Anesthesiology
61:608–610, 1984

Perioperative Management of Newborn Pharyngeal Teratomas

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Pharnygeal teratoma is a rare congenital lesion that arises from the pharynx, protrudes through the mouth, and causes varying degrees of orofacial distortion and upper airway obstruction.[1] Well-differentiated teratomas may demonstrate primitive organ formation with rudimentary limbs and have often been referred to as epignathi, *fetuses-in-fetu*, or parasitic twins.[2] Perioperative management of newborn pharyngeal teratomas should include early insertion of a tracheal airway, rapid differentiation from meningoencephalocele, and prompt surgical excision.

Report of a Case

A 3.5-kg term female was delivered by primary cesarean section for dysfunctional labor in a 23-year-old primigravida with mild preeclampsia and polyhydramnios. Though vigorous at birth, with Apgar scores of 10-10, the infant experienced gagging and episodic upper airway obstruction in both the supine and lateral positions because of a large orofacial mass (fig. 1). The infant then was placed prone with the head and mass turned to the left and was able to maintain a patent upper airway through the left nostril. An iv line was secured, and the infant was transferred to our institution at 3 h of age.

Physical examination on admission demonstrated an otherwise well-developed term female infant with a large pedunculated mass that filled the right nasopharynx and protruded through the mouth distorting the oral cavity and face (fig. 1). Auscultation confirmed the left nostril as the only patent airway. Skull roentgenograms and computerized tomograms showed the mass to be multiloculated, not connected with the central nervous system (CNS), and filled with small calcifications. The brain, ventricles, and meninges were normal.

Direct laryngoscopy in the supine position was performed during the preoperative visit with a modified Miller 1 blade.[3] The tumor mass was noted to be attached by a thick pulsatile stalk to the right anterior tonsillar pillar, was moved easily to the right of the midline, obstructed the right nasal airway only, and, when moved rightward and suspended by an assistant, permitted direct visualization of a normal epiglottis and glottis. The soft palate was also cleft in the midline. Atropine, 0.06 mg, was given im 20 min before surgery.

The pharyngeal teratoma prohibited an airway via a mask (fig. 1). Only the left nostril provided unobstructed ventilation. We sprayed this nostril with 0.5 ml 4% cocaine and inserted a 3.5-mm endotracheal tube in the left nasopharynx. Halothane (0.5–1.5%) and 60% N_2O in 40% O_2 was insufflated via the nasopharynx after preoxygenation with 100% O_2. Spontaneous ventilation was assisted with a Jackson-Rees modification of a Mapleson D nonrebreathing circuit and a fresh gas flow of 6 l. After the inhalation induction, the glottis was visualized with the use of a modified Miller 1 laryngoscope blade,[3] with an assistant suspending the teratoma off the infant's face and to the right of the midline (fig. 1). The 3.5-mm nasopharyngeal tube then was advanced carefully between the vocal cords under direct vision and without Magill forceps. Bilateral breath sounds were auscultated, and the nasotracheal tube secured. Anesthesia was maintained with halothane and nitrous oxide–oxygen throughout the operation.

Intraoperative monitoring included precordial stethoscope, electrocardiogram, Doppler flow detector, blood pressure cuff, rectal temperature probe, and continuous measurement of inspired and end-tidal gases by mass spectrometry.

The surgical team inserted a palatal retractor, controlled the vascular tumor pedicle with multiple suture ligatures, and removed the giant teratoma piecemeal by sharp dissection. Abrupt hemorrhage of 10 ml occurred when a pedicle ligature broke; quick hemostasis was accomplished, and transfusion was not needed. The soft palate also was repaired. Surgical course was otherwise uneventful.

The trachea was extubated with the infant awake, vigorous, and able to suck for the first time. The infant was discharged on the fifth postoperative day and has continued to feed, grow, and develop normally.

Histologic examination of the surgical specimen was consistent with benign teratoma showing multiple well-differentiated germ cell layers including skin, fat, muscle, cartilage, bone, bronchial and intestinal mucosa, and cerebral tissue.

Discussion

Congenital neoplasms are rare and may include teratomas, neuroblastomas, and Wilm's tumors.[2] Teratomas occur with an incidence of 1 in 4,000 live births, with sacroccygeal teratoma being the most common type (45%) followed by teratomas of the gonads, anterior mediastinum, retroperitoneum, and oronasopharynx (2% or less).[2,3] Pharyngeal teratomas often are diagnosed prenatally by abdominal roentgenogram or ultrasound[5] because of their association with polyhydramnios,[6] breech presentation, dysfunctional labor, and intrauterine fetal demise.[1,7] Pharyngeal teratomas appear to occur more commonly in females[8]; originate in the tonsillar fossae, maxilla, or palate; and may be attached to the sphenoid bone.[2,5] Vascular supply is extensive and originates from the ipsilateral external carotid artery.[4] Respiratory distress at birth is common with the larger pharyngeal teratomas or epignathi.[1,5] Malignant degeneration, though possible, has not been reported.[2]

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Received from the Department of Anesthesiology, Ochsner Clinic and Alton Ochsner Medical Foundation, New Orleans, Louisiana. Accepted for publication April 26, 1984.

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Key words: Airway: obstruction; pharyngeal teratoma. Anesthesia: pediatric.

Preoperative management of pharyngeal teratomas must be directed toward early establishment of a reliable airway, early exclusion of rare congenital CNS lesions such as frontonasal meningoencephalocele or craniopharyngioma, and diagnostic laryngoscopy before surgical excision.[9] Unobstructed ventilation after birth may be established by simple positional changes,[10] as in the case reported, immediate endotracheal intubation,[9] or immediate tracheostomy.[11,12] Skull films and computerized tomograms easily will exclude CNS defects, delineate tumor size and site of attachment, and identify calcifications common to teratomas.[13] Early awake examination of the upper airway by direct or flexible fiberoptic laryngoscopy is recommended to evaluate nasal patency, tumor movability and vascularity, and difficulty of tracheal intubation before anesthesia.[13] Diagnostic laryngoscopy should be brief and cautious and need not require laryngeal suspension as for tracheal intubation, promote glottic stimulation with laryngospasm, or traumatize the tumor mass.

Preanesthetic medication with anticholinergics should reduce the volume of oral secretions and prevent reflex bradycardia during airway or tumor manipulations in infants with giant pharyngeal teratomas. Preanesthetic narcotics or barbiturates appear contraindicated because of the potential for cardiorespiratory depression.

Airway management for excision of pharyngeal teratomas should be by tracheostomy or careful nasotracheal intubation in fasting patients to permit wide oral exposure, avoid vascular tumor pedicles, and protect the lungs from aspiration of orogastric secretions, blood, or fragments of tumor. A mask airway is usually impossible to maintain (fig. 1). Awake tracheal intubation may be difficult or traumatic, and, in tonsillar teratomas, has been associated with bradycardia and lethal hemorrhage.[14,15] Nostrils often are obstructed on one side, making binasal instrumentation impossible.[7] Flexible fiberoptic bronchoscopes may be useful for preoperative evaluation but will not pass through endotracheal tubes with internal diameters less than 4.0 mm.[13,16] Knowledgeable anesthesia assistants and surgeons skilled in pediatric tracheostomy should be present during induction of anesthesia and endotracheal intubation in patients with giant pharyngeal teratomas.

Tumor fragmentation, exsanguinating hemorrhage, and laryngospasm may complicate attempts at endotracheal intubation in either conscious or anesthetized infants with pharyngeal teratomas. Tumor fragmentation is avoided best by selecting nasotracheal intubation (under direct vision) with inhalation anesthesia or tracheostomy for airway management, keeping the laryngoscope blade away from the tumor, and having an assistant gently suspend the tumor away from the airway during all airway manipulations. Exsanguinating hemorrhage from traumatized tumor pedicles or ruptured teratomas must be managed swiftly by combinations of surgical control of the tumor base, manual compression of the ipsilateral external carotid artery, airway protection by tracheal intubation or tracheostomy, and restoration of blood volume through a preestablished iv line with appropriately crossmatched blood available at the bedside. An adjustable elastic ligature loosely snaring the tumor base would be a simple preoperative measure that could provide gentle compression of the feeding vessels and restore a drier operative field in the event of abrupt hemorrhage.

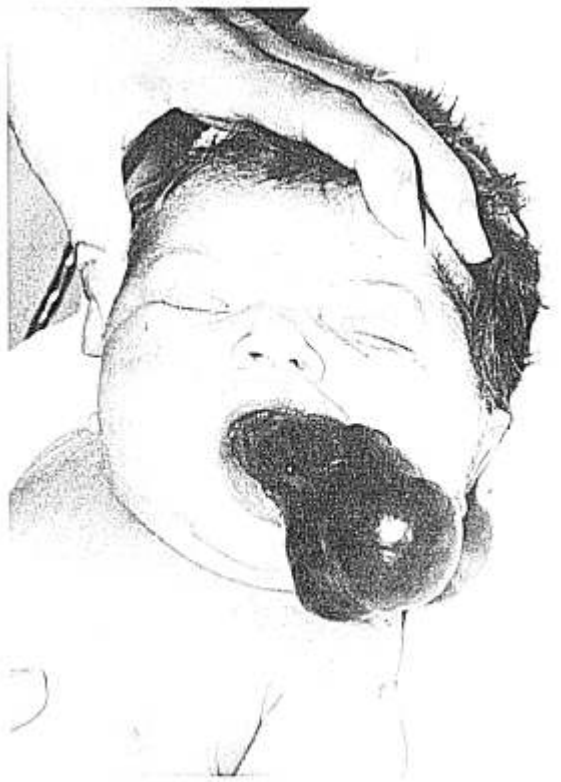

FIG. 1. Newborn female with intermittent upper airway obstruction from a giant congenital teratoma arising from the pharynx and protruding through the mouth.

Laryngospasms with acute hypoxia can be reduced by confining airway operations to conscious or deeply anesthetized infants, avoiding repeated attempts at tracheal intubation, and insuring preoxygenation with accurately monitored inspired oxygen concentrations before all airway manipulations. In the event of laryngospasm in patients with huge pharyngeal teratomas, positive-pressure ventilation by mask would be impossible (fig. 1), neuromuscular paralysis would not insure successful tracheal intubation, and only tracheostomy or spontaneous resolution of laryngospasm would be likely to restore airflow.

We chose nasopharyngeal insufflation of inhaled anesthetics, an old technique,[17] for induction of anesthesia for several reasons. First, preoperative evaluation demonstrated the only upper airway to be the left nostril with a maximum caliber of 3.5 mm. Secondly, the tumor stalk was friable and pulsatile and filled the right side of the mouth. Finally, surgical exposure required a transoral route or right mandibular flap route, thus compromising any oral airway.[7] Preoperative examination also demonstrated easy glottic visualization by direct laryngoscopy on the left of midline.

In conclusion, perioperative management of newborn pharyngeal teratomas should include careful preoperative evaluation of the upper airway, exclusion of midline CNS lesions, provision for a secure perioperative airway, complete surgical excision, and early postoperative evaluation for airway edema, distortion, or recurrent hemorrhage. Prognosis in properly managed and uncomplicated cases is excellent.

References

1. Nogales FF, Gasca L, Llamas R, Blanco A, Sanz JF: Case report: Epignathus—clinical, radiologic, and pathologic considerations. Int J Gynaecol Obstet 15:41–43, 1977
2. Holt GR, Holt JE, Weaver RG: Dermoids and teratomas of the head and neck. Ear Nose Throat J 58:520–531, 1979
3. Diaz JH: Further modifications of the Miller blade for difficult pediatric laryngoscopy. ANESTHESIOLOGY 60:612–613, 1984
4. Mahour GH, Woolley MM, Trivedi SN, Landing BH: Teratomas in infancy and childhood. Surgery 76:309–318, 1974
5. Kang KW, Hissong SL, Langer A: Prenatal ultrasonic diagnosis of epignathus. Journal of Clinical Ultrasound 6:330–331, 1978
6. Hawkins DB, Park R: Teratomas of the pharynx and neck. Ann Otol Rhinol Laryngol 81:848–853, 1972
7. Heroman WH, Golden SM, Yudt WM: Nasopharyngeal teratoma in the newborn. Ear Nose Throat J 59:203–207, 1980
8. Foxwell PB, Kelham BH: Teratoid tumours of the nasopharynx. J Laryngol Otol 72:647–657, 1958
9. Rowe LD: Neonatal airway obstruction secondary to nasopharyngeal teratoma. Otolaryngol Head Neck Surg 88:221–226, 1980
10. Mitra S, Purohit A, Mukherjee B, Pathak I: Pharyngeal teratomas. Ear Nose Throat J 61:536–538, 1982
11. Dekelbaum AM: Teratoma of the nasopharynx in the newborn. Otolaryngol Head Neck Surg 87:628–634, 1979
12. Ochsner A, Ayres WB: Epignathus. Surgery 30:560–564, 1951
13. Whitlock R, Yonfa A, Buntain WL: A case report: Maxillary deformity with intraoral teratoma—anesthetic considerations. Journal of American Association Nurse Anesthesists 49:503–506, 1981
14. Shah BL, Vasan U, Raye JR: Teratoma of the tonsil in a premature infant. Am J Dis Child 133:79–80, 1979
15. Baugh CD, O'Donoghue RF: Teratoma of the tonsil causing respiratory obstruction in the newborn. Arch Dis Child 30:396–397, 1955
16. Alfery DD, Ward CF, Harwood IR, Mannino FL: Airway management for a neonate with congenital fusion of the jaws. ANESTHESIOLOGY 51:340–342, 1979
17. Marquez X, Roxas RS: Induction of anesthesia in infant with frontonasal dysplasia and meningoencephalocele: A case report. Anesth Analg 56:736–738, 1977

Anesthesiology
61:610–613, 1984

Cardiovascular Effects of Ketamine Given to Relieve Penile Turgescence after High Doses of Fentanyl

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Penile turgescence during attempted Foley catheterization after induction of anesthesia with high doses of fentanyl has been observed in approximately 1% of male patients undergoing cardiac surgery at my institution. Ketamine is touted as an agent effective in the treatment of penile turgescence.[1,2] But induction doses of ketamine increase heart rate, blood pressure, cardiac output, pulmonary artery pressure, and intrapulmonary shunt.[3,4] We present four cases in which the prior administration of fentanyl 40–50 $\mu g \cdot kg^{-1}$ and pancuronium 0.08 $mg \cdot kg^{-1}$ blocked these cardiovascular effects when ketamine 0.5–1.8 $mg \cdot kg^{-1}$ was given to induce detumescence.

Report of Four Cases

All patients were premedicated with morphine 0.1 $mg \cdot kg^{-1}$ im and lorazepam 0.05 $mg \cdot kg^{-1}$, po, 1.5 h before induction of anesthesia. Diazepam 4–10 mg iv was administered in 2-mg increments over 15 min during the insertion of arterial and pulmonary artery catheters. Arterial blood pressure, pulmonary artery pressure, and central venous pressure were recorded continuously. While breathing oxygen, metocurine 4 mg iv was given. Anesthesia was induced with fentanyl 40–50 $\mu g \cdot kg^{-1}$ iv over a 5-min period. Pancuronium 0.08 $mg \cdot kg^{-1}$

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Key words: Anesthetics, intravenous: fentanyl; ketamine. Complications: penile turgescence.