



## Total Hip and Total Knee Arthroplasty in a Case-Series of Patients with Tardive Dyskinesia

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### Abstract

**Background:** Tardive dyskinesia (TD) is a dopaminergic movement disorder caused by prolonged use of dopaminergic antagonists. In this case-series we describe the preoperative, postoperative and radiographic clinical characteristics of patients with TD undergoing total joint arthroplasty (TJA).

**Methods:** We identified 11 patients with TD who underwent primary TJA at our urban tertiary arthroplasty clinic between 2008-2015. The underlying etiology of TD was bipolar disorder in 7 patients, schizophrenia in 3 patients, and GERD in 1 patient.

**Results:** Average Harris Hip Scores and Knee Society Scores improved postoperatively. Nine patients reported a clinically significant decrease in pain while 10 patients reported increased ambulation postoperatively. No patients required revision, and none had acute postoperative complications.

**Conclusion:** We have no evidence that TJA in patients with TD is dangerous or ineffective at short-term follow-up.

**Keywords:** Tardive Dyskinesia; Total Hip Arthroplasty; Total Knee Arthroplasty; Extrapyramidal Syndromes.

### Introduction

Tardive dyskinesia (TD) is an extrapyramidal tardive syndrome characterized by oro-buccal-lingual (OBL) dyskinesia iatrogenically induced as a result of prolonged dopaminergic antagonism [1, 2]. Dopamine receptor blocking agents associated with the development of TD include antipsychotics, tricyclic antidepressants, antiemetics, and some antihistamines used to treat gastric disorders. Typical (first generation) antipsychotics pose a greater risk than atypical (second and third generation) antipsychotics [3]. In addition to OBL dyskinesia, chorea or athetosis of the trunk and limbs is observed, coupled with pelvic dyskinesia and slowed, shuffling gait [2]. The prevalence of TD among patients using antipsychotics varies across studies from 3-62% with a mean of approximately 20%, with variations in prevalence attributed to sociodemographic and clinical characteristics, variable diagnostic criteria and methods of assessment, and the fluctuating course of symptom presentation [3, 4].

Researchers have examined surgical outcomes for total joint arthroplasty (TJA) in patients with other dopaminergic movement conditions, such as Parkinson's disease. In patients undergoing total hip arthroplasty (THA), extrapyramidal syndromes are associated with increased risk of adverse outcomes, including dislocation and aseptic loosening [5]. Patients with Parkinson's disease undergoing TJA have longer post-operative hospitalizations and higher rates of perioperative and postoperative complications [6, 7]. There is also evidence of poorer functional improvements in patients with Parkinson's after total hip and knee arthroplasty relative to control groups, despite similar patient-reported pain relief [8].

Scant data exist on the surgical outcomes of total hip or knee arthroplasty in patients with Tardive dyskinesia, leaving clinicians with little guidance when treating such patients. In this study, we aimed to better characterize this patient population by describing a case-series of patients with Tardive dyskinesia undergoing total hip or knee arthroplasty.

### Materials and Methods

After approval from the institution's ethical review board, we conducted a chart review to identify patients with Tardive dyskinesia who underwent total hip arthroplasty (THA) or total knee arthroplasty (TKA) at our urban academic tertiary care arthroplasty clinic. To identify patients of interest, we used the Research Electronic Data Capture (Red Cap) database of the senior surgeon from Jan 2008, April

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2015, supplemented by operative data sheets and office visit notes. First, we selected all patients diagnosed with schizophrenia, schizoaffective disorder, bipolar disorder, depression, or gastric motility disorders, since patients with these conditions are most likely to be taking medications likely to produce TD. We then further filtered these patients based on selected medications known to induce TD, and assessed whether the patients demonstrated an outlined constellation of symptoms including oro-buccal-lingual dyskinesia, orofacial dyskinesia, lip-smacking, puckering, and facial tics.

## Results

We identified 11 patients with Tardive dyskinesia who underwent total joint arthroplasty; 6 patients had total hip arthroplasty and 5 had total knee arthroplasty. Eight patients were Caucasian, 2 were African-American, and 1 was Asian.

### Total Hip Arthroplasty in Patients with Tardive Dyskinesia

The patients with Tardive dyskinesia who underwent THA were followed for an average of 2 years (range: 7 weeks to 4 years). One of these patients had a lapse in follow-up care due to incarceration. Three patients underwent bilateral THA, resulting in a total of 9 THA procedures (4 on the right side and 5 on the left). Two patients were male and four were female. Their mean body mass index (BMI, weight in kg divided by height in meters squared) was 29.7 (range: 21.9 to 39.9). The mean age was 54 years (range: 39 to 72 years).

The underlying etiology of TD was Bipolar Disorder in 4 patients, Schizophrenia in 1 patient, and Gastroesophageal Reflux Disease (GERD) in 1 patient. Medications included the antipsychotics Depakote, Quetiapine, Aripiprazole, Chlorpromazine, Haloperidol, and Risperidone and the antacid/antihistamine Ranitidine. Five patients had significant history of additional mental illness, including depression, anxiety, borderline personality disorder, and PTSD. Two patients reported a history of smoking. Three patients reported a history of polysubstance abuse.

Patients underwent THA for a variety of indications. Two patients had severe degenerative joint disease, one patient had evidence of avascular necrosis, and one patient had arthritis and impingement. One patient had a history of a right hip fracture from a suicide attempt 10 months prior to THA surgery. This patient initially had a girdle stone procedure and underwent revision to THA.

The mean preoperative Harris Hip Score was 29.4 (range: 20.9 to 42.1). Patient-reported preoperative pain ranged between 8-10 on a 1-10 scale. All patients reported serious limitations to daily activities. Three patients required two crutches to ambulate and two patients required a cane to ambulate preoperatively. Mean length of stay in the hospital was 3.22 days (range: 2 to 7 days). There were no acute postoperative complications, although one patient experienced greater than normal blood loss (1800 cc) during surgery. No patients required revisions.

Pain and limitations to daily activities were reduced postoperatively in all patients. The two patients who required two crutches to ambulate before surgery reported needing only a cane at their last follow-up appointment. Both patients who had previously required a cane to ambulate reported no assistance needed for ambulation at their one year follow-up. One patient reported hip instability and occasional crepitus at 6 month follow-up. Another patient reported acute onset left side buttock/hip pain at 10 week follow-up. An X-ray was negative for fracture but lumbar spine arthrosis was present and pain was suspected to be referred radicular pain. Referred radicular pain

persisted through 4 year follow-up. The same patient had a left greater trochanteric bursitis at 4 year follow-up. Mean Harris Hip Scores at one year follow-up was 82.4 (range: 65.0 to 93.3) for those patients followed up to one year or more (n=4). Average improvement in Harris Hip Scores at one year follow-up was 49.1.

### Total Knee Arthroplasty in Patients with Tardive Dyskinesia

Five patients with TD underwent TKA and were followed for an average of 3 years (range: 6 months to 5 years). Three patients underwent bilateral TKA during the study period. A total of 8 TKAs were completed with 4 on the right side and 4 on the left side. One patient was male and 4 were female, with a mean BMI of 38.0 (range: 26.5 to 48.5). The mean age was 52 (range: 44 to 60 years).

The underlying etiology of TD was Bipolar Disorder in 3 patients and Schizophrenia in 2 patients. Medications included Olanzapine, Ranitidine, Haloperidol, Quetiapine, Perphenazine and Risperidone. Three patients had significant history of additional mental illness, including depression, anxiety, and psychosis. Three patients reported a history of smoking with one of those patients also reporting a history of alcohol abuse and another patient reporting a history of polysubstance abuse. All patients underwent TKA for osteoarthritis.

For patients with enough available data (n=4) the mean preoperative Knee Society Score was 49.75 (range: 10 to 94). The mean preoperative Knee Society Function score for all patients (n=6) was 50.8 (range: 35 to 80). Patient reported preoperative pain ranged from 6-11 on a 1-10 scale. One patient was housebound and the other 4 patients could walk less than 5 blocks preoperatively. Mean length of stay in the hospital was 3.33 days (range: 3 to 4 days). There were no reported acute postoperative complications and no patients required revision during the study window. Three patients reported a decrease in pain postoperatively at their last follow-up appointment. Four patients improved their ambulation distance. Improvements ranged from 5-10 blocks at 3-month follow-up to unlimited ambulation at 2 or more years follow-up. One patient remained housebound before and after surgery and had no reduction in pain at 1-year follow-up. This patient reported 4 falls in 1 month and pain in the left knee (non-surgical knee) and bilateral hips. An X-ray was inconclusive to explain full scope of the patient's pain. Mean Knee Society Scores at six-week follow-up was 65.5 (range: 45 to 89) for those patients with available data (n=4). Mean Knee Society Function Scores at six-week follow-up was 55 (range: 30-60) for all patients (n=6).

## Discussion

Patients with movement disorders pose a challenge to orthopedic surgeons and health care teams, as postoperative care can be complex. There is existing literature that examines the outcomes of TJA on patients with movement disorders, particularly those with Parkinson's disease. However, there are few reports on the surgical outcomes of patients with Tardive Dyskinesia. Patients with Parkinson's disease who undergo hip arthroplasty have poor outcomes due to complications related to their condition, with high rates of morbidity and mortality [5]. Similarly, TD patients are predisposed to joint loosening and dislocation. Spasticity and contractures related to their movement disorder cause abnormal muscle tone across the affected joint, often resulting in early failure of the joint replacement [8].

Our study examined preoperative and postoperative clinical characteristics of TD patients undergoing TJA between 2008 and 2015 at an urban academic tertiary care arthroplasty clinic. Of the 11 patients over the average follow-up time of 2.5 years, none required

revision and none presented with acute postoperative complications. Future research should look more broadly at nationally-representative samples, to quantify complication rates and other important outcome variables. In conclusion, we found no evidence that TJA is dangerous or ineffective in patients with TD at short-term follow-up, with a low complication risk similar to the complication rate in the general population [9]. Knee Society Score and Knee Society Function Score were consistent with published thresholds defining treatment success of TKA [10]. Harris Hip Scores represented good outcomes according to standard guidelines [11]. The strengths of our study include a sample pool extracted from a research database (RED cap) that had extensive patient information and accurate identification of patients with TD diagnoses. In addition, we had access to operative data sheets and office visit notes from patients who had been followed for an average time of 2.5 years. The major limitation of this study is its small sample size. Conducting a large prospective study with sufficient follow-up periods on each patient would enhance the level of evidence in evaluating the factors influencing clinical outcomes of TD disorder patients following TJA. The results of our study aimed to improve current postoperative management of this patient population by providing clinicians with the knowledge to make preemptive decisions based on the patient's movement disorder. Future efforts to examine TD patient outcomes should involve large, multicenter, prospective trials that aim to develop postoperative protocols following TJA to minimize risks for complications.

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