



ELSEVIER

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Primary Arthroplasty

Distribution of Subcutaneous Fat Around the Hip in Relation to Surgical Approach for Total Hip Arthroplasty

Gregory R. Sprowls, BS ^{a, b, *}, Jessica E. Pruszynski, PhD ^c, Bryce C. Allen, MD ^a^a Department of Orthopedic Surgery, Baylor Scott and White Health, Temple, Texas^b College of Medicine, Texas A&M Health Science Center, Temple, Texas^c Department of Biostatistics, Baylor Scott & White Health, Temple, Texas

ARTICLE INFO

Article history:

Received 31 July 2015

Received in revised form

6 November 2015

Accepted 1 December 2015

Available online 17 December 2015

Keywords:

total hip arthroplasty

subcutaneous fat

surgical site infection

postoperative complications

BMI

ABSTRACT

Background: Although preoperative risk assessment is multifactorial, subcutaneous fat thickness at the incision site has been associated with postoperative complications in studies of total hip arthroplasty (THA) and other procedures. This study compared subcutaneous fat thickness encountered in THA approaches using a lateral hip incision with that of approaches using an anterior incision and examined the relationship between body mass index (BMI) and fat distribution based on sex and age.

Methods: Subcutaneous fat measurements were obtained from 2004 patient CT images at positions that correspond with lateral and anterior incision sites for common approaches to THA. A thickness ratio (lateral/anterior) was calculated, and BMI, sex, and age were collected via chart review.

Results: Males and females had significantly different thickness ratio averages at 1.97 and 2.68, respectively. Thickness ratios were not significantly different between BMI groups. Lateral thickness averages were significantly different for males and females, and the interaction between sex and BMI group was significant. The relationship between BMI and the thickness ratio in males aged ≥ 65 years was significantly different from males of < 65 years and females of all ages.

Conclusion: Regardless of BMI, sex, or age, incision site soft tissue thickness was greater for approaches using a lateral hip incision than for those with an anterior incision, and a positive relationship between BMI and both measurements was identified. The predominance of lateral fat was more pronounced in females of all age and BMI groups and less pronounced in obese males aged ≥ 65 years.

© 2015 Elsevier Inc. All rights reserved.

Many factors may be considered in the choice of surgical approach for total hip arthroplasty (THA), including hip stability, muscle damage, speed of recovery, risk of heterotopic ossification, visualization, special equipment required, and surgeon comfort. The direct anterior approach (DAA) is often suggested to provide access to the hip through a smaller soft tissue envelope, allowing for a less-invasive procedure. However, to our knowledge, there are no studies that compare the subcutaneous fat thickness encountered at respective incision sites for different approaches in THA. The relationship between incision site subcutaneous fat and postoperative complications has been well documented in separate

studies of colorectal surgery, midline laparotomy, cervical and lumbar spine fusions, and recently, THA [1–5]. In light of these studies, an understanding of general trends in the distribution of subcutaneous fat at different approach sites for THA could be of clinical value.

The purpose of this retrospective study was to (1) use computed tomography (CT) measurements to compare the thickness of subcutaneous fat that would be encountered in an approach using a lateral hip incision (posterior, lateral, and anterolateral approaches) with that of an approach using an anterior incision (DAA and variations of the Hueter or Smith-Petersen approach) and (2) examine the relationship between body mass index (BMI) and the distribution of subcutaneous fat around the hip based on sex and age.

Materials and Methods

This study was approved by the Institutional Review Board of the hospital where it was performed. A retrospective study was

No author associated with this paper has disclosed any potential or pertinent conflicts which may be perceived to have impending conflict with this work. For full disclosure statements refer to <http://dx.doi.org/10.1016/j.arth.2015.12.015>.

* Reprint requests: Gregory R. Sprowls, BS, College of Medicine, Texas A&M Health Science Center, c/o Gregory Sprowls (MS-III), 2401 S. 31st Street, MS-AG-402, Temple, TX, 76508.

<http://dx.doi.org/10.1016/j.arth.2015.12.015>

0883-5403/© 2015 Elsevier Inc. All rights reserved.

performed using chart reviews of 2004 patients, aged ≥ 18 years, who received a CT scan of the pelvis at our institution from 2003 to 2013.

Patients with a visible history of pelvic surgery, right THA, right femur fracture and/or repair, severe acetabular degeneration or fracture, septic arthritis of the hip, osteomyelitis, chronic osseous abnormalities of the pelvis, or severe muscle atrophy were excluded from the study. Patients were also excluded if both the lateral and anterior measurements were unable to be obtained because of inadequate visualization of the measurement landmarks. In all, 162 patients were excluded from the study.

Two measurements of subcutaneous hip fat, a lateral and an anterior, were obtained from each CT. Both measurements were made using the linear distance measurement tool on the picture archiving communication system imaging program (GE Centricity Enterprise Web V3.0, Fairfield, CT). Each was obtained from the CT slice in which the femoral head diameter was widest. Only the right hip was measured. The landmarks for each measurement were designed to provide an accurate assessment of the thickness of subcutaneous fat that would be encountered at standard incision sites for common THA approaches.

To account for variation in patient position on the CT table, the horizontal plane for the lateral measurement was first established by creating a line tangent to both ischial spines, at the most posterior aspect of each. This line was then transferred so the right end point was at the center of the right femoral head, and the left end point extended past the skin barrier. The initial slope that was established between the ischial spines was maintained during the transfer. The lateral measurement was then obtained by creating a new line extending from the surface of the iliotibial band to the skin level and aligning it on top of the guideline that was established based on the ischial spine relationship (See Fig. 1A.)

The left end point of the guideline was then rotated so the line extended from outside the skin barrier, through the anterior 1/3 of the tensor fascia latae muscle to the center of the femoral head. The anterior measurement was obtained by creating a new line on the top of the newly placed guideline that extended from the surface of the tensor fasciae latae muscle to the skin level (See Fig. 1B.)

Patient age at the time of the CT study was then calculated, and patient sex was obtained from the CT database. BMI, height, and

weight were obtained through a review of the patient's charts from any medical visit that occurred 6 months before or after the date of the CT.

Statistical Analysis

Means and standard deviations were reported for continuous variables; frequencies and percentages were reported for categorical variables.

A 2-factor analysis of variance (ANOVA) model was used to determine whether BMI group (BMI <30 , BMI 30–40, and BMI >40) and sex had any effect on the average lateral thickness, anterior thickness, and the thickness ratio (lateral/anterior). The factors considered in each model were BMI group, sex, and interaction between BMI group and sex. When examining the effects on average lateral and anterior thicknesses, the Tukey-Kramer post hoc test was used to further assess the significant differences between each BMI group that were initially found using the ANOVA model. For the lateral thickness analysis, the data were also separated by BMI group and lateral thickness by sex was compared in each group. This was done to determine in which BMI groups males and females had significantly different lateral thickness averages. A significance level of 0.01 was used for these tests to control the type I error rate. To assess the magnitude of the differences between the BMI groups, adjusted means were evaluated based on the least square means model for average lateral thickness, anterior thickness, and thickness ratio.

The relationships between BMI and lateral thickness, BMI and anterior thickness, and BMI and the thickness ratio were analyzed through a series of 2 general linear models to determine whether there were any significant differences in the relationships based on sex and groups arranged by sex and age together (males <65 years, males ≥ 65 years, females <65 years, and females ≥ 65 years). The linear slopes in these models represented the relationships between BMI and each individual thickness variable. The 3 predictors for each model were sex, BMI, and the interaction of sex and BMI; and group, BMI, and the interaction of group and BMI, respectively. The interaction terms were used in each model to determine whether the relationships between BMI and each individual thickness variable were significantly different based on sex or age and sex grouping. Adjusted means for the sex and age groups were

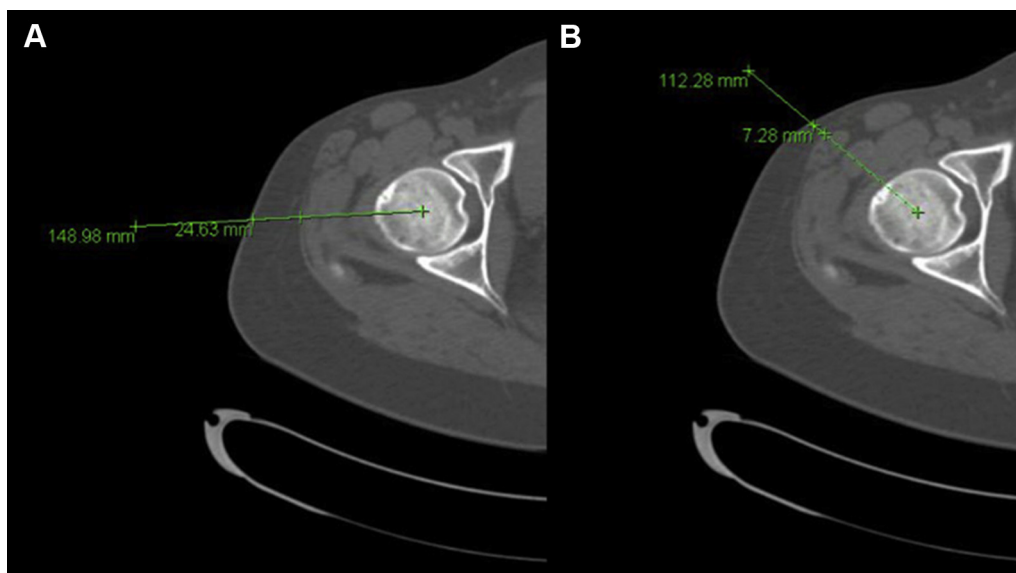


Fig. 1. (A) The lateral measurement (24.63 mm for this patient). (B) The anterior measurement (7.28 mm for this patient).

Download English Version:

<https://daneshyari.com/en/article/4059875>

Download Persian Version:

<https://daneshyari.com/article/4059875>

[Daneshyari.com](https://daneshyari.com)