The Journal of Arthroplasty 30 (2015) 840–845

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Total Joint Arthroplasty in Transplant Recipients: In-Hospital Adverse Outcomes

Priscilla K. Cavanaugh, MS, Antonia F. Chen, MD, MBA, Mohammad R. Rasouli, MD, Zachary D. Post, MD, Fabio R. Orozco, MD, Alvin C. Ong, MD

The Rothman Institute at Thomas Jefferson University, Philadelphia, Pennsylvania

ARTICLE INFO

Article history:
Received 7 September 2014
Accepted 30 November 2014

Keywords:
organ transplant
total hip arthroplasty
total knee arthroplasty
renal transplant
complications

ABSTRACT

This study aims to determine in-hospital complications and mortality in transplant recipients following total joint arthroplasty. The Nationwide Inpatient Sample database was queried for patients with history of transplant and joint arthroplasty (primary or revision) from 1993 to 2011. Kidney transplant increased risk of surgical site infection (SSI) and wound infections (OR = 2.03), systemic infection (OR = 2.85), deep venous thrombosis (OR = 2.07), acute renal failure (ARF) (OR = 3.48), respiratory (OR = 1.34), and cardiac (OR = 1.21) complications. Liver transplant was associated with SSI/wound infections (OR = 2.32), respiratory complications (OR = 1.68), cardiac complications (OR = 1.34), and ARF (OR = 4.48). Other transplants grouped together were associated with wound complications (OR = 2.13), respiratory complications (OR = 2.06), and ARF (OR = 4.42). Our study suggests these patients may be at increased risk of in-hospital complications, particularly ARF in renal and liver transplant patients.

© 2014 Published by Elsevier Inc.

Organ transplantation is an increasingly popular option for treating patients with end-stage organ failure. Annually, more than 12,000 kidney transplantations, 5000 liver transplantations and 2000 heart transplantations are performed in the United States alone, and these numbers are expected to rise in the next several decades [1]. The overall long-term survival of transplant patients has improved despite long waiting times, coexisting comorbidities, obesity, increasing age, and higher degree of human leukocyte antigen (HLA) mismatch in patients undergoing organ transplantation [1,2]. This improvement is mainly due to precise patient selection, advancement in perioperative care, surgical technique and immunosuppressive medications [1].

With continued improvement in the survival rates of transplant recipients, more of these patients will subsequently require total joint arthroplasty (TJA) either due to degenerative joint disease or steroid-induced osteonecrosis [1]. However, chronic immunosuppression therapy and poor bone quality make these patients susceptible to surgical site infection (SSI) and mechanical prosthesis failure, respectively [1,3,4]. Transplant patients are also at increased risk of bleeding due to thrombocytopenia [5]. Thus, performing TJA in transplant patients poses a challenging dilemma for orthopedic surgeons. More specifically, the paucity of literature regarding the outcome of TJA in patients with certain organ transplants, such as lung and pancreas, makes predicting outcomes difficult for surgeons.

Therefore, the purpose of this study is to compare in-hospital complications in a large cohort of transplant recipients based on the type of transplant and type of TJA performed.

Materials and Methods

Nationwide Inpatient Sample (NIS) data from 1993 to 2011 was utilized for this study. Since the NIS database has been sufficiently de-identified, this study was exempt from institutional review board review. Patients with a history of transplant who underwent hip or knee arthroplasty (primary or revision) were identified using International Classification of Diseases (ICD)-9 codes. The following codes were utilized for a history of transplant (V42.0: kidney, V42.1: heart, V42.6: lung, V42.7: liver, V42.81: bone marrow, V42.83: pancreas) and TJA codes (81.51: primary total hip arthroplasty [THA], 81.53, 00.70-00.73: revision THA, 81.54: primary total knee arthroplasty [TKA] and 81.55, 00.80-00.84: revision TKA). Patient comorbidities and perioperative complications were also identified using the same coding system.

For all patients, patient demographics (age, sex, and race), insurance type, hospital type (urban academic, urban private, or rural), hospital size (small, medium, or large), region (Northeast, Midwest, West, and South), underlying joint disorder (osteoarthritis versus osteonecrosis) and in-hospital mortality were obtained. ICD-9 codes were used to identify postoperative cardiac, respiratory, pulmonary embolism (PE), deep venous thrombosis (DVT), SSI, systemic infection, acute renal failure (ARF) and wound related complications (Appendix 1). ICD-9 codes

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.2014.11.037.

Reprint requests: Alvin Ong, MD, 2500 English Creek Ave, Building 1300, Egg Harbor Township, NJ 08234.

http://dx.doi.org/10.1016/j.arth.2014.11.037
0883-5403/© 2014 Published by Elsevier Inc.

defined ARF as ARF with lesion of tubular necrosis, lesion of renal cortical necrosis, lesion of renal medullary necrosis, other specified pathologic lesion to kidney, or ARF unspecified.

Statistical Analysis

Multivariate logistic regressions were used to determine if having a history of organ transplant was an independent predictor for cardiac complications, respiratory complications, PE, DVT, SSI, wound complications, systemic infection, ARF, and in-hospital mortality. A full regression model was created for each complication, transfusion and mortality incorporating all possible factors, including demographics, hospital region, setting and size, primary payer, year of surgery, underlying joint disorder, type of TJA (revision versus primary) and type of joint (knee versus hip). The reported odds ratios and confidence intervals were based on the multivariate analyses. For each transplant group, the adjusted odds ratio (OR) of each complication is presented in a forest plot with their 95% confidence interval. In some cases, the 95% confidence interval was so wide that plotting it on a visible scale was not feasible, so the complication was not incorporated into the associated plot; in those cases, the estimated OR was not statistically significant. Those confidence intervals (CI) that were above 1.0 were considered statistically significant to $P < 0.05$. All analyses were performed using R 3.0.2 (R Foundation for Statistical Computing, Vienna, Austria) using the 'rms' package to perform the logistic regression. *P*-values less than 0.05 were considered to be statistically significant.

Results

A total of 4493 TJA patients (0.17% of the study sample) with a history of at least one organ transplant comprised the study cohort, with a total of 4654 transplants. Overall, transplants were most commonly seen in revision THA (0.50%), followed by primary THA (0.30%). The proportion of patients with a history of organ transplant that underwent primary TKA increased from 0.04% to 0.11% over the study period, which increased significantly over time ($P < 0.01$). Meanwhile, the proportion of transplant recipients who had undergone primary THA slightly decreased going from 0.35% to 0.24% over 18 years. Both proportions of revision TKA and THA in the study population increased from 0.03% to 0.16%, and 0.35% to 0.52%, respectively (Fig. 1). These trends significantly changed over time ($P < 0.01$).

Kidney transplants were the largest group with 3209 patients (3209/4654, 69.0%), followed by liver transplants with 787 patients (787/4654, 16.9%). Patients with a history of transplant tended to be younger on average than the overall patient population, with pancreas making up the youngest transplant group (Table 1). Additionally, transplant patients were more likely to be male in the kidney (male 57.21%, female 42.79%), liver (male 57.31%, female 42.69%) and all other transplant groups (male 69.4%, female 30.06%).

Table 1
Demographics of Study Cases.

	All Patients	Kidney Transplant	Liver Transplant	Other Transplants
Number	2,583,529	3209	787	658
Age (mean ± SD)	66.8 ± 11.6	53.5 ± 13.1	57.9 ± 10.4	58.1 ± 11.9
Female (%)	61.0%	42.8%	42.7%	30.1%
Caucasian race (%)[a]	66.3%	55.3%	64.9%	65.5%

[a] Race was unspecified in a large proportion of cases.

TJA in Kidney Transplant Recipients

Patients with a history of kidney transplant had a significantly increased risk of ARF (OR = 3.48, 95% CI: 2.79–4.33, $P < 0.001$), DVT (OR = 2.07, 95% CI: 1.46–2.94, $P < 0.001$), systemic infection (OR = 2.85, 95% CI: 1.66–4.9, $P < 0.001$), wound infection/SSI (OR = 2.03, 95% CI: 1.53–2.7, $P < 0.001$), and cardiac (OR = 1.21, 95% CI: 1.1–1.3, $P < 0.001$) and respiratory complications (OR = 1.34, 95% CI: 1.1–1.6, $P < 0.002$) (Fig. 2). Overall, patients with kidney transplants undergoing TJA trended toward higher in-hospital mortality compared to non-transplant patients, as indicated by multivariate analysis (OR = 2.04, 95% CI: 0.96–4.33, $P = 0.06$); however, this result was not statistically significant.

TJA in Liver Transplant Recipients

Similarly, liver transplants were associated with a higher risk of wound infection/SSI (OR = 3.90, 95% CI: 1.4–3.9, $P = 0.001$), ARF (OR = 4.48, 95% CI: 3.15–6.37, $P < 0.001$), cardiac (OR = 1.34 95%, CI: 1.1–1.6, $P = 0.001$) and respiratory complications (OR = 1.68 95%, CI: 1.2–2.4, $P = 0.006$) (Fig. 3).

TJA in Other (Heart, Lung, and Pancreas) Transplant Recipients

There were a total number of 658 (658/4654, 14.1%) cardiac, lung and pancreas transplant recipients that were much smaller in number. This subset of transplant patients had higher rates of respiratory complications (OR = 2.06 95%, CI: 1.43–2.95, $P < 0.001$), wound complications (OR = 2.13 95%, CI: 1.27–3.58, $P = 0.004$), and ARF (OR = 4.42 95%, CI: 3.01–6.48, $P < 0.0001$). These specific transplant patients undergoing TJA did not have significantly increased rates of DVT or in-hospital mortality compared to non-transplant patients (Fig. 4).

Primary Versus Revision Arthroplasty in Transplant Recipients

The unadjusted rate of cumulative complications was overall higher in revision versus primary arthroplasty, which included non-transplant patients (6.2% primary versus 10.5% revision $P < 0.0001$), kidney transplant (10.3% primary versus 13.1% revision, $P = 0.05$), and liver transplant recipients (12.6% primary versus 23.4% revision, $P = 0.004$)

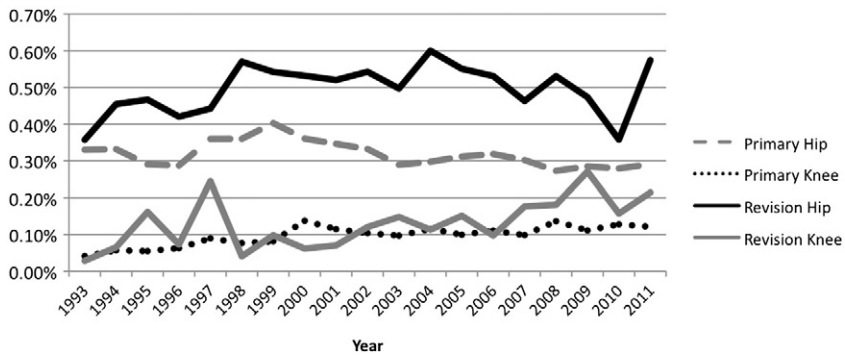

Fig. 1. Trends in transplant recipients that underwent total hip arthroplasty (THA) and total knee arthroplasty (TKA) between 1993 to 2011.

Download English Version:

https://daneshyari.com/en/article/4060492

Download Persian Version:

https://daneshyari.com/article/4060492

Daneshyari.com