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The influence of psychiatric comorbidity on perioperative outcomes after shoulder arthroplasty

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Background: Psychiatric comorbidity has been associated with increased health risks and poor long-term treatment outcomes in numerous medical disciplines, but its effect in short-term perioperative settings is incompletely understood. The purpose of this study was to evaluate the influence of a preoperative diagnosis of depressive disorder, anxiety disorder, schizophrenia, or dementia on in-hospital (1) adverse events, (2) blood transfusion, and (3) nonroutine discharge in patients undergoing shoulder arthroplasty.

Methods: Using the National Hospital Discharge Survey (NHDS) database, we identified 348,824 discharges having undergone partial or total shoulder arthroplasty from 1990 to 2007. Multivariable regression analysis was performed for each of the outcome variables.

Results: The prevalence of diagnosed depressive disorder was 4.4%, anxiety disorder, 1.6%; schizophrenia, 0.6%; and dementia, 1.5%. Preoperative psychiatric disorders, with the exception of schizophrenia, were associated with higher rates of adverse events. Depression and schizophrenia were associated with higher perioperative rates of blood transfusion. Any preoperative psychiatric illness was associated with higher rates of nonroutine discharge.

Conclusions: Patients with preoperative psychiatric illness undergoing shoulder arthroplasty are at increased risk for perioperative morbidity and posthospitalization care. Preoperative screening of psychiatric illness might help with planning of shoulder arthroplasty.

Level of evidence: Level II, Retrospective Cohort Design, Prognosis Study.

Keywords: Psychiatric illness; shoulder arthroplasty; comorbidities

Anxiety disorder and depressive disorder are the 2 most commonly diagnosed psychiatric disorders in the general population,[1] with a lifetime prevalence of about 29% and 17%, respectively.[22] Isolated schizophrenia, however, is an uncommon condition, with a lifetime prevalence slightly below 1%.[29] Dementia, largely attributed to Alzheimer disease, affects more than 6% of people aged older than 60 years in the United States.[11] A recent study revealed that the worldwide number of older individuals with a clinically diagnosed psychiatric illness is expected to double in approximately 20 years.[31]

Several studies, particularly in the fields of cardiology and neurology, have linked the presence of psychiatric disorders to increased risks of distinct diseases, suboptimal treatment outcomes, and higher utilization of health care

The Massachusetts General Hospital Institutional Review Board has determined that this study is exempt from review. The data are deidentified and available free online.

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resources.[8,10,16,18,20,21,28,31,34,42] Research evaluating the influence of psychiatric disorders in short-term perioperative settings is scarce.[4] In particular, limited data are available on the effect of psychiatric comorbidity on patients undergoing shoulder arthroplasty, a procedure whose demand has grown substantially during the past decade.[7,23]

We therefore sought to measure the influence of psychiatric disorders on inpatient perioperative outcomes in a large national database of patients that had undergone partial or total shoulder arthroplasty (TSA). The aim of the present study was to evaluate the relationship of psychiatric comorbidity with in-hospital (1) adverse events, (2) blood transfusion, and (3) nonroutine discharge in patients undergoing shoulder arthroplasty.

Materials and methods

To evaluate the influence of concomitant psychiatric comorbidities on in-hospital adverse events, blood transfusion, and nonroutine discharge after partial and TSA, demographic and medical information was obtained from public use files of the National Hospital Discharge Survey (NHDS) database for the years 1990 to 2007. First endorsed by the National Center for Health Statistics (NCHS) almost 50 years ago, and published annually since then, the NHDS uses a complex 3-stage probability design that includes population-weighting adjustments to ensure an unbiased national sampling of inpatient records.[9] More than 250,000 discharges from nonfederal short-stay hospitals in the 50 states and the District of Columbia are surveyed annually.[13] NHDS uses the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes to classify up to 7 medical diagnoses and up to 4 procedures, besides demographic information, and inpatient outcomes, including discharge destination and hospital length of stay.[5,6,26]

Our study population consisted of the deidentified data of individuals aged ≥18 years undergoing partial or TSA from 1990 to 2007.

Discharges with a procedure code (ICD-9-CM) for total (81.80) or partial (81.81) shoulder arthroplasty were included in the sample. Primary diagnosis and the prevalence of concomitant comorbidities and in-hospital adverse events were also determined using the appropriate ICD-9-CM codes. To elucidate the influence of mental disorders on postoperative inpatient outcomes, ICD-9-CM codes were used to further divide mental disorders into 4 subgroups: depression (296.2, 296.3, 296.5, 296.9, 300.4, 301.12, 309.0, 311.x), anxiety (300.x, 309.24, 309.28), schizophrenia (295.x), and dementia (290.x).

We tracked age, sex, primary diagnosis, type of shoulder arthroplasty, presence or absence of comorbidities and complications, length of stay, discharge destination, and death. We subdivided patients by preoperative comorbidity as follows: (1) depression, (2) anxiety, (3) schizophrenia, (4) dementia, and (5) those without any of these diagnoses. The overall prevalence for psychiatric disorders was 4.4% for depression, 1.6% for anxiety, 0.6% for schizophrenia, and 1.5% for dementia (Table I).

Osteoarthrosis of the shoulder (48%) was the most frequent indication for shoulder arthroplasty in the entire study population as well as in the depression subgroup, followed by closed proximal humeral fracture (25%). In patients with comorbid anxiety, schizophrenia, or dementia, the most common indication for shoulder replacement was proximal humeral fracture. Hypertensive disease (45%), diabetes mellitus (14%), and chronic pulmonary disease (13%) were the most common medical comorbidities in the cohort (Table II).

Our response variables were (1) presence of adverse events, (2) necessity of blood transfusion, and (3) discharge to a rehabilitation facility. Data for the variable "discharge destination" were only available from 2001 to 2007. A normal distribution was assumed, based on the large sample size. Patient characteristics among subgroups were compared using the Pearson χ^2 test for categoric data and independent-samples t tests for continuous data.

To detect the relationship between depression, anxiety, schizophrenia, and dementia with negative postoperative inpatient outcomes (adverse event, need for transfusion, discharge to a facility), we included all demographic and medical variables present in at least 2% of the population[24] into a multivariable logistic regression model. For the in-hospital adverse events, we used a cutoff of 1% due to their lower rates of occurrence. Correcting for multiple comparisons, we used a P value $<.001$ to define statistical significance in all analyses.

Results

Psychiatric comorbidity was associated with a higher rate of inpatient adverse events (depression, 21%; anxiety, 26%; schizophrenia, 24%; dementia, 29%) compared with no psychiatric comorbidity (16%; Table III). In multivariable analysis, depression, dementia, and anxiety were independently associated with higher odds of an inpatient adverse event (model fit: for omnibus test of model coefficients: $\chi^2 = 33861$, $P < .001$, Nagelkerke $R^2 = 0.16$; Table IV). With the exception of dementia patients (1.9%), in hospital mortality was low in patients with concomitant psychiatric comorbidity (depression, 0%; anxiety, 0%; schizophrenia, 0%; no psychiatric comorbidity, 0.2%).

Acute postoperative anemia was the most common adverse event in all psychiatric comorbidity subgroups (depression, 10%; anxiety, 15%; dementia, 13%). In multivariable analysis, patients with schizophrenia and depression had a higher risk, and patients with anxiety a lower risk for blood transfusion (model fit: omnibus test of model coefficients: $\chi^2 = 27198$, $P < .001$, Nagelkerke $R^2 = 0.20$; Table V).

Rates of hospital discharge to short-term or long-term rehabilitation facilities were higher in patients with any comorbid mental condition (depression, 32%; anxiety, 40%; schizophrenia, 36%; dementia, 23%) than in individuals with no psychiatric comorbidity (15%). The subgroups with the highest rate of discharge to short-term and long-term facilities were schizophrenia (25%) and depression (24%). The length of inpatient days of care was shorter in patients with comorbid depression (3.0 ± 1.7 days), perhaps because they were transferred more quickly to a long-term facility, but higher in patients with