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Anaesthetic considerations in an adult with Down's syndrome for laparoscopic cholecystectomy: A case report

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Abstract
We report the successful management of a 35-year-old male with down syndrome posted for lap cholecystectomy. The anomalies associated with Down syndrome present some interesting challenges for the anaesthesiologist. Airway difficulties, a potentially unstable cervical spine, and a high incidence of congenital heart disease all require careful consideration. Impaired immune function predisposes to chronic infections and demands attention to asepsis during invasive procedures.

Keywords: Lap cholecystectomy, down syndrome, anaesthesia, cervical instability

Introduction
Down syndrome, or trisomy 21, is a common congenital abnormality associated with characteristic morphological features, impaired intellectual development and disorders of multiple organ systems with a broad spectrum of severity. It is the most prevalent genetic disorder worldwide, affecting more than 1 in 800 live births, and remains the most commonly encountered congenital anomaly in medical practice. Patients with Down syndrome are of special concern to the anaesthesiologist, primarily due to their unique set of medical conditions, including respiratory, cardiovascular, atlanto-axial instability, congenital heart disease and other systemic problems.

Case Report
A 35-year old male presented with complaints of progressive pain in the abdomen and right hypochondrial region since 10 days. On examination, he was moderately built weighing 50kgs. He had gross mental and physical retardation and mongoloid facies with upward slant of eyes, small nose with flat nasal bridge; he also had simian crease and sandal gap. Vital signs were normal. Nervous system examination revealed generalized hypotonia. Examination of cardiovascular and respiratory systems revealed no gross abnormality. On abdominal examination, there was tenderness with guarding in the right hypochondrial region. On airway examination, he had adequate mouth opening, macroglossia with prominent upper incisors, MMP-IV and TMD>3 fingers. Neck movements were adequate. USG Abdomen revealed cholecystitis. Routine hematologic tests were within normal limits. Echocardiography and Thyroid profile were normal. X ray neck revealed no abnormal findings. He was accepted under ASA II and posted for lap cholecystectomy under general anaesthesia.

Technique
Pre-operative fasting was observed for 6 hours. In the OR, he was connected to a monitor displaying heart rate (HR), non-invasive blood pressure (NIBP), (ECG), pulse oximetry (SpO_2), $EtCO_2$ and core body temperature. All the anaesthetic equipments and drugs were checked. Difficult airway equipments and fibreoptic bronchoscope were kept ready. Premedication with glycopyrolate and ondensetron were given intravenously. Preoxygenation with 100% oxygen was done for 3 minutes and induction was done with fentanyl 100 mcg and propofol 100mg. After ascertaining bag-mask ventilation, inj. succinylcholine 100mg was given. Conventional laryngoscopy was done with the head of the patient in neutral position.

With good visualization of the epiglottis and vocal cords (Cormack I), the patient was intubated with 8.5 size ETT. Anaesthesia was maintained with O_2 and N_2O (50%:50%), isoflurane and atracurium 25mg followed by 5mg (every 30 minutes). The surgery was performed without cervical extension. All monitoring parameters remained within normal limits during the surgery. At the end of the surgery, inj. neostigmine 2.5mg and inj. glycopyrolate 0.5mg were administered and the patient was extubated. The patient remained stable in the post-anaesthetic care unit.

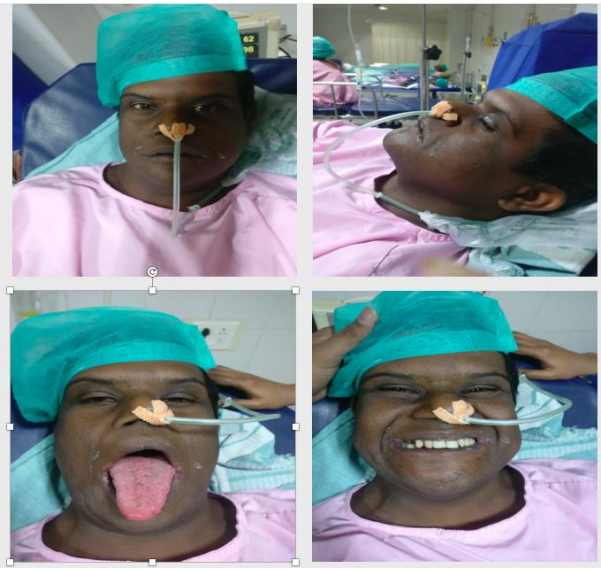

Fig 1: Facial features of Down's syndrome seen in the patient

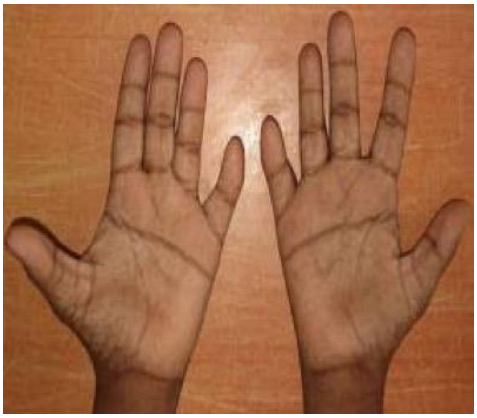

Fig 2: Simian crease seen in both hands

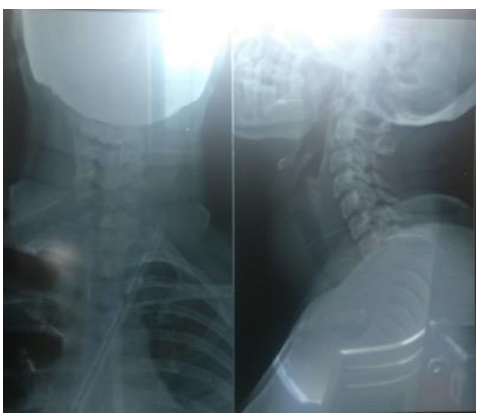

Fig 3: Cervical spine X-ray of the patient showing no atlantoaxial instability

Discussion

Down's syndrome is widely associated with abnormalities involving cardiovascular, respiratory and central nervous system. Features such as microcephaly, macroglossia (large tongue), cardiac defects (endocardial cushion defects, ventricular septal defects), duodenal atresia, atlantoaxial instability and airway (supraglottic) stenosis causes concern to the anaesthesiologist. Proper planning for managing the difficult airway should be done. Atlantoaxial instability is seen in nearly 20% of patients. The major signs pointing to neck instability include gait instability, radiculopathy, and bowel/ bladder incontinence. So, it is vital to order for a cervical spine X-ray to rule out atlantoaxial instability.

The major cardiac abnormalities with Down's syndrome are endocardial cushion defects (40%), atrial septal defects-ASD (30-60%), ventricular septal defects-VSD, patent ductus arteriosus-PDA (12%) and Tetrology of fallot-TOF (8%). Hence, pre-operative echocardiography must be done in these cases. Gastrointestinal (GI) abnormalities include gastro esophageal reflux disease, duodenal stenosis and Hirschsprung's disease. Hence, premedications to prevent gastro esophageal reflux should be included. Bradycardia is a nightmare for the anaesthesiologist during induction of anesthesia in these patients. In such cases, atropine may be useful. There is also increased risk of respiratory complications. Upper and lower airway problems occur in these individuals due to hypotonia, small upper airway, pulmonary hypoplasia, cardiac disease, obesity and congenital anomalies of airway. This can also result in pulmonary arterial hypertension (PAH). There is also increased possibility of pulmonary infections and other infections leading to sepsis. Therefore, strict aseptic precautions should be taken during intravenous cannulations and during central venous cannulation and removal. Central lines should be removed as soon as possible after the surgery. TO conclude, anaesthetic management in patients with Down's syndrome requires special consideration in view of the anatomical abnormalities and particular pathology encountered in these individuals.

Conflict of Interest: NIL

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