Case Report

Early extubation of a patient in the operating room after prolonged glomus jugulare tumor surgical resection: a case report

Abstract

The excision of glomus jugulare tumor as an infrequently highly vascular tumor has many risks and problems for anesthesiologists. Early extubation causes short length of hospitalization and less complications. As there are scant articles about early extubation for it, this encouraged us to report early extubation after prolonged anesthesia for glomus jugulare tumor excision**.** General anesthesia was performed with the combined use of intravenous anesthetic agents and isoflurane in a convulsive female. After 13 hours and 40 minutes of surgery, she was successfully extubated in the operative room. Therefore, early extubation in selected patient is possible after such a prolonged surgery.

Keywords: Glomus jugulare tumor, Anesthesia, General, Isoflurane, Seizures, Airway Extubation

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Introduction

Glomus jugulare tumor as a type of extra-adrenal paraganglioma is a rare hypervascular tumor with histologically benign slow-growing feature. Glomus jugulare tumor origins within the jugular foramen of the temporal bone and sometimes involves the IX to XI cranial nerves. Its feeder arteries usually are external carotid artery branches. Although it is a slow-growing tumor, it sometimes invades bones of jugular foramen (petrous part of the temporal bone anteriorly and the occipital bone posteriorly), mastoid process and intracranial nerves. Occasionally, it can also rapidly expand intracranially. The excision of glomus jugulare tumors has unique problems for surgeons and anesthesiologists. Some of these challenges and risks are such as surgery for intracranial space occupying lesions, intraoperative blood pressure elevations due to catecholamine secretion, hemodynamic instability, delay tracheal extubation, prolonged surgery and intraoperative massive bleeding. Early tracheal extubation is associated with shorter hospital stay, early evaluation of the post-operative neurological condition, reduced post-operative pneumonia, and reduced costs for the patient, the hospital or the medical insurance company.[1-3] In the review of articles, scant articles have been found about early tracheal extubation in these patients. Therefore, this encouraged us to share our experience about a woman with glomus jugulare tumor who had a prolonged anesthesia for surgical resection of it.

Case report

A 41-year-old female (weight:73Kg, Height: 164cm, BMI:27/1, ASA score:2) diagnosed with glomus jugulare tumor was admitted for surgical tumor removal. She was complained of pulsatile tinnitus, hearing loss and *deviation* of the mouth and face. She also had a history of seizure and obsessive-compulsive disorder, and used carbamazepine, sodium valproate, fluoxetine and propranolol. On preoperative physical examination, the *mallampati score was 2, and* she had facial nerve palsy without swallowing disorder and dysphonia. The routine laboratory tests were normal. The Ejection fraction (EF) and pulmonary artery pressure (PAP) were in normal range.

The findings on computerized tomography (CT) scan and magnetic resonance imaging (MRI) suggested a glomus jugulare tumor with destruction of the jugular foramen (Figure 1). CT scan of abdomen showed no evidence of mass lesion and alaboratory tests also showed a normal level of noradrenaline (in plasma and urine) and urinary vanillylmandelic acid (VMA). Seven days prior to surgery, preoperative embolization of tumor vessels was performed. Preoperatively, haemoglobin was 10.8 g/dl. After consultation with a cardiologist and endocrinologist, she was transported to operating room. Prior to induction of anesthesia, standard monitoring including pulse oximeter, ECG and after tracheal intubation End-tidal carbon dioxide (ET CO_2) monitors applied. *The* vital signs were as follows: blood pressure of 132/76 mmHg, heart rate of 92 beats/min with sinus regular rhythm and oxygen saturation (SPO2) was 98 on room air. After placing two large 16-G intravenous catheters and an arterial line in the left radial artery for close haemodynamic monitoring and administration of fluids and vasopressors if needed intraoperatively, midazolam 2 mg and fentanyl 1.5µg/kg were injected. The anesthesia was induced with intravenous propofol 2mg/kg, lignocaine 1 mg/kg and cisatracurium 0.2mg/kg. Anesthesia was maintained uneventfully with isoflurane 0.2%-0.4% in oxygen and fentanyl and cisatracurium. The patient also received propofol (50-75µg/min) and dexmedetomidine (*0.1 - 0.15* µg */kg/hour)* infusions during surgery. The extracranial and intracranial tumors were resected by an otolaryngologist and neurosurgeon, respectively. Intraoperatively, the patient received one blood unit. In the end of surgery, the neuromuscular blockade was reversed successfully with neostigmine and atropine. When she was fully awake, then, she extubated in the operative room after 13 hours and 40 minutes of surgery. The patient

required no hemodynamic support during the procedure. Ultimately, she was transported in a good condition to intensive care unit (ICU). She also had no need of tracheal reintubation or using any inotropes or vasopressors in the ICU and ward.

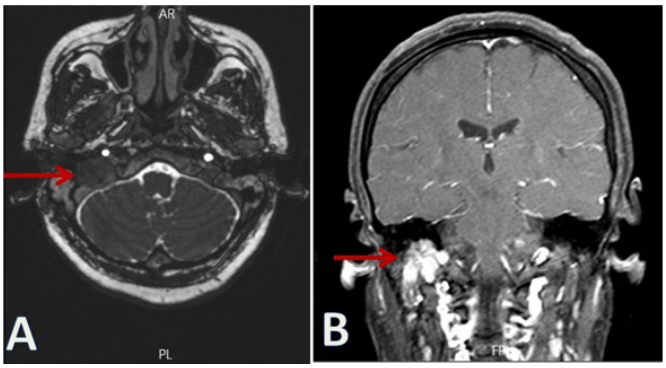

Figure 1 Preoperative MRI images. Arrows show erosion of the right jugular foramen in temporal bone axial T2 (A) and coronal T1 contrast enhanced views (B), respectively.

Discussion

Glomus jugulare is a benign and infrequently highly vascular tumor that origins from the paraganglion cells within the adventitia of the jugular bulb. About 0.6% of head and neck tumors and 0.03% of all neoplasms are glomus jugulare tumors. Only 1 to 8% of all cases of them are catecholamine-secreting glomus tumors and perioperative catecholamine hyper secretion is the most problem in the management of patients. Therefore, screening of catecholamine secretion is needed for all glomus tumor patients.[1-3] Some of clinical manifestations are pulsatile tinnitus (the most common presenting symptom), conductive hearing loss, aural fullness, discharge or bleeding, facial paralysis, dysphonia, hearing loss, and pain. These manifestations generally depend on tumor location such as middle ear and jugulare foramen. Direct compression of larger tumors on lower cranial nerves (IX to XI, and/or XII) causes shoulder weakness, dysphagia, hoarseness, regurgitation, and deviation of uvula and tongue (less common).[3-5] There are several modalities to evaluate the tumor such as CT scan, three dimentional computerized tomography, angiography, magnetic resonance angiograph and MRI. MRI is the best tool to confirm the existence of the glomus jugulare tumor even the smallest tumors. It also reveals tumor vascularity and three-dimensional relationships of the tumor to surrounding vascular structures. Angiography discloses carotid artery involvement, jugular vein patency, and the vascular extent of the tumor. Currently, the options for treatment are radiation (for small lesions), radiotherapy (for recurrent glomus jugulare tumors), therapeutic embolization, surgical resection (for younger patients or tumors causing bony destruction) or a combination of them. Preoperative embolization of tumor vessels generally is helpful (diminishing intraoperative blood loss and shortening operative time) for surgical resection.[1-4] The anesthesia managements of these patients have multiple and challenging risks. Intraoperatively, the most serious challenges especially in catecholamine-secreting glomus tumors include fatal dysrhythmia, blood pressure instability, hemorrhage (due to highly vascular tumor) and circulating blood volume management.[1,3,5] The other risks are raised intracranial pressure in intracranial extension of tumor, and air embolism in ligation of the internal jugular vein or sigmoid sinus.[1-3] These patients also are prone for regurgitation, aspiration and airway obstruction during general anesthesia. One of the critical components of airway management is the process of extubation. A number of complications can arise during extubation, such as laryngospasm and bronchospasm, upper airway obstruction, hypoventilation, laryngeal or negative-pressure pulmonary edema, paradoxical vocal cord motion, arytenoid dislocation and Aspiration. Coughing and straining during tracheal extubation can lead to surgical wound dehiscence. Although some of these complications are minor with no long-term sequelae, others can lead to a failed extubation. Failed tracheal extubation can result from the failure of oxygenation or ventilation, inadequate clearance of pulmonary secretions or loss of airway patency. A number of factors associated with increased extubation risk, such has known difficult airway, obesity and obstructive sleep apnea, neuromuscular, cardiovascular or respiratory disease. Although several techniques can be used to manage tracheal extubation of the difficult airway such as bailey maneuver or remifentanil infusion, the use of an airway exchange catheter (AEC) is most common and recommended by the ASA's task force on management of the difficult airway. Tracheal extubation, defined as removal of the endotracheal tube. As there is no exact definition about what the moment extubation can be considered early tracheal extubation, we considered early extubation when performed in the operating room. As evaluation of the neurological condition in a conscious patient is the best and least expensive neuromonitoring method, early post- operative awakening is a good option. Therefore, it is also associated with the rapid diagnosis of neurosurgical complication. The process requires a coordinated action of the surgeon, anesthesiologists, intensivists and nurses in managing properly pain, ventilatory and hemodynamic instabilities. The essential components for the successful early tracheal extubation in neurosurgery are associated with using anesthetic drugs of short duration, no disfunction of the cranial nerves, Glasgow coma score >8, tumor location, blood loss of >1,000 ml, duration of surgery of >6 hours, maintenance of stable respiratory and cardiovascular parameters, and avoiding hypothermia and pain during emergence from anesthesia. The latter situations interfere the awaking due to increasing oxygen consumption (Vo_2) promote shivering, catecholamine release and arterial hypertension. Too rapid emergence from anesthesia is associated to worsening of cerebral edema or cerebral hemohrrage owing to severe arterial hypertension. In the not fully conscious patient, early tracheal extubation promote hypercapnia and aspiration. One of the biggest challenges' physicians is *prolonged operative time* and prolonged exposure to general anesthesia (like our case). Using low dose of various types of short-acting anesthetic agents allow early recovery of anesthesia and tracheal extubation. The neuromuscular monitoring and electroencephalogram bispectral (BIS) are valuable tools for evaluation of the degree of depth of anesthesia and, therefore, the adequate moment for tracheal extubation. Unfortunately, in our hospital, these valuable monitors were not available. The other main issue for delay tracheal extubation is possible dysfunction of cranial nerves due to surgical resection of tumor.[1,3,5] In our case, despite a *prolonged operative time and* history of seizure*, the patient was comfortably extubated in operative room. It was may be due to saving cranial nerves, hemodynamic* stability *during surgery and using low concentration of* short-acting anesthetic agents. It should be noted that there were some restrictions on the use of certain medications and monitors due to our country's sanctions and politics. Therefore, for avoiding to use a large amount of anesthetic agents (such as propofol, dexmedetomidine, isoflurane, narcotics) in the operating room and intensive care unit, a combination of inhalation and intravenous anesthetic agents *were inevitably used*.

Conclusion

This case showed that early tracheal extubation after prolonged glomus jugulare tumor surgical resection in the operating room can be safely achieved. However, the patients undergoing prolonged

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neurosurgery procedures should be selected more conservatively for early tracheal extubation in the operating room.

Acknowledgments

None.

Conflicts of Interest

None.

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