# **Anterior Cervical Discectomy and Fusion (ACDF)**

# **CONSENT**

This document outlines the risks, potential complications, and their estimated incidence associated with **anterior cervical discectomy and fusion (ACDF)**. The information is based on current evidence from large clinical series, meta-analyses, and systematic reviews.

**Common Risks and Their Estimated Incidence:**

- **Dysphagia (difficulty swallowing):** Occurs in approximately 3–17% of cases, with higher rates in multi-level fusions (up to 22–45 per 1000 for 3+ levels). Most cases are transient, but persistent dysphagia is possible.[1][2][3][4][5][6]

- **Hoarseness (voice changes):** Incidence ranges from 1–5%, often due to recurrent laryngeal nerve irritation or palsy. Most cases resolve, but permanent changes are rare.[1][3][4][6]

- **Hematoma (bleeding/neck swelling):** Occurs in 0.1–5.6% of cases. Hematoma may require urgent intervention if airway compromise develops.[1][2][3][4][6]

- **Superficial wound infection:** Reported in 0.1–2.8% of cases. Deep infection is rare.[1][3][4][6]

- **Neurologic complications (new or worsened deficit, C5 palsy):** Incidence of new neurologic deficit is 0.05–0.4%. C5 palsy occurs in 2–5% of cervical myelopathy cases, but is less common after ACDF (about 2%).[4][7][8]

- **Dural tear (cerebrospinal fluid leak):** Occurs in 0.5–1.9% of cases.[1][3][4]

- **Reoperation:** Early reoperation (within 90 days) occurs in 2–5.6% of cases, most commonly for hematoma or hardware issues. Late reoperation (after 90 days) is often due to adjacent segment disease or pseudarthrosis.[6][9]

- **Fusion failure (nonunion):** Symptomatic pseudarthrosis requiring revision occurs in 0.6–3.7% of cases.[4][6][9]

- **Graft or hardware complications (subsidence, dislodgement):** Occur in 0.9–3.7% of cases.[1][4][6]

- **Airway compromise:** Occurs in 0.1–0.75% of cases, may require urgent intervention.[3][7][10]

**Rare but Serious Risks:**

- **Esophageal injury/perforation:** Incidence is 0.1–0.3%. May require surgical repair and can be life-threatening.[1][3][10]

- **Vertebral artery injury:** Very rare, but can result in stroke or death.[10]

- **Spinal cord injury:** Extremely rare, but can result in paralysis.[10]

- **Death:** Reported mortality is 0.07–0.1%.[1][3][7][8]

**Other Considerations:**

- **Systemic complications:** Medical complications (e.g., infection, pulmonary embolism, cardiac events) account for most unplanned readmissions (5–8% within 90 days).[11]

- **Risk factors:** Advanced age, multi-level fusion, comorbidities (e.g., kidney disease, anemia, diabetes, obesity), and use of bone morphogenetic protein (BMP) increase the risk of complications.[4][5][6][7][11][12]

- **Complication rates by number of levels:** Complication rates increase with the number of levels fused, with 1–2 level ACDF having lower rates (3–8%) and 3–4 level ACDF higher (up to 16–19%).[1][2][3][6]

**Summary Table of Key Risks:**

| **Complication** | **Estimated Incidence (%)** | **Notes (if applicable)** | **References** |
| --- | --- | --- | --- |
| Dysphagia | 3–17 (up to 22–45/1000 for 3+ levels) | Usually transient | [1][2][3][4][7][8] |
| Hoarseness | 1–5 | Usually transient | [1][3][7][8] |
| Hematoma | 0.1–5.6 | May require urgent intervention | [1][2][3][7][8] |
| Wound infection | 0.1–2.8 | Superficial > deep | [1][3][7][8] |
| Neurologic deficit/C5 palsy | 0.05–0.4 / 2–5 | C5 palsy less common in ACDF | [3][5][12] |
| Dural tear | 0.5–1.9 |  | [1][3][7] |
| Reoperation (early/late) | 2–5.6 / 3.6 | Early: hematoma/hardware | [6][8] |
| Fusion failure | 0.6–3.7 | Symptomatic pseudarthrosis | [3][6][8] |
| Graft/hardware complication | 0.9–3.7 | Subsidence/dislodgement | [1][3][8] |
| Airway compromise | 0.1–0.75 | May require urgent intervention | [5][7][10] |
| Esophageal injury | 0.1–0.3 | May be life-threatening | [1][7][10] |
| Death | 0.07–0.1 |  | [1][5][7][12] |

**Patient Acknowledgment:**

By signing below, the patient acknowledges understanding of the above risks, their estimated incidence, and the potential for both common and rare complications associated with anterior cervical discectomy and fusion. All questions have been answered to the patient's satisfaction.

**Patient Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_**

**Patient Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DOB:\_\_\_\_\_\_\_\_\_**

# **References**

1. [Surgical Complications of Anterior Cervical Diskectomy and Fusion for Cervical Degenerative Disk Disease: A Single Surgeon's Experience of 1,576 Patients.](https://pubmed.ncbi.nlm.nih.gov/24056095) Nanda A, Sharma M, Sonig A, Ambekar S, Bollam P. World Neurosurgery. 2014;82(6):1380-7. doi:10.1016/j.wneu.2013.09.022.

2. [Four-Level ACDF Surgical Series 2000-2022: A Systematic Review of Clinical and Radiological Outcomes and Complications.](https://pubmed.ncbi.nlm.nih.gov/38606493) Arnautovic A, Mijares J, Begagić E, Ahmetspahić A, Pojskić M. British Journal of Neurosurgery. 2024;:1-12. doi:10.1080/02688697.2024.2337020.

3. [Anterior Cervical Discectomy and Fusion Associated Complications.](https://pubmed.ncbi.nlm.nih.gov/17906571) Fountas KN, Kapsalaki EZ, Nikolakakos LG, et al. Spine. 2007;32(21):2310-7. doi:10.1097/BRS.0b013e318154c57e.

4. [Prevalence of Complications After Surgery in Treatment for Cervical Compressive Myelopathy: A Meta-Analysis for Last Decade.](https://pubmed.ncbi.nlm.nih.gov/28328846) Wang T, Tian XM, Liu SK, et al. Medicine. 2017;96(12):e6421. doi:10.1097/MD.0000000000006421.

5. [Incidence and Risk Factors for Dysphagia After Anterior Cervical Fusion.](https://pubmed.ncbi.nlm.nih.gov/23873236) Singh K, Marquez-Lara A, Nandyala SV, Patel AA, Fineberg SJ. Spine. 2013;38(21):1820-5. doi:10.1097/BRS.0b013e3182a3dbda.

6. [Retrospective Single-Surgeon Study of 1123 Consecutive Cases of Anterior Cervical Discectomy and Fusion: A Comparison of Clinical Outcome Parameters, Complication Rates, and Costs Between Outpatient and Inpatient Surgery Groups, With a Literature Review.](https://pubmed.ncbi.nlm.nih.gov/29600910) Mullins J, Pojskić M, Boop FA, Arnautović KI. Journal of Neurosurgery. Spine. 2018;28(6):630-641. doi:10.3171/2017.10.SPINE17938.

7. [Predictors of Inpatient Morbidity and Mortality After 1- And 2-Level Anterior Cervical Diskectomy and Fusion Based on the National Inpatient Sample Database From 2006 Through 2010.](https://pubmed.ncbi.nlm.nih.gov/34590947) Rogerson A, Aidlen J, Mason A, et al. Orthopedics. 2021 Sep-Oct;44(5):e675-e681. doi:10.3928/01477447-20210817-08.

8. [Perioperative Neurological Complications Following Anterior Cervical Discectomy and Fusion: Clinical Impact on 317,789 Patients From the National Inpatient Sample.](https://pubmed.ncbi.nlm.nih.gov/30980979) Kashkoush A, Mehta A, Agarwal N, et al. World Neurosurgery. 2019;128:e107-e115. doi:10.1016/j.wneu.2019.04.037.

9. [Reoperation Rate After Anterior Cervical Discectomy and Fusion Using Standalone Cages in Degenerative Disease: A Study of 2,078 Cases.](https://pubmed.ncbi.nlm.nih.gov/31404654) Shousha M, Alhashash M, Allouch H, Boehm H. The Spine Journal : Official Journal of the North American Spine Society. 2019;19(12):2007-2012. doi:10.1016/j.spinee.2019.08.003.

10.  [Adverse Events Associated With Anterior Cervical Spine Surgery.](https://pubmed.ncbi.nlm.nih.gov/19056921) Daniels AH, Riew KD, Yoo JU, et al. The Journal of the American Academy of Orthopaedic Surgeons. 2008;16(12):729-38. doi:10.5435/00124635-200812000-00005.

11.  [30- And 90-Day Unplanned Readmission Rates, Causes, and Risk Factors After Cervical Fusion: A Single-Institution Analysis.](https://pubmed.ncbi.nlm.nih.gov/30475339) Zaki O, Jain N, Yu EM, Khan SN. Spine. 2019;44(11):762-769. doi:10.1097/BRS.0000000000002937.

12.  [Prevalence, Complications, and Hospital Charges Associated With Use of Bone-Morphogenetic Proteins in Spinal Fusion Procedures.](https://jamanetwork.com/journals/jama/fullarticle/10.1001/jama.2009.956?utm_source=openevidence&utm_medium=referral) Cahill KS, Chi JH, Day A, Claus EB. JAMA. 2009;302(1):58-66. doi:10.1001/jama.2009.956.