

## CASE REPORT

### **Title: Subglottic Stenosis: Potential Complications in the Perioperative Period**

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### **ABSTRACT**

Upper airway obstruction is a commonly occurring emergency situation especially in pediatric population. The severity and level of obstruction are the prime determinants of management. Airway management is a major challenge in such cases as there is a compromise in ventilation alongwith the difficulties in manual ventilation and intubation. A proper planning regarding possible interventions and step by step approach is mandatory so as to plan an anaesthetic plan. Thus coordination between ENT surgeon and anaesthesiologist can help to deal with complications that arise.

We report a case of management and treatment of 9 months old baby presented with suspected laryngomalacia for further management.

**Study Design:** Case Report

**Keywords:** Subglottic, Stenosis, Potential, Complications & Perioperative.

### **INTRODUCTION:**

Obstruction in the upper airway causes difficulty in breathing, stridor, respiratory distress. Obstruction in upper airway is considered from nose/mouth

up to the trachea, can be due to nasal polyp, enlarged tonsils/ adenoids, laryngomalacia, tracheomalacia, etc<sup>(1)</sup>. Narrowest part of upper airway in children is subglottis, while in adults is glottis. Subglottic stenosis is the third leading cause of congenital stridor in neonates as it measures approximately 4.5\*7mm in infants and edema of mere 1mm can reduce cross-sectional area of subglottis by 60%.<sup>(1)</sup> Stenosis in subglottic area can be congenial or acquired. Most common acquired cause is endotracheal intubation leading to mucosal compression, edema, ischemia and ulceration. Besides prolonged intubation, other risk factors for stenosis are size of endotracheal tube, repeated/traumatic intubation, low birth weight (<1500gm), presence of nasogastric tube.

## **CASE REPORT**

A 09 months old female weighing 5.1kgs with complaint of severe pneumonia, meningitis, moderate anaemia with CONS sepsis and respiratory failure with query laryngomalacia was posted for fiberoptic endoscopy with bronchoalveolar lavage and tracheostomy. Child was delivered at term via normal vaginal delivery with birth weight of 2kg, cried after birth. She had history of breathlessness for 2months, 3 episodes of projectile vomiting 2 month back and stridor since 1.5 months.. Patient was intubated and extubated 4 times in these 2 months. Her HRCT scan showed patchy area of consolidation with adjacent glass attenuation in apical segment of upper lobe and apico-posterior segment of

left upper lobe along with few enlarged mediastinal lymph nodes. On examination stridor was present and chest on auscultation was clear, respiratory rate of 45/min. SpO<sub>2</sub> 95% on CPAP, HR 154bpm. Child was shifted in operation theatre on oxygen support via face mask, vitals as observed on OT table after connecting standard monitor were HR 150bpm, SpO<sub>2</sub> 96% on JRC. IV line was connected. Surgeon planned to first visualise glottis and subglottic area under direct vision with laryngoscopy. Apneic ventilation planned. Inhalational induction was done with sevoflurane 5% till loss of muscle tone and laryngoscopy done by ENT surgeon and presence of subglottic stenosis and anterior glottic web was confirmed (FIG 1). With 0 degree endoscope under direct vision stenosis and web released with sickle knife (Mercedes Benz incision) and 1 mg Injection Dexamethasone was infiltrated. Continuous suctioning was done to avoid blood and other secretions trickling in lower airways. Vitals were continuously monitored and SpO<sub>2</sub> maintained between 92-98% with intermediate ventilation achieved via JRC with 100% oxygen and sevoflurane. With each increasing attempt glottic view reduced (Fig 1-5) Two attempts to release stenosis were made in view of falling saturation. During second attempt bradycardia occurred HR dropped to 78bpm along with reducing saturation to 60%, patient was ventilated with 100% oxygen only and HR and SpO<sub>2</sub> both returned to baseline. Child was then intubated with 3.5mm endotracheal tube and ventilated with 100% oxygen till return of spontaneous

ventilation. Child was then shifted with endotracheal tube in situ to pediatric ICU while maintaining saturation on spontaneous ventilation at JRC.



FIG 1

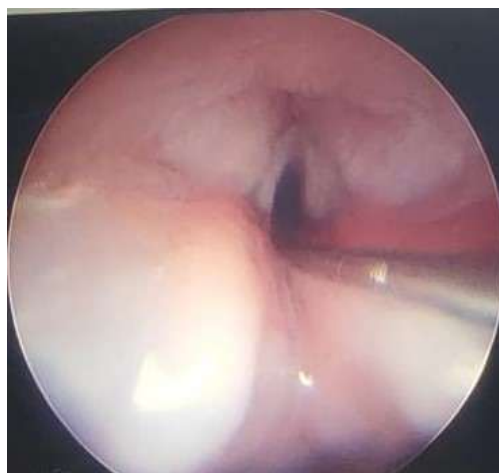


FIG 2



FIG 3



FIG 4

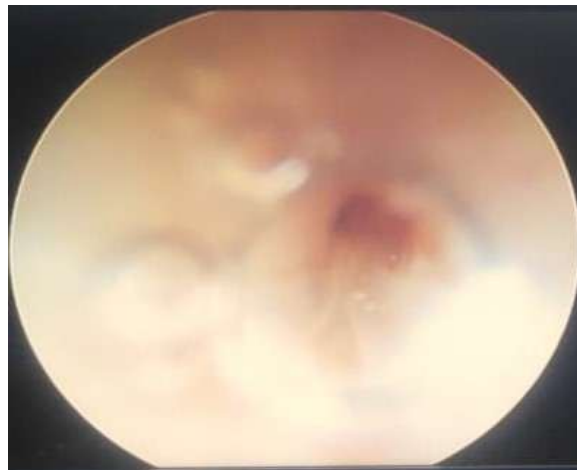
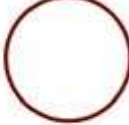











FIG 5

## DISCUSSION

Subglottic stenosis has recently seen spike in recent years with change in age curve towards infants which can be maximally attributed to posterior glottis injury as there is posterior displacement of endotracheal tube at the base of tongue and posterior angulation of trachea<sup>(2)</sup> Our patient in study was 9 months old and had finding of subglottic stenosis and anterior glottic web confirmed after direct laryngoscopy. Patient might have developed it following repeated intubation and extubation for pneumonia, light sedation, traumatic intubation/extubation etc. Cotton Mayer grading is used for subglottic stenosis<sup>(3)</sup> (Figure 6).

Grade	From	To	Examples
Grade I	 No Obstruction	 50% Obstruction	
Grade II	 51% Obstruction	 70% Obstruction	
Grade III	 71% Obstruction	 99% Obstruction	
Grade IV	No detectable lumen		

**FIGURE 6**

Challenges we faced during surgery can be categorised into preoperative, intraoperative and postoperative.

Preoperative preparation demands a comprehensive anaesthetic plan, better coordination between surgeon and anaesthesiologist alongwith patient's parents regarding surgery and need of tracheostomy

Intraoperative could be listed as: need of apneic ventilation; maintenance of desired plane of anaesthesia to avoid its other consequences like bronchospasm, laryngospasm; increasing risk of difficulty in intubation with each attempt as a result of subglottic edema; end tidal CO<sub>2</sub> monitoring; OT pollution. Bronchoscopy is relatively difficult in pediatric patients due to lack of availability of appropriately sized instruments.<sup>[5]</sup>

Postoperative period demand careful monitoring as these patients are at increased risk of impending hypoxia, hemodynamic compromise

The present work aims to provide practical guidance and a pre-operative concise procedural checklist to be used by the surgical team in this setting.

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