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Anesthetic management in downs syndrome patient posted for tonsillectomy surgery – A case report

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Abstract
Down's syndrome is a congenital anomaly occurring due to extra chromosome attached to Chromosome 21. Cardiovascular, respiratory and central nervous system, atlanto-axial joint instability may be involved in Down's syndrome as an isolated system involvement or multiple system involvement, thus posing several anaesthetic challenges. Pediatric tonsillectomy and adenoidectomy (TNA) is a common and usually uncomplicated surgery. These surgical procedure involves manipulation of neck for proper surgical field accessibility. Since Downs syndrome patients may have atlanto-axial joint instability, manipulation of the neck for intubation and surgery should be performed very cautiously. We report 7 year old male child, a case of Downs syndrome posted for tonsillectomy surgery. We discussed the peri-operative management of this patient.

Keywords: Tonsillectomy surgery, syndrome patient, atlanto-axial

1. Introduction

Pediatric tonsillectomy and adenoidectomy (TNA) is a common and usually uncomplicated surgery. But these surgeries in Down syndrome can add significant difficulties. Down's syndrome is the most commonly encountered congenital anomaly in medical practice. These patients are of special concern to medical practice because of their associated problems with regard to respiratory, cardiovascular and other systemic problem [1, 2]. Children with Down syndrome are more prone to sleep apnea and airway obstruction due to a large tongue, short neck and laryngomalacia [3]. About 60 percent of children experience pre-surgical anxiety, and Down syndrome children are even more likely to be affected. Many have had prior surgeries and other unpleasant medical encounters as well as varying degrees of mental deficits [4]. Manipulation of the neck for intubation and surgery should be performed very cautiously because of potential neck instability. Airways require special attention during Tonsillectomy and adenoidectomy surgery, since it is involved in the surgical field and frequent changes in the position of the head might be necessary, requiring perfect fixation of the tool used to access the surgical field. Cervical complications related to incorrect positioning result in undesirable postoperative consequences, including cervical lesion in patients with risk factors [5]. Bleeding, secretions, edema, and excessive manipulation might lead to respiratory complications.

2. Case Report

This is a seven year old male child weighing 24 kg, ASA II, with Down syndrome, and the diagnosis of hypertrophy of the palatine tonsils. The patient developed obstructive sleep apnea, indicating the need of tonsillectomy. Routine blood tests were ordered during preanesthetic check-up which were normal. Special tests included 2D echo to rule out associated congenital cardiac condition, thyroid profile test to rule out hypothyroidism both of which had a normal report. X ray neck was ordered with special emphasis on the atlanto axial joint to rule out atlanto-axial ligament laxity which is commonly seen in patients with downs syndrome. X-ray revealed no abnormal findings. After clinical and physical examination, the child was accepted under ASA II and posted for surgery.

Pre-operative fasting was observed for 4 h for milk, 6 h for solid food and 2 h for clear fluid. Baseline vital parameters like heart rate (HR), non-invasive blood pressure (NIBP), (ECG), pulse oximetry (SpO2), capnography were noted inside the O.T. Pre cordial stethoscope fixed. All the anaesthetic equipments and drugs were checked. He had an oral opening of 2 cm, Mallampati I, and no limitation of cervical extension and rotation. Decreasing concentrations of sevoflurane (8% to 4%) and nitrous oxide at 50% were used for anesthetic induction. When the anesthetic plane was achieved, a venipuncture was performed with a 22G catheter. Inj. Glycopyrolate and Inj. Ondensetran, given intravenously. After administration of atracurium and fentanyl, conventional laryngoscopy was performed with the head of the patient in neutral position. With good visualization of the epiglottis and vocal cords (Cormack I), the patient was intubated without intercurrences. Anesthesia was maintained with 2% sevoflurane and 50% nitrous oxide. Despite the small technical difficulty, the surgery was performed without cervical extension. All monitoring parameters remained within normal limits during the surgery, which lasted approximately 40 minutes. At the end of the surgery, inj.neostigmine and inj.glycopyrolate were administered and the patient was extubated without intercurrences. The patient remained stable in the post-anesthetic care unit, being discharged from the hospital on the first postoperative day.

3. Discussion

Down's syndrome is a congenital anomaly occurring due to extra chromosome attached to Chromosome 21. This is also called as Trisomy 21 [1]. Trisomy 21 is the commonest chromosomal abnormality that affects people with an incidence of 1:800 live births [1]. Down's syndrome is associated with anomalies in various systems. Cardiovascular, respiratory and central nervous system may be involved in Down's syndrome as an isolated system involvement or multiple system involvement, thus posing several anaesthetic challenges. Clinical features of Down's syndrome include microcephaly, macroglossia, and

ligamentous laxity at atlanto occipital joint and subglottic stenosis, which can pose problems for securing airway [1]. Atlantoaxial instability has been reported in 20% of patients and spinal cord compression in 2% [2]. Hence, it is important to do a cervical spine X-ray preoperatively. Typical signs and symptoms of neck instability include gait instability, radiculopathy, and bowel or bladder incontinence [3] If the child is not symptomatic, be cautious in neck manipulation. Other physicians, nurses, surgical technicians and health care providers should be cautioned to avoid excessive neck extension during the surgical and peri-operative period. If the child is symptomatic, he or she should have cervical spine imaging. If any abnormalities are seen, the patient should be referred to a pediatric neurosurgeon or orthopedic surgeon who specializes in atlanto-axial evaluation and management [4]. In our case, it was normal. Down's syndrome is associated with several types of congenital heart defects such as endocardial cushion defects (40%), ventricular septal defects, atrial septal defects (30-60%), patent ductus arteriosus (12%) and Tetrology of fallot (8%) [5]. Therefore, it is important that echocardiography should be performed in these cases. Echocardiography was normal in our case. Gastrointestinal anomalies associated are duodenal stenosis, gastro esophageal reflux, imperforate anus and Hirschsprung's disease [6]. Therefore, premedication should include prophylaxis to prevent gastro esophageal reflux.

About 60 percent of children experience presurgical anxiety, and Down syndrome children are even more likely to be affected. Many have had prior surgeries and other unpleasant medical encounters as well as varying degrees of mental deficits. Expect to spend extra time trying to establish some sort of rapport and calming these patients, always take time to assess children for anxiety. If patients cannot be calmed by talking or distraction, premedication with benzodiazepines or alpha-2 agonists may help. Depending on hospital policy, it may also be helpful to have a parent accompany the child into the O.R. for induction. Bradycardia is common during induction of anesthesia in children with Down syndrome. If the heart rate does not recover, atropine may be useful [5]. If an I.V. line is not in place, the drug can be injected sublingually for fast effect. Many clinicians prefer to minimize the use of opioids in these patients, although a small amount of fentanyl at the end of surgery can provide analgesia as the patient wakes up. Dexamethasone, acetaminophen, dexmedetomidine and ibuprofen may also be useful alternatives to opioids [6]. Tonsillectomy is a same-day procedure for many hospitals, but Down syndrome children should spend at least one night under observation. Patients with increased risk for obstructive sleep apnea should not be discharged to an unmonitored setting until they are no longer at risk for respiratory depression.

4. Conclusion

In our case, a detailed preoperative assessment and optimization was done. There was no atlanto-axial instability and cardiovascular anomalies. However, child was evaluated thoroughly and anaesthetic management was planned with anticipation for difficult airway, sensitivity to drugs and ventilation challenges during surgery. A meticulous anaesthetic management resulted in a good peri-operative outcome in our case.

5. References

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