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The Spine Journal 15 (2015) 427–432

THE SPINE JOURNAL

Clinical Study

# The duration of symptoms and clinical outcomes in patients undergoing anterior cervical discectomy and fusion for degenerative disc disease and radiculopathy

Sigita Burneikiene, MD[a,b,*], E. Lee Nelson, MD[a,b], Alexander Mason, MD[a,b], Sharad Rajpal, MD[a], Alan T. Villavicencio, MD[a,b]

[a]*Boulder Neurosurgical Associates, 4743 Arapahoe Ave., Ste 202, Boulder, CO 80303, USA*
[b]*Justin Parker Neurological Institute, 4743 Arapahoe Ave., Ste 202, Boulder, CO 80303, USA*

Received 18 February 2014; revised 1 July 2014; accepted 15 September 2014

**Abstract**

**BACKGROUND CONTEXT:** There have been controversial reports published in the literature on the duration of symptoms (DOS) and clinical outcome correlation in patients undergoing anterior cervical discectomy and fusion (ACDF) for painful degenerative disc disease and radiculopathy.

**PURPOSE:** The primary purpose of this study was to analyze if the DOS has any effect on clinical outcomes.

**STUDY DESIGN/SETTING:** A post hoc analysis was performed on an original prospective clinical study analyzing clinical outcomes and cervical sagittal alignment correlations.

**PATIENTS SAMPLE:** Fifty-eight patients undergoing one- or two-level ACDF surgeries for cervical degenerative radiculopathy were analyzed.

**OUTCOME MEASURES:** Standardized questionnaires were used to evaluate clinical outcomes. Neck and arm pain was evaluated using (Visual Analog Scale [VAS]). Two scales of Health-Related Quality-of-Life Questionnaire (Short-Form 36 Health Survey [SF-36]) were used for this study: the physical component summary (PCS) and mental component summary (MCS). Neck disability index (NDI) was used to evaluate chronic disability in activities of daily living. The patients completed a self-reported Patient Satisfaction with Results Survey.

**METHODS:** Patients who had previous or redo surgeries, were diagnosed with myelopathy or had more than two-level ACDF surgeries were excluded, leaving a total of 58 patients. The mean follow-up was 37.2 months (range 12–54). Patients were divided into two groups for clinical outcome analyses according to the DOS: patients who had surgery within 6 months (n=29) or more than 6 months (n=29) after becoming symptomatic.

**RESULTS:** There were no statistically significant differences in any demographic or clinical parameters among the patient groups. Controlling for preoperative scores, the patients who had surgery within 6 months reported significantly higher reduction (p=.04) in arm pain scores compared with the patients who waited more than 6 months. No significant differences were detected in postoperative neck pain VAS (p=.3), NDI (p=.06), SF-36 PCS (p=.08), and MCS (p=.8) scores.

FDA device/drug status: Not applicable.

Author disclosures: ***SB:*** Nothing to disclose. ***ELN:*** Stock Ownership: Lanx (F); Speaking and/or Teaching: Medtronic Navigation (C); Grants: Medtronic Navigation (D, Paid directly to institution). ***AM:*** Consulting: KB Medical (B). ***SR:*** Consulting: Medtronic (C), LDR (C), Lanx (A); Speaking and/or Teaching Arrangements: Cleveland Clinic Foundation (A). ***ATV:*** Physician-Owned Distributorship: Leading Edge Spinal Implants (F); Stock Ownership: Lanx (G); Research Support (Investigator Salary, Staff/Materials): Medtronic (B, Paid directly to institution), Globus (B, Paid directly to institution), Profibrix (F, Paid directly to institution), Covidien (D, Paid directly to institution), Grifols (B, Paid directly to institution), Orthofix (C, Paid directly to institution); Fellowship Support: Orthofix (D, Paid directly to institution).

The disclosure key can be found on the Table of Contents and at www.TheSpineJournalOnline.com.

* Corresponding author. Boulder Neurosurgical Associates, 4743 Arapahoe Ave., Ste 202, Boulder, CO 80303, USA. Tel.: (303) 938-5700; fax: (303) 998-0007.

*E-mail address*: sigitab@bnasurg.com (S. Burneikiene)

http://dx.doi.org/10.1016/j.spinee.2014.09.017

**CONCLUSIONS:** Neck and upper extremity pain can be successfully treated conservatively. In those cases, when surgical intervention is pursued, patients with shorter DOS have better improvement in radiculopathy symptoms that is statistically significant. 

*Keywords:* Anterior cervical discectomy and fusion; Clinical outcomes; Duration of symptoms; Prospective clinical study; Radiculopathy; Degenerative disc disease

## Introduction

Anterior cervical discectomy and fusion (ACDF) surgery is quite effective in relieving radiculopathy symptoms in patients suffering from symptomatic cervical spondylosis. However, the optimal timing for surgical treatment has not been clearly defined. Insurance companies require at least a 6-week trial of conservative treatment before approving this procedure. The systematic reviews that analyzed if timing of surgery had any effect on clinical outcomes found insufficient evidence to make any recommendations [1–3].

On the contrary, the vast majority of reports published in the literature on the duration of symptoms (DOS) and clinical outcome correlation in patients undergoing lumbar surgeries for painful degenerative disc disease and radiculopathy agree that shorter DOS before surgery resulted in improved clinical outcomes [4–10]. The primary purpose of this study was to analyze if the DOS has any effect on clinical outcomes and resolution of radicular symptoms in patients undergoing ACDF for cervical radiculopathy because of degenerative disc disease.

## Materials and methods

A post hoc analysis was performed using the data of a prospective clinical study that analyzed clinical outcomes and cervical sagittal alignment correlations [11]. We have selected a total of 58 out of 122 patients for this analysis. All patients had cervical radiculopathy symptoms. The patients who had previous surgeries, were diagnosed with cervical myelopathy or had more than 2-level ACDF surgeries were excluded from this analysis (n=64). The distinction between radiculopathy and myelopathy was based on clinical symptoms and imaging findings. All patients included in this study failed at least 6 weeks of conservative therapy before surgery unless they required immediate surgical intervention.

Standardized questionnaires were used to analyze clinical outcomes. Clinical evaluations were performed preoperatively, postoperatively at 3, 6, and 12 months, and then annually. Two separate scales (Visual Analog Scale [VAS]) to evaluate the severity of neck and arm pain were used. Functional outcomes were assessed using the Health-Related Quality-of-Life Questionnaire (Short-Form 36 [SF-36]). Two scores within the scoring algorithm were analyzed: the physical component summary (PCS) and mental component summary (MCS). Neck disability index (NDI) was used to evaluate chronic disability and activities of daily living. Preoperative and postoperative neurological examinations were performed, which included motor strength, sensory function, and reflexes. In addition, the patients completed a self-reported Patient Satisfaction with Results Survey. A sample of the patient satisfaction survey is presented in Fig. 1. Answers were scored on a scale from 0 to 100: 100, definitely true; 75, mostly true; 50, do not know; 25, mostly false; and 0, definitely false. A total score was calculated for each patient by averaging the scores from all 6 responses, and the means were compared between the patient groups. The patients were divided into two groups for clinical outcome analyses according to the DOS: patients who had surgery within 6 months (n=29) or more than 6 months (n=29) after becoming symptomatic (Table 1).

### *Statistical analyses*

The comparison between groups was made using Student *t* tests for all independent continuous quantitative variables. Categorical values were compared using $\chi^2$ analysis. Logistic regression analyses were performed to examine clinical outcome scores between the patients who had surgery within 6 months (coded in the analyses as 0) or more than 6 months (coded in the analyses as 1) after becoming symptomatic, while controlling for respective preoperative scores and number of surgical levels.

## Results

There were 30 male (51.7%) and 28 (48.3%) female patients. The average age was 48.4 (range 27–73) years. The mean follow-up time was 37.2 (range 12–54) months. There were no statistically significant differences in any demographic, surgical (Table 1), or preoperative clinical (Fig. 2 and Table 2) parameters among the patient groups.

Postoperatively, the patients who had surgery within 6 months had significantly decreased mean VAS (arm and neck), NDI, and increased mean SF-36 PCS scores at the last follow-up, indicating improvement in almost all clinical outcome measures (Fig. 3, Left). The only not quite statistically significant improvement (p=.08) in SF-36 MCS scores was observed for this group of patients. Neck pain and NDI scores were the only statistically significant