

Outpatient Anterior Cervical Discectomy and Fusion

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Introduction: Anterior cervical discectomy and fusion (ACDF) has been a reliable and statistically predictable procedure for several decades.ⁱ Prevention of surgical complications for this procedure relies upon a well-recognized surgical exposure with minimal tissue disruption allowing for direct visualization of the spinal column for neural decompression and fusion.ⁱⁱ Complications, although uncommon, have the potential to cause dire consequences which require urgent responses from the surgical team.ⁱⁱⁱ Most surgeons prefer to perform this procedure in an inpatient setting due to the potential for these rare occurrences. As this procedure has increased in popularity, a general trend toward performing this procedure in an outpatient venue has occurred.

We believe that with proper patient selection and meticulous attention to surgical detail, anterior cervical discectomy with direct decompression of the neural elements and subsequent reconstructions of the anterior column can be performed as an outpatient procedure with minimal risk.

We are reporting upon a retrospective series of consecutive patients who underwent this procedure at an outpatient surgical center with reproducibly safe and comparable results to most inpatient series. We further believe that in the future, elective spinal reconstructions will gradually move to an outpatient setting, while maximizing the safe, convenient and personalized service that can be provided.

Additionally, outpatient anterior cervical discectomy decompression procedures will provide significant cost saving to both patients and insurance payers while maintaining what has been recognized as a safe, efficacious procedure.

Methods:

The surgical records of 110 consecutive patients who underwent 1 level, 2 level, and 3 level ACDF from 2010 to 2018 at the Ambulatory Surgical Center of Somerset were retrospectively reviewed for this study. Data relating to patient demographics, number of patients requiring pre-operative clearance, operative course, perioperative morbidity, and Postoperative morbidity were included in this study to evaluate the efficacy and safety of ACDF in the outpatient setting. Perioperative and Postoperative morbidity were evaluated and compared between 1-level, 2-level, and 3-level ACDF performed in an outpatient setting.

Results:

All Level Surgery:

Demographics: A total of 110 ACDF cases performed between 2010 and 2018 were included in the study. The overall patient population had a mean age of 47.3 ± 9.45 and 59 (53.6%) of patients were male. The average BMI for all patients was 28.13 ± 5.3 . A total of 38 (34.55%) patients required additional preoperative clearance. The highest patient BMI recorded is 43

Perioperative and Postoperative morbidity: Perioperative and Postoperative morbidity values as noted in Table 1 were exceptionally low including 2 patients with dysphagia (1.82%), 1 patient with recurrent laryngeal nerve palsy (.91%). The highest complication rates encountered included 3 patients with numbness over incision (2.73%) and 3 patients with pseudoarthrosis (2.73%). There were no incidences of esophageal injury, return to OR within 28 days, post-operative paralysis, and post-operative hematoma requiring evacuation.

1-Level ACDF

Demographics: A total of 48 1-level ACDF cases were performed. The 1-level ACDF patient population had a mean age of 46.98 ± 10.24 and 27 (56.3%) of patients were male. The average BMI for all patients was 27.12 ± 4.99 . A total of 19 (39.58%) 1-level ACDF patients required additional preoperative clearance. The highest patient BMI recorded for 1-Level ACDF was 42

Perioperative and Postoperative morbidity: Perioperative and Postoperative morbidity values as noted in Table 1 included 1 patient with dysphagia (2.08%) and 1 patient with pseudoarthrosis (2.08%). There were no incidences of esophageal injury, recurrent laryngeal nerve palsy, numbness over incision, return to OR within 28 days, post-operative paralysis, or post-operative hematoma requiring evacuation.

2-Level ACDF

Demographics: A total of 57 2-Level ACDF cases were performed. The 2-Level ACDF patient population had a mean age of 47.77 ± 8.93 and 30 (52.6%) of patients were male. The average BMI for all patients was 28.71 ± 5.16 . A total of 17 (29.82%) 2-Level ACDF patients required additional preoperative clearance. The highest patient BMI recorded for 2-Level ACDF was 43.

Perioperative and Postoperative morbidity: Perioperative and Postoperative morbidity values as noted in Table 1 included 1 patient with dysphagia (1.75%), 1 patient with recurrent laryngeal nerve palsy (1.75%) The highest complication rates encountered included 2 patients with numbness over incision (3.51%) and 2 patients with pseudoarthrosis (3.51%). There were no incidences of esophageal injury, return to OR within 28 days, post-operative paralysis, and post-operative hematoma requiring evacuation.

3-Level ACDF

Demographics: A total of 5 3-Level ACDF cases were performed. The 3-Level ACDF patient population had a mean age of 45 ± 6.1 and 2 (40%) of patients were male. The average BMI for all patients was 31.26 ± 7.39 . A total of 2 (40%) 3-Level ACDF patients required additional preoperative clearance. The highest patient BMI recorded for 3-Level ACDF was 38.

Perioperative and Postoperative morbidity: Perioperative and Postoperative morbidity values as noted in Table 1 included 1 patient with numbness over incision (20%). There were no incidences of dysphagia, esophageal injury, recurrent laryngeal nerve palsy, pseudoarthrosis, return to OR within 28 days, post-operative paralysis, and post-operative hematoma requiring evacuation.

Table 1- Complication Rates for 1-Level, 2-Level, 3-Level, and All Surgeries Performed.

Complication	1 Level # Patients, (%)	2 Level # Patients, (%)	3 Level # Patients, (%)	All Surgeries # Patients, (%)
Dysphagia	1 (2.08%)	1 (1.75%)	0	2 (1.82%)
Esophageal Injury	0	0	0	0
Incisional Numbness	0	2 (3.51%)	1 (20%)	3 (2.73%)
Paralysis	0	0	0	0
Pseudoarthrosis	1(2.08%)	2 (3.51%)	0	3 (2.73%)
Recurrent Laryngeal Nerve Palsy	0	1 (1.75%)	0	1 (0.91%)
Return to OR (4 Weeks)	0	0	0	0

Discussion

We hope this retrospective review of our experience performing anterior cervical discectomy with direct neural decompression and reconstruction of the cervical spine illustrates the ability to move elective spinal procedures to an outpatient venue. Despite the limitations of a retrospective analysis, our results highlight the ability to perform these cervical procedures at properly equipped surgical centers in a safe reproducible fashion.

Physician's surgical experiences in addition to developing surgical proficiency also provides a conscious database from which surgeons stratify risk.

Risk stratification, however, underlines the ability to safely perform these procedures with reproducible results. The last decade has seen an increased focus on risk stratification which allows physicians and patients to communicate more effectively regarding their treatment options and outcome expectations.¹⁹ These discussions will hopefully result in more personalized service while optimizing results. Additionally, the potential cost savings attributed to safely performing inpatient procedures in an outpatient facility should attract more attention as the health care debate moves towards optimizing outcomes while controlling costs.

It appears that the future of reimbursements and health care policies will focus increasingly on outcomes relative to cost. Outpatient outcomes data that compares favorably to traditional inpatient procedures while reducing costs and providing a consistently safe and convenient alternative, should be properly leveraged to advance the field of elective spine surgery. Pre-operative risk stratification will be increasingly important in this environment. Risk stratification that relies upon strict quantitative registration tools to provide accurate prognosis have the potential to aid surgical results, however, care must be taken not to restrict access to providers and patients.

We believe accurate risk stratification will allow improved patient – surgeon decision making and increased patient satisfaction following surgical intervention in the outpatient setting.

Conclusion:

Our series highlights the ability to perform anterior cervical discectomy with direct neural decompression and reconstruction at an outpatient surgical center in a safe reproducible fashion with results that are comparable to most inpatient surgeries. Meticulous attention to surgical details and proper risk stratification of patients are the cornerstone for optimizing surgical results, reducing complications while controlling costs in the outpatient setting.

ⁱ Hilibrand, Alan S., et al. "Radiculopathy and Myelopathy at Segments Adjacent to the Site of a Previous Anterior Cervical Arthrodesis*." *The Journal of Bone & Joint Surgery*, vol. 81, no. 4, Apr. 1999, pp. 519–28., doi:10.2106/00004623-199904000-00009.

ⁱⁱ Smith, George W., and Robert A. Robinson. "The Treatment of Certain Cervical-Spine Disorders by Anterior Removal of the Intervertebral Disc and Interbody Fusion." *The Journal of Bone & Joint Surgery*, vol. 40, no. 3, 3 June 1958, pp. 607–624., doi:10.2106/00004623-195840030-00009.

ⁱⁱⁱ Fountas, Kostas N., et al. "Anterior Cervical Discectomy and Fusion Associated Complications." *Spine*, vol. 32, no. 21, 1 Oct. 2007, pp. 2310–2317., doi:10.1097/brs.0b013e318154c57e.

^{iv} Miller, Emily K, et al. "Risk Stratification and the Future of Spine Surgery." *SpineLine*, 2018, pp. 14–20.