rate, and cost between the surgical approaches for elective THA (MS-DRG 469 and 470). Average THA total episode cost was negligibly higher for procedures using the anterior approach compared to the posterior approach ($22,517 and $22,068, respectively). Statistically significant differences were observed in inpatient rehab and home health cost and service utilization. However, the effect sizes of these comparisons are negligible when accounting for the large sample size. All other comparisons showed minimal and statistically insignificant variation.
Conclusion: The results indicate that surgical approach alone is not the primary driver of postacute care service utilization, quality outcomes, or cost. Other factors such as physician-led patient-focused care pathways, care coordination, rapid rehabilitation protocols, perioperative pain management protocols, and patient education are integral for effective patient care.

Osteoarthritis is a primary cause of hip pain in the adult population. Before the advent of total hip arthroplasty surgeries in 1969, osteoarthritis-associated joint pain was often debilitating for the affected population. Total hip arthroplasty (THA) has permitted a substantial portion of the US population to maintain mobility despite having severe arthritis. To date, hip and knee arthroplasties are among the most commonly performed surgeries in the United States, with estimates of approximately 1 million procedures performed per year.

THA is an extremely effective surgical intervention for relief of hip pain with outstanding long-term results and quality of life improvement for patients. While numerous surgical approaches to THA are possible, 2 primary approaches for THA are considered in this report, direct anterior approach and traditional posterior approach. The traditional posterior approach provides a surgeon with clear access to the affected joint and spares the hip abductor muscles; however, the incision is long (6-10 in) and other muscles are usually cut or detached. Minimally invasive posterior surgical approaches may have a shorter single incision or multiple short incisions. The direct anterior approach is reported to be a minimally invasive technique where the joint is accessed via 1 or 2 smaller incisions (2-6 in) that supposedly spare muscle damage by going

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to http://dx.doi.org/10.1016/j.arth.2016.06.057.

* Reprint requests: Gerald Rupp, PhD, Signature Medical Group, Inc., 4 City Place Drive, St. Louis, MO 63141.

http://dx.doi.org/10.1016/j.arth.2016.06.057
0883-5403/

between hip muscles and, as a result, limits the chances of subsequent dislocations. However, the anterior approach offers restricted access to the proximal femur and may put nerves at risk. Ultimately, consideration of surgical approach of choice depends in part on the type of surgery (elective vs trauma), patient age, part of hip that needs to be accessed, and preference/expertise of the surgeon.

Not surprisingly, controversy remains as to which surgical approach is best for THA. Several studies cite improvement of the anterior approach over the posterior approach [1-6]. Other series report superiority of the posterior approach [7] or no difference between the anterior or posterior approach [8,9]. Many of these studies show that any potential benefit provided by the anterior approach is short lived and that no dramatic differences exist after either 6 weeks or 3 months postoperatively [1-3,6]. Several studies report that the anterior approach has a higher level of surgical risk when compared to the posterior approach and a higher learning curve associated with this procedure [10,11]. An extensive meta-analysis of all the reported literature to date concludes that there is no compelling data to suggest the superiority of either approach [8]. An online review study reveals that most websites publish misleading information regarding the anterior approach and suggests that marketing forces may be the driving factor for patient recruitment [12].

The purpose of this study was to determine if significant differences in postacute care service utilization and expenditures occur during an episode of care that spans 90 days postoperatively when comparing the anterior vs posterior surgical approaches for THAs. This cross-sectional study compares postacute care service utilization and cost between anterior vs posterior THA surgical approaches based on Medicare patients that would be eligible for inclusion in the Bundled Payment for Care Improvement (BPCI) program.

Materials and Methods

The data set used for this study was obtained from Medicare BPCI eligible participants. Retrospective claims data originated from a nationwide distribution of 62 participating orthopedic physician group practices and included all claims data for Medicare fee-for-service patients receiving BPCI-eligible orthopedic episodes spanning a 2-year period from January 2013 through December 2014.

The data set was analyzed to create complete patient-specific episodes of care, acute care period through 90 days post discharge. Patients receiving total joint arthroplasties coded as MS-DRG 470 (total joint arthroplasty of the lower extremity without major complications or comorbidities (MCC)) and MS-DRG 469 (total joint arthroplasty of the lower extremity with MCC) were extracted from the data set for further analysis. Elective hip procedures were differentiated from trauma-based (hip fracture) procedures by Current Procedural Terminology (CPT) code analysis (27,130 elective and 27,236 trauma) and International Classification of Diseases (ICD) code support.

Following careful patient selection based on data analysis, a total of 26,773 Medicare fee-for-service patients receiving elective THAs met the criteria and were selected for this study. Patient data were further separated into 2 pools by surgical approach based on identification of the operating orthopedic surgeon and their reported preference for THA surgical approach as acquired by Signature Medical Group, Inc, an awardee convener in the Medicare BPCI program. The resultant cross-sectional data set included 23,653 patients that received THA procedures using the posterior surgical approach (historic norm), while 3120 patients were confirmed to have had THAs performed using the direct anterior surgical approach. The discrepancy in volume is based solely on physician preference and expertise with anterior approach THAs. This difference was expected given that the traditional posterior approach remains the most commonly used method.

Each of the selected elective THA episodes were analyzed for total episode cost, postacute care costs (subtotal and cost by provider type), postacute care utilization (incidence rate and length of stay/service by provider type), discharge disposition to postacute care services (home with or without outpatient therapy services, home with home health services, skilled nursing facility, or inpatient rehabilitation facility), and readmission incidence.

Statistical analyses and inference were completed using statistical software (R-project for statistical computing and Statistical Processing for Social Science [SPSS]). The dependent continuous and continuous interval variables demonstrated a linear relationship and were normally distributed, thus, meeting the assumptions necessary for parametric methods. We used standard 95% confidence intervals and set alpha at 0.05. We utilized a classic Student *t* test design to detect differences in means within variables of scale level measurement across the different surgical approaches. Because of our relatively large sample size, we developed our conclusions using several inferential measurements including *P* value, Cohen's d, and r. All frequencies and inferential statistics reported in this article are a product of these analyses.

Results

This cross-sectional study (26,773 Medicare fee-for-service patients) compares critical outcomes measures for THA procedures performed using either the traditional posterior surgical approach or the anterior surgical approach. These outcome measures include postacute care service utilization, cost, and complications (in the form of readmissions) incurred during an episode of care that include the acute care period plus 90-day post discharge. Several parameters of postacute care service utilization were determined including incidence rates and length of stay/service for skilled nursing facilities and home health providers, the primary drivers of postacute care cost for elective THA procedures. Total episode cost was determined by summing the cost of all claims incurred during the episode of care. Readmission rates were determined for 90-day all-cause readmission that would not have triggered exclusion from the program. Readmissions are both a driver of excess episode spending and a measure of procedure quality.

Posterior THA Surgical Approach

Claims data analysis from the BPCI eligible data set spanning a 2-year period from January 2013 through December 2014 revealed that 23,653 Medicare patients received THA procedures (MS-DRG 469 and 470) using the posterior surgical approach. The average total episode cost for these procedures was $22,068. The average incidence rate for Skilled Nursing Facility utilization was 31.9% with an average length of stay of 22.4 days. The average incidence rate for Home Health Agency utilization was 63.6% with an average length of service of 25.9 visits. Some patients may have utilized both postacute care service types. Readmission rate (90-day all cause) was 7.7% (2106 patients).

Anterior THA Surgical Approach

Claims data analysis from the same BPCI eligible data revealed that 3120 Medicare patients received THA procedures (MS-DRG 469 and 470) using the anterior surgical approach. The average total episode cost for these procedures was $22,517. The average incidence rate for Skilled Nursing Facility utilization was 35.9% with