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Total Hip Arthroplasty in Patients With Previous Lumbar Fusion Surgery: Are There More Dislocations and Revisions?

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ABSTRACT

Background: The purpose of this study was to determine whether the risk of dislocation and/or revision following THA is increased in patients with a history of prior lumbar fusion given the alterations in dynamic pelvic motion following LSF.
Methods: A total of 62,387 patients (5% Medicare part B claims database) were identified from 1997 to 2014 with primary THA. From this group, 1809 patients (2.9%) were stratified to identify those with prior lumbar fusion within 5 years of primary THA to compare risk of dislocation and revision with those without lumbar fusion. Multivariate cox regression analysis was performed adjusting for age, socio-economic status, race, census, region, gender, Charlson score, preexisting conditions, and type of fusion.
Results: Between years 2002 and 2014, there was a 293% increase in the number of patients with prior lumbar fusion undergoing THA. Prevalence of hip dislocation in patients with lumbar fusion before THA was 7.4% compared to 4.8% without fusion, $P < .001$. There was an 80% increase in dislocation in the fusion group at 6 months, 71% at 1 year, and 60% at 2 years. There was a 48% increased risk of failure leading to revision hip surgery in patients with fusion at 6 months, 41% at 1 year, and 47% at 2 years. Dislocation was the most common mode of failure leading to revision in both the fusion group (20.8%) and the nonfusion group (16%).
Conclusion: Results of this study demonstrate that lumbar fusion before THA is an independent risk factor for dislocation leading to increased risk of revision THA.

The number of patients undergoing total hip arthroplasty (THA) continues to increase, with the Centers for Disease Control and Prevention (CDC) estimating nearly 330,000 performed each year in the United States as of 2010 [1]. In 2008, over 413,000 spinal fusion surgeries were performed [2]. Increasing numbers of patients are undergoing both lumbar spine fusion (LSF) and THA. Each procedure alone effectively alleviates patients' symptoms, but concerns have arisen regarding increased complication rates in those patients who have undergone both operations [3].

The goal of LSF is to reduce motion in those segments involved in order to relieve patients' symptoms due to stenosis, instability, radiculopathy, or any combination thereof. Creating rigidity in the lumbar spine, or an altered sagittal plane balance, and abnormal pelvic parameters can lead to proximal junctional kyphosis and these factors may contribute to early failure of THA in this patient population [4]. Patients undergoing primary THA who had previously undergone LSF may not be able to safely accommodate THA implants in the same “safe zone” position as those patients with their native or normal lumbar spine, as described by Lewinnek et al [5]. The overall decreased lumbar flexibility following lumbar fusion and its effect on pelvic and hip biomechanics warrants

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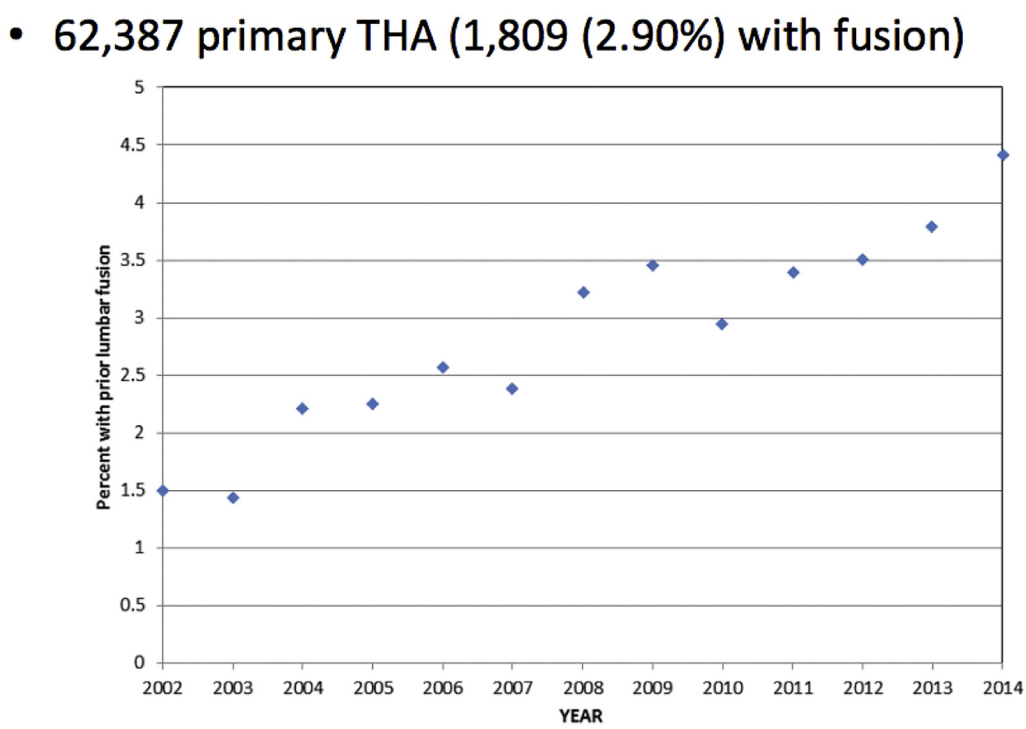

Fig. 1. Patient cohort. THA, total hip arthroplasty.

increased investigation and vigilance before considering THA candidacy and surgical planning.

The goals of this study are to investigate the prevalence of patients with THA within 5 years of undergoing prior LSF in the Medicare population and compare the risk of dislocation and revision in THA patients with and without prior LSF.

Materials and Methods

We retrospectively reviewed 5% Medicare Part B claims data from 1997 to 2014 to identify patients who underwent primary THA (Current Procedural Terminology [CPT] codes 27130 and 27132) between 2002 and 2014, leaving 5 years prior for review of those with previous LSF. The following patients were excluded from the analysis: (1) younger than 65 years; (2) non-US residents; (3) enrolled in a Health Maintenance Organization (HMO); and (4) not enrolled in both Parts A and B. The younger patients were excluded due to their enrollment in Medicare for confounding reasons, such as physical disabilities, end-stage renal disease, and ALS. The remaining exclusion criteria were applied due to the incomplete claim history for those patients. We then stratified the data to identify those patients who had undergone LSF (CPT codes 22558, 22612, 22630, and 22633) within 5 years before THA, resulting in a cohort of 1809 patients (out of 62,387 primary THA or 2.9%). CPT codes 22585, 22614, 22632, and 22634 were used to identify each additional spine levels treated. Post-THA dislocation was identified using 27250, 27252, 27253, 27254, 27265, and 27266, while revision surgery was identified 27134, 27137, and 27138.

A multivariate Cox regression was used to compare the risk of dislocation and revision following primary THA between those patients who had LSF in the 5 years before THA and those who did not. The analysis was adjusted for age, socioeconomic status (Medicare buy-in), race, census region, gender, year THA performed, Charlson comorbidity score, preexisting conditions (within 12 months before THA including diabetes, obesity, and smoking), history of prior LSF within 5 years, type of lumbar fusion (anterior lumbar interbody fusion, posterior lumbar interbody fusion, transforaminal lumbar interbody fusion, 360° fusion, single-incision 360 fusion), and number of fusion interspaces.

Results

We identified 62,387 Medicare patients who met the inclusion criteria and underwent primary THA between 2002 and 2014, which extrapolated to 1,247,740 Medicare patients having the procedure in this time interval. We found that 1809 (3%) of the 62,387 THA patients had previously undergone LSF within 5 years before THA. Between 2002 and 2014, there was a 293% increase in the number of patients with LSF undergoing THA (Fig. 1). Age ($P < .001$), Charlson score ($P < .001$), prior LSF ($P < .001$), Medicare buy-in ($P < .001$), census region ($P < .001$), year of surgery ($P < .001$), race ($P = .013$), and gender ($P = .011$) were identified as risk factors for dislocation in all THA patients within 5 years postoperatively, regardless of previous LSF or not (Table 1). The prevalence of dislocation in patients with prior LSF was 7.4%, compared to 4.8% in patients without previous LSF, $P < .001$. There was an 80% increased risk of dislocation in the LSF group at 6 months, 71% at 1 year, 60% at 2 years, 67% at 5 years, and 72% at 10 years ($P < .001$ for all time periods; Fig. 2).

The prevalence of revision in patients with prior LSF was 6.9%, compared to 4.6% in patients without previous LSF. There was a 48% increase in the risk of revision in LSF group at 6 months ($P = .007$), 41% at 1 year ($P = .012$), 47% at 2 years ($P = .002$), 53% at 5 years ($P < .001$), and 55% at 10 years ($P < .001$; Fig. 3). Age ($P = .021$), Charlson score ($P < .001$), prior LSF ($P < .001$), Medicare buy-in ($P = .017$), race ($P = .003$), census region ($P < .001$), and smoking ($P = .049$) were identified as risk factors for revision in all THA patients within 5 years postoperatively, regardless of LSF history (Table 2). For the fusion patients, the type of lumbar fusion was an independent risk factor for revision surgery ($P < .001$), but not found to be a risk factor for dislocation ($P = .552$). The number of segments fused was also not a risk factor for dislocation ($P = .098$) or revision ($P = .468$). Dislocation was