

# Anesthetic Challenge in a Patient with Compressive Cervical Chordoma: A Case Report

## Abstract

Compressive cervical chordoma is a rare, high-risk anesthetic condition because tumor-related distortion of the upper airway, proximity to neurovascular structures, and postoperative airway edema may make both intubation and extubation difficult. We report the case of a 73-year-old patient with a large left anterior cervical mass causing progressive dysphagia, dysphonia, hoarseness, and deviation of the aerodigestive tract. Cervical imaging showed a lesion invading the C6 vertebral body, associated with grade II vertebral collapse and extension into the left lateral cervical soft tissues.

After multidisciplinary discussion with the neurosurgical team, an anticipated difficult-airway strategy was adopted. Topical airway preparation was performed with nasal naphazoline, nebulized 5% lidocaine, and oropharyngeal lidocaine gel. Airway nerve blocks were avoided because of markedly distorted anatomical landmarks. Awake nasotracheal intubation was achieved under fiberoptic guidance after conscious sedation with midazolam 2 mg and titrated ketamine up to a total dose of 100 mg, while spontaneous ventilation was preserved.

Once tracheal intubation had been confirmed clinically and by capnography, general anesthesia was completed with fentanyl 200 micrograms, propofol 100 mg, and rocuronium 50 mg, and maintained with age-adjusted sevoflurane at approximately 1 minimum alveolar concentration. Continuous invasive blood pressure monitoring was used, with a target mean arterial pressure of at least 80 mmHg. The intraoperative course was uneventful. Extubation was planned as a second critical step and was performed after full recovery, effective spontaneous ventilation, quantitative neuromuscular monitoring, and reversal with sugammadex 200 mg.

This case highlights the value of preoperative imaging-based planning, preservation of spontaneous ventilation during airway control, limitation of cervical movement, preparation of a backup invasive-airway strategy, and structured extubation planning in compressive cervical tumors.

## Introduction

Chordoma is a rare malignant tumor arising from remnants of the embryonic notochord. It usually grows slowly but remains locally aggressive, with a marked tendency for bone and soft-tissue invasion. Cervical spine involvement is considerably less frequent than sacrococcygeal and skull-base disease [1].

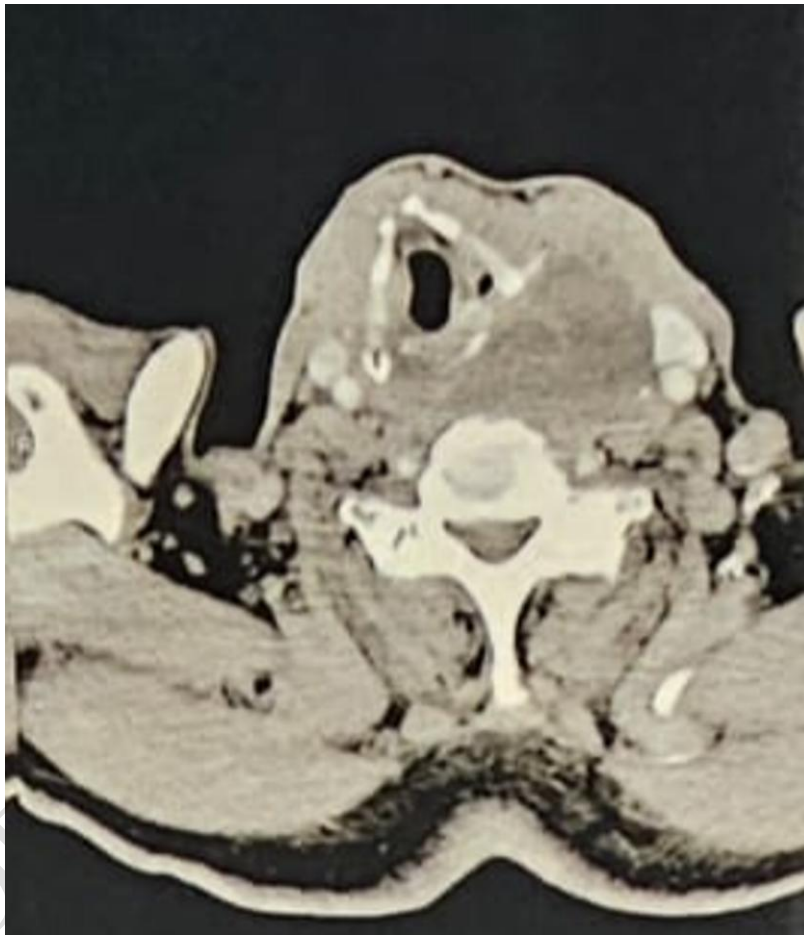
In compressive cervical forms, the anesthesiologist must anticipate difficult airway management, limit cervical spine movement, preserve cerebral and spinal cord perfusion, and plan extubation before induction of anesthesia. The anesthetic strategy must therefore be individualized, multidisciplinary, and guided by both clinical and radiological preoperative assessment [2].

## Case Presentation

A 73-year-old patient was admitted for surgical management of a left anterior cervical mass that had evolved over approximately eight months. The clinical presentation included progressive

40 dysphagia, dysphonia with hoarseness, moderate impairment of general condition, and  
41 intermittent vertigo associated with right-sided hearing loss. Medical history included an  
42 ischemic stroke two years earlier and former smoking. No previous surgical history was  
43 reported.

44 Cervical computed tomography and magnetic resonance imaging revealed a tumor invading the  
45 C6 vertebral body, associated with grade II vertebral collapse and extension into the left lateral  
46 cervical soft tissues. The mass measured approximately 45 x 41 mm, with a craniocaudal  
47 extension of 59 mm, and displaced the aerodigestive tract. Additional cervicothoracic imaging  
48 confirmed a large left anterolateral mass deviating the laryngotracheal axis while leaving a  
49 residual patent airway lumen (Figures 1 and 2).



50  
51 *Figure 1. Axial cervical computed tomography scan showing a large left lateral cervical mass*  
52 *causing mass effect, rightward deviation, and narrowing of the tracheal lumen. The trachea*  
53 *remains patent despite significant extrinsic compression.*



W IN IJAR

54  
55 *Figure 2. Coronal cervical magnetic resonance image showing a large tumor centered on the C6*  
56 *vertebral body, with heterogeneous signal intensity and extension into the left lateral cervical*  
57 *soft tissues, causing mass effect and deviation of the aerodigestive tract.*

58 After multidisciplinary discussion between the anesthesia and neurosurgical teams, the patient  
59 was considered to have an anticipated difficult airway. The main objective was to secure the  
60 airway before deepening anesthesia, while maintaining spontaneous ventilation and preserving  
61 neurological safety. Difficult-airway equipment was prepared, and emergency surgical airway  
62 access was discussed as the rescue strategy in case of failed or impossible intubation.

63 In the operating room, standard monitoring was applied and supplemental oxygen was  
64 administered. Topical airway anesthesia was performed with nasal naphazoline, nebulized 5%  
65 lidocaine, and oropharyngeal lidocaine gel. Airway nerve blocks were not performed because the  
66 tumor had distorted the usual anatomical landmarks. Conscious sedation was administered with  
67 midazolam 2 mg intravenously, followed by titrated ketamine up to a total dose of 100 mg  
68 intravenously, while maintaining spontaneous ventilation and patient cooperation.

69 Awake nasotracheal intubation was performed under flexible fiberoptic guidance using a  
70 reinforced endotracheal tube with an internal diameter of 6.5 mm. After visual confirmation of  
71 tracheal placement and continuous capnographic confirmation, anesthesia was completed with  
72 fentanyl 200 micrograms intravenously, propofol 100 mg intravenously, and rocuronium 50 mg

73 intravenously. Anesthesia was maintained with age-adjusted sevoflurane at approximately 1  
74 minimum alveolar concentration in an air-oxygen mixture.

75 A radial arterial catheter was inserted for continuous invasive blood pressure monitoring. A  
76 target mean arterial pressure of at least 80 mmHg was selected because of the history of ischemic  
77 stroke and the cervical surgical context involving major vascular structures. Blood products were  
78 prepared in advance.

79 Surgery was performed in the supine position with slight head rotation to the right, avoiding  
80 excessive cervical extension. The intraoperative course was uneventful, with no desaturation,  
81 respiratory event, or major hemodynamic instability.

82 At the end of surgery, extubation was considered a second critical phase. After full awakening,  
83 effective spontaneous ventilation, quantitative train-of-four monitoring confirming  
84 neuromuscular recovery, and reversal with sugammadex 200 mg intravenously, extubation was  
85 performed under controlled conditions. The patient was transferred to the post-anesthesia care  
86 unit and subsequently to the ward after achieving an Aldrete score greater than 9.

87 **Table 1. Summary of the anesthetic management strategy applied in this case**

Step	Key elements
Anticipation	Anticipated difficult airway; multidisciplinary discussion with neurosurgery; difficult-airway equipment prepared; emergency surgical airway access discussed as rescue strategy.
Topicalization	Nasal naphazoline, nebulized 5% lidocaine, and oropharyngeal lidocaine gel; airway nerve blocks avoided because of distorted anatomical landmarks.
Sedation	Midazolam 2 mg IV followed by titrated ketamine up to a total dose of 100 mg IV, with preservation of spontaneous ventilation.
Intubation	Awake nasotracheal intubation under flexible fiberoptic guidance; reinforced endotracheal tube with 6.5-mm internal diameter.
After airway control	Fentanyl 200 micrograms IV, propofol 100 mg IV, and rocuronium 50 mg IV.
Maintenance	Age-adjusted sevoflurane at approximately 1 minimum alveolar concentration in an air-oxygen mixture.
Monitoring	Standard monitoring plus radial arterial catheter; target mean arterial pressure at least 80 mmHg.
End of procedure	Quantitative neuromuscular monitoring; sugammadex 200 mg IV; extubation after full recovery and fulfillment of clinical criteria.

## 88 Discussion

89 Cervical chordoma is a rare notochordal tumor whose severity is related more to local  
90 aggressiveness than to growth rate. Its close anatomical relationships with the spinal cord, nerve  
91 roots, carotid arteries, vertebral arteries, and upper airway make both surgical and anesthetic  
92 management complex. Involvement of the mobile spine is uncommon, which explains the  
93 limited number of anesthesia-focused reports in the literature [1,3].

94 Treatment is primarily surgical when complete or maximal safe resection is feasible, often as  
95 part of a multimodal strategy. In cervical locations, surgery may be indicated for symptomatic,  
96 compressive, unstable, or progressive lesions; however, resection remains technically  
97 challenging because of the proximity of neural and vascular structures [2,3].

98 Our patient presented with progressive dysphagia, dysphonia, and hoarseness. These symptoms  
99 are consistent with previously reported cervical chordomas with retropharyngeal or upper

100 aerodigestive extension, in which airway or voice symptoms may precede neurological  
101 manifestations [4].

102 Radiological analysis was central to anesthetic planning. Imaging demonstrated a large left  
103 anterolateral mass deviating the aerodigestive tract and laryngotracheal axis, with eccentric  
104 airway narrowing. The residual tracheal lumen suggested that intubation could be feasible if  
105 performed under direct visualization while spontaneous ventilation was preserved [5].

106 The case reported by Han et al. similarly emphasized the importance of imaging as a roadmap  
107 for airway management in cervical chordoma. Conversely, Chen et al. showed that even  
108 fiberoptic intubation can fail when the tube cannot be advanced through a compressed or  
109 deviated airway segment, despite successful passage of the bronchoscope [6,7].

110 Preoperative airway evaluation in this setting must go beyond classical difficult-airway  
111 predictors. It should include neurological assessment, vertebrobasilar symptoms, tolerance of the  
112 supine position, swallowing disorders, voice quality, and symptom variation with neck  
113 movement. Current difficult-airway guidelines recommend awake tracheal intubation when  
114 conventional induction may cause loss of airway control or when difficult ventilation, difficult  
115 intubation, or aspiration risk is anticipated [8,9].

116 In our case, airway nerve blocks were not feasible because anatomical landmarks were altered by  
117 the tumor. We therefore used noninvasive topical airway anesthesia combined with cautious  
118 sedation, and awake fiberoptic nasotracheal intubation was performed while spontaneous  
119 ventilation was maintained. A rescue strategy involving emergency surgical airway access had  
120 been established with the surgical team.

121 Endotracheal tube selection was guided by the estimated residual airway caliber on imaging. In  
122 the absence of precise DICOM-based measurements, a semiquantitative assessment was used. A  
123 reinforced 6.5-mm internal diameter tube was chosen as a compromise between ease of passage  
124 and adequate ventilation. Tube choice should also take outer diameter into account, because it  
125 directly affects passage through narrowed airways and may influence airway trauma [10,11].

126 Beyond airway management, cervical chordoma surgery exposes patients to potential bleeding,  
127 vascular compromise, and positioning-related complications. In our patient, previous ischemic  
128 stroke justified strict avoidance of hypotension. Continuous arterial monitoring and a target mean  
129 arterial pressure of at least 80 mmHg were used to support cerebral and spinal cord perfusion.  
130 Cervical positioning and anterior cervical surgical manipulation may influence carotid and  
131 vertebral blood flow, particularly in vulnerable patients [12,13].

132 Extubation should be treated as a planned, high-risk phase rather than as a routine endpoint.  
133 Difficult Airway Society guidance recommends a structured approach to at-risk extubation, with  
134 preparation for reintubation and post-extubation monitoring. In our case, quantitative  
135 neuromuscular monitoring and sugammadex reversal were used to reduce the risk of residual  
136 neuromuscular blockade, airway obstruction, and postoperative respiratory complications [14-  
137 16].

## 138 **Conclusion**

139 Compressive cervical chordoma can create a major anesthetic challenge because of airway  
140 distortion, potential spinal involvement, and neurovascular risk. In this case, detailed radiological  
141 assessment, awake fiberoptic intubation with preserved spontaneous ventilation, hemodynamic

142 optimization, and planned extubation with quantitative neuromuscular monitoring contributed to  
143 a safe perioperative outcome. This case supports a proactive, multidisciplinary, and  
144 individualized strategy for patients with cervical compressive tumors.

145

#### 146 **Author Statement**

#### 147 **Conflict of Interest Statement**

148 No authors have competing interests.

149

#### 150 **Consent**

151 As per international standard or university standard, patient's consent has been collected and  
152 preserved by the authors.

153

#### 154 **Ethical Approval**

155 None.

#### 156 **References**

- 157 1. Bakker SH, Jacobs WCH, Pondaag W, Gelderblom H, Nout RA, Dijkstra PDS, et al.  
158 Chordoma: a systematic review of the epidemiology and clinical prognostic factors  
159 predicting progression-free and overall survival. *Eur Spine J.* 2018;27(12):3043-3058.  
160 doi:10.1007/s00586-018-5764-0.
- 161 2. Court C, Briand S, Mir O, Le Pechoux C, Lazure T, Missenard G, et al. Management of  
162 chordoma of the sacrum and mobile spine. *Orthop Traumatol Surg Res.*  
163 2022;108(1S):103169. doi:10.1016/j.otsr.2021.103169.
- 164 3. Akinduro OO, Garcia DP, Domingo RA, Vivas-Buitrago T, Sousa-Pinto B, Bydon M, et al.  
165 Cervical chordomas: multicenter case series and meta-analysis. *J Neurooncol.*  
166 2021;153(1):65-77. doi:10.1007/s11060-021-03742-6.
- 167 4. Nicoucar K, Rausch T, Becker M, Dulguerov P. Cervical chordoma with retropharyngeal  
168 extension presenting with impaired voice. *Tumori.* 2008;94(6):873-876.  
169 doi:10.1177/030089160809400619.
- 170 5. Jain K, Gupta N, Yadav M, Thulkar S, Bhatnagar S. Radiological evaluation of airway - What  
171 an anaesthesiologist needs to know! *Indian J Anaesth.* 2019;63(4):257-264.  
172 doi:10.4103/ija.IJA\_488\_18.
- 173 6. Han YZ, Jing FY, Xu M, Guo XY. [Anesthesia management of cervical chordoma resection: a  
174 case report]. *Beijing Da Xue Xue Bao Yi Xue Ban.* 2019;51(5):981-983. Chinese.  
175 doi:10.19723/j.issn.1671-167X.2019.05.033.
- 176 7. Chen YT, Ho CN, Hung KC. Successful endotracheal intubation with Trachway after failed  
177 fiber-optic manipulations in a patient with retropharyngeal cervical chordoma. *Tzu Chi Med*  
178 *J.* 2017;29(3):174-176. doi:10.4103/tcmj.tcmj\_63\_17.
- 179 8. Ahmad I, El-Boghdady K, Bhagrath R, Hodzovic I, McNarry AF, Mir F, et al. Difficult  
180 Airway Society guidelines for awake tracheal intubation (ATI) in adults. *Anaesthesia.*  
181 2020;75(4):509-528. doi:10.1111/anae.14904.

- 182 9. Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022  
183 American Society of Anesthesiologists Practice Guidelines for Management of the Difficult  
184 Airway. *Anesthesiology*. 2022;136(1):31-81. doi:10.1097/ALN.0000000000004002.
- 185 10. Ajmera P, Prasad N. Comparison of tracheal diameter measurements on radiograph versus  
186 computed tomography at a tertiary care hospital in Pune, Central India. *Cureus*.  
187 2021;13(3):e13755. doi:10.7759/cureus.13755.
- 188 11. Gupta B, Gupta L. Significance of the outer diameter of an endotracheal tube: a lesser-known  
189 parameter. *Korean J Anesthesiol*. 2019;72(1):72-73. doi:10.4097/kja.d.18.00056.
- 190 12. Benesch C, Glance LG, Derdeyn CP, Fleisher LA, Holloway RG, Messe SR, et al.  
191 Perioperative neurological evaluation and management to lower the risk of acute stroke in  
192 patients undergoing noncardiac, nonneurological surgery: a scientific statement from the  
193 American Heart Association/American Stroke Association. *Circulation*. 2021;143(19):e923-  
194 e946. doi:10.1161/CIR.0000000000000968.
- 195 13. Pollard ME, Little PW. Changes in carotid artery blood flow during anterior cervical spine  
196 surgery. *Spine (Phila Pa 1976)*. 2002;27(2):152-155. doi:10.1097/00007632-200201150-  
197 00006.
- 198 14. Popat M, Mitchell V, Dravid R, Patel A, Swampillai C, Higgs A. Difficult Airway Society  
199 guidelines for the management of tracheal extubation. *Anaesthesia*. 2012;67(3):318-340.  
200 doi:10.1111/j.1365-2044.2012.07075.x.
- 201 15. Thilen SR, Weigel WA, Todd MM, Dutton RP, Lien CA, Grant SA, et al. 2023 American  
202 Society of Anesthesiologists Practice Guidelines for Monitoring and Antagonism of  
203 Neuromuscular Blockade: a report by the American Society of Anesthesiologists Task Force  
204 on Neuromuscular Blockade. *Anesthesiology*. 2023;138(1):13-41.  
205 doi:10.1097/ALN.0000000000004379.
- 206 16. Murphy GS, Brull SJ. Quantitative neuromuscular monitoring and postoperative outcomes: a  
207 narrative review. *Anesthesiology*. 2022;136(2):345-361.  
208 doi:10.1097/ALN.0000000000004044.