

Development of an Outpatient Protocol for Lumbar Discectomy: Our Institutional Experience

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Key words

- Discectomy
- Laminotomy
- Lumbar
- Outpatient
- Protocol
- Same-day

Abbreviations and Acronyms

ED: Emergency department

OR: Operating room



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INTRODUCTION

As a result of improved anesthesia and surgical techniques in the last decade, earlier patient mobilization has been made possible. Secondary to fiscal pressures, and with a goal of improved patient outcomes, many procedures that historically resulted in inpatient admission have been converted to outpatient procedures. Lumbar discectomy is traditionally performed as an inpatient procedure. However, it is now being performed at many centers as an ambulatory surgery (10, 14). More recent data have shown that patients who undergo outpatient discectomy have shorter recovery times, improved patient satisfaction scores, and decreased hospital costs (2-6, 8, 11, 13, 15, 16). In 2009, our institution designed and implemented a protocol for outpatient lumbar discectomies. To our knowledge, this is the first study that compares efficacy and safety before and after implementation of an outpatient spinal surgery protocol. We reviewed the perioperative and surgical

■ **BACKGROUND:** Traditionally, lumbar discectomy has involved overnight hospital admission. Recent literature supports the shift to same-day lumbar discectomy because of improved outcomes and better patient satisfaction scores. A successful protocol for outpatient lumbar discectomies was proposed and implemented at a single institution. The aim of this study is to perform a quantitative and qualitative analysis of this institutional model.

■ **METHODS:** Retrospective clinical data were collected for patients who underwent a lumbar discectomy during the period 2008–2012. Admission and readmission rates, emergency department (ED) visit rates, surgical complications, and differences between neurosurgeons specializing in spinal procedures and neurosurgeons not specializing in spinal procedures were analyzed before and after implementation of the outpatient surgery protocol.

■ **RESULTS:** Of 1011 cases identified, 643 cases of lumbar discectomy were performed before the implementation of the protocol, and 368 cases were performed after implementation. The admission rate before the start date of the outpatient protocol was 96.4% versus 50.3% after implementation. After protocol implementation, the most common reasons for admission were uncontrolled pain (18.9%), late operative start times (14.1%), comorbidities (13%), and intraoperative operating room complications (11.9%). Intraoperative complications consisted almost exclusively of dural tears. The 30-day readmission rate after protocol initiation was 4.6% ($n = 17$ of 368) versus 2.3% ($n = 15$ of 643) before initiation ($P = 0.046$), and ED visit rate not requiring an admission was 2.2% ($n = 8$ of 368) versus 1.1% ($n = 7$ of 643) before initiation ($P = 0.170$).

■ **CONCLUSIONS:** Our data demonstrate that a collaborative protocol for outpatient discectomy can be implemented in a safe and effective manner despite a statistical increase in hospital readmissions. The percentage rates of readmissions and ED visits accounted for a very small percentage of the overall number of cases after protocol implementation. Improvements in perioperative pain management and ensuring that outpatient lumbar discectomies are scheduled early in the day may further decrease the number of admissions. Future studies should examine the societal and financial impact of same-day discectomy versus overnight hospital stays.

management of patients undergoing ambulatory lumbar discectomy to identify all factors that affected patient outcome or led to an unanticipated admission or emergency department (ED) visit.

METHODS

Database Design

A retrospective database was constructed using data collected between July 2008 and

May 2012 from 2 academic hospitals for patients with Current Procedural Terminology codes of 63030 and 63042 as the entry criteria. Current Procedural Terminology code 63030 represented surgery for a single interspace lumbar laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy, or excision of herniated intervertebral disk. Current Procedural Terminology code 63042 represented

reexploratory lumbar hemilaminectomy for excision of recurrent herniated intervertebral disk. We reviewed the database and removed cases that involved multiple-level discectomies or bilateral lumbar surgery so that only one-level, single-sided discectomies remained. Patients were not excluded because of age, gender, or medical comorbidities, and all patients were included in this protocol regardless of preexisting conditions or perioperative complications. Although the protocol recommends hospital admissions for certain comorbidities, such as extreme age or distance traveled, our analysis included all patients. If a patient underwent multiple one-level discectomies, each surgery was documented as a separate case. Data entered into the database included patient demographics, medical comorbidities, level of lumbar surgery, initial versus redo discectomy status, surgical complications, procedure time, and reason for inpatient admission. Admissions were defined as any patient who was not directly discharged from the postanesthesia care unit. Readmissions and ED visits within 30 days of discectomy to hospitals in our health system were also recorded. Readmissions and ED visits were confirmed at the time of follow-up appointment, 4–6 weeks postoperatively. The institutional review board at the University of Pennsylvania approved the creation of this database.

Outpatient Discectomy Protocol

Our outpatient protocol was created by a multidisciplinary task force and consisted of a 9-page guide entailing a concise and effective algorithm for outpatient neurosurgery. In the beginning of the protocol, the goals and team member responsibilities from the initial neurosurgery preoperative visit to postoperative recovery are listed in detail. The protocol highlights selection of appropriate patients and patient education of outpatient surgery during this preoperative visit.

Other sections of this document include patient expectations for preadmission

testing, preoperative holding unit (before operating room [OR]), and postanesthesia care unit and the team responsibilities if an admission is warranted. The section on OR procedure lists guidelines for prophylaxis and aggressive treatment of postoperative nausea and vomiting and suggestions for effective analgesia. These suggestions include the use of nonsteroidal antiinflammatory drugs, local anesthesia preoperatively and postoperatively, and intraoperative placement of Depo-Medrol Gelfoam (Depo Medrol: Pharmacia & Upjohn Co. Division of Pfizer Inc., New York, New York) in the subarticular gutters. The guide concludes with criteria for aborted same-day discharge, which include pain >7 on visual analog scale, wound drainage requiring application of additional dressings, uncontrolled emesis, and failure to urinate or need for multiple straight catheterizations.

Data Analysis

Descriptive statistics were performed on entries in the database. Continuous variables were reported as mean value \pm SD, and discrete variables were reported as percentages. We used χ^2 test for categorical variables and a *P* value of 0.05 to define statistical significance.

RESULTS

Our database included 1011 cases of one-level lumbar discectomy in 998 unique patients. Patients from 11 neurosurgeons, 4 of whom are specialty trained in spine surgery, were included in this database. We implemented our outpatient discectomy protocol on 363 patients. There were 643 cases before implementation of the protocol and 368 cases afterward. The 2 groups were similar in mean age (47.8 years old before vs. 47.7 years old after) and gender (54% male vs. 58% male) (Table 1) as well as major comorbidities and level of disc herniation (Figure 1). There was also no significant difference of the average procedure length (91 minutes before vs. 90 minutes after) and average

length of OR use including anesthesia (147 minutes vs. 146 minutes) (Table 1).

Outpatient Procedure Versus Inpatient Admission

The admission rate before the implementation of the outpatient protocol was 96.4%. After protocol implementation, there was a significant decrease in the admission rate to 50.3%. There were differences in the admission rate for an initial discectomy versus redo discectomy (39.3% for initial discectomy vs. 81.5% for redo discectomy). The most common reasons for admission were uncontrolled pain (18.9%), late operative start times (14.1%), comorbidities (13%), and intraoperative surgical complications (11.9%). Other reasons included surgeries on already admitted patients, urinary retention, preexisting or new neurologic deficits, nausea, and postoperative medical and surgical complications (Figure 2). Intraoperative surgical complications consisted almost solely of dural tears, with most dural tears observed after protocol implementation (Figure 3). Based on clinician interviews, increase in number of durotomies appears to be an anomaly secondary to improved documentation that was needed to justify an admission after protocol implementation rather than an actual increase in durotomies.

Readmission Rates and ED Visits

We compared the rates of admission, readmission, and ED visits between neurosurgeons who specialized in spine procedures and neurosurgeons who did not specialize in spine procedures (Figure 4). The readmission and ED rates were similar between these 2 groups; however, there was a trend for the spine neurosurgeons to perform the discectomy as an overnight hospital stay (56% vs. 32%). The 30-day readmission rate after protocol implementation was 4.6% ($n = 17$ of 368) versus 2.3% before implementation ($n = 15$ of 643) and was statistically different between the 2 groups ($\chi^2 = 3.99$, $P = 0.046$). We report the percentage of each category of reasons

Table 1. Demographic Information

Group	Range of Dates	Age (years)	Total Cases	% Male Patients	Surgery Time (minutes)	Number (%) Redo Discectomy
Before implementation	July 2008–September 2010	47.8 \pm 13.9	643	54.4%	91 \pm 33	125 (19.4%)
After implementation	October 2010–May 2012	47.7 \pm 13.7	368	58.5%	90 \pm 35	65 (17.7%)

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