RESEARCH PAPER | Medical sciences | Volume : 5 | Issue : 3 | March 2015 | ISSN - 2249-555X

Aryepiglottoplasty With Diode Laser in Severe Laryngomalacia, a Case Report

KEYWORDS: Laryngomalacia, Diode laser, aryepiglottoplasty

Dr Halikar Sudhir G

Assistant professor Institute of Medical Sciences & Research, Mayani, Satara

ABSTRACT *Laryngomalacia is the most common laryngeal anomaly which causes inspiratory stridor in newborns. The disease is usually self-limiting and resolves before the age of two years. We present a case of severe laryngomalacia with feeding disorder and airway obstruction which needed surgical management--aryepiglottoplasty. The shortened aryepiglottic folds were incised using Diode laser through laryngoscopic view. The patient was observed at the hospital for one week after surgery and followup was done for six months in opd with complete recovery.*

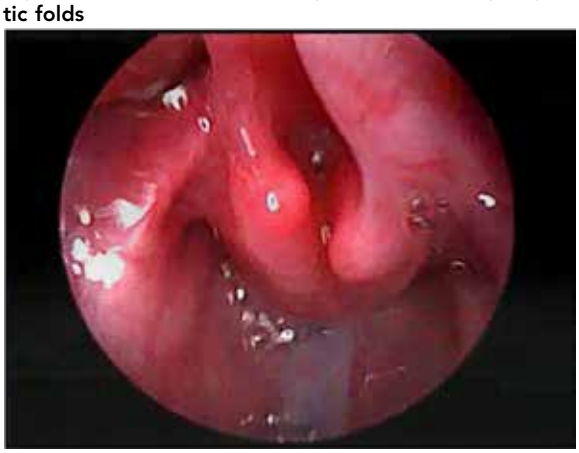
Case Report :

A two month old female child was admitted in neonatal intensive care unit for severe respiratory distress. To start with there was h/o cough and cold with fever and difficulty in breathing. She was not accepting feeds well and weighed 2.4 kg. The baby was born through an elective caesarian section with a birth weight of 2.099kg. There was history of child having mild respiratory distress with stridor at birth and was admitted to neonatal intensive care unit [NICU] for a week. This was the precious baby of the mother who had lost her first twins, one was stillborn and second died in NICU presumably due to the complications arising from hydronephrosis.

On examination, the child was in severe respiratory distress with suprasternal and substernal retraction. There was severe tachypnoea [respiratory rate 88/min] and tachycardia [heart rate 190/min]. The child was immediately intubated and kept on ventilator. Septic workup was done with chest X ray and arterial blood gas analysis [ABG]. Intravenous antibiotics were started and one point of packed cell volume [PCV] was given in view of low hemoglobin and ventilatory requirement. Extubation trial was given after a few days but she landed in respiratory distress with stridor in few hours. After a couple of such failed trials the child was posted for rigid laryngo-bronchoscopic examination under anaesthesia.

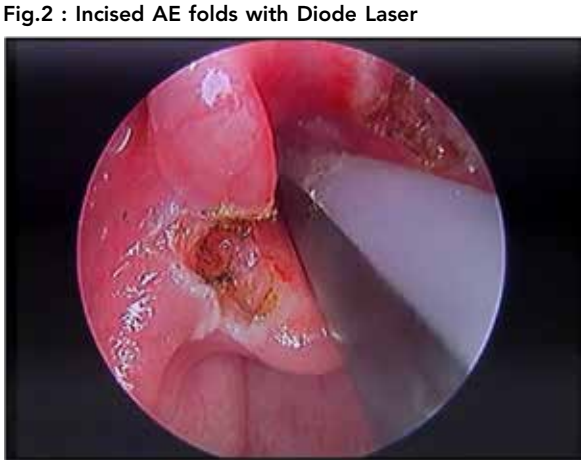
Under anaesthesia initially nasal endoscopy was done to allow dynamic examination of the infant's larynx under optimal conditions (sedated infant) and to detect any sleep-related or sleep-exacerbated diseases. Deeper general anaesthesia was then ensured by intravenous anaesthetics and anaesthetic gases and rigid endoscopy was performed under spontaneous breathing. A dose of systemic corticosteroids (methylprednisolone 2 mg/kg) was administered at the beginning of the procedure. Local anaesthesia of the glottic and supraglottic regions was performed. Direct laryngoscopy and rigid bronchoscopy were performed , on laryngoscopy epiglottis was omega shaped with very short aryepiglottic folds . There was no other abnormality in the air passage like vocal cord paralysis, laryngeal web or interarytenoid cleft etc.

Fig. 1 : Endoscopic view of larynx with short aryepiglottic folds



Surgery was planned a couple of days later after proper consent from the parents. The plan was direct laryngoscopy (suspension laryngoscopy) using an operating microscope with diode laser assisted aryepiglottoplasty. The short aryepiglottic folds were divided with diode laser at a point approximately midway between the arytenoids and the epiglottis. Following the dissection, the epiglottis was found to immediately spring forward leaving the laryngeal inlet more visible and open.

Fig.2 : Incised AE folds with Diode Laser



Volume : 5 | Issue : 3 | March 2015 | ISSN - 2249-555X

The child was extubated on third postoperative day. She was comfortable with no respiratory distress and chest indrawing. Nasogastric tube was removed on seventh postoperative day and oral feeds were started. She tolerated oral feeds well. The child was then discharged. At three weeks , two and six months follow-up the child is doing well, she has gained weight substantially with no further episode of respiratory distress and stridor.

Discussion:

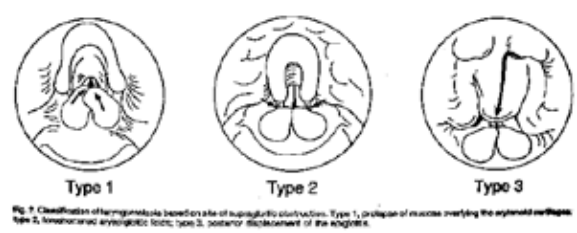
Laryngomalacia is defined as collapse of supraglottic structures during inspiration. It is the most common cause of stridor during infancy [1]. Laryngomalacia presents in the form of stridor, a high-pitched, musical, vibrating, multiphase inspiratory noise appearing within the first 10 days of life. Approximately 90% reported cases are mild and the symptoms resolve spontaneously by the age of two years. Signs of severity are present in 10% of cases: poor weight gain , dyspnoea with permanent and severe intercostal or xyphoid retraction, episodes of respiratory distress, obstructive sleep apnoea, episodes of suffocation while feeding or feeding difficulties and occasionally sudden death.(2)

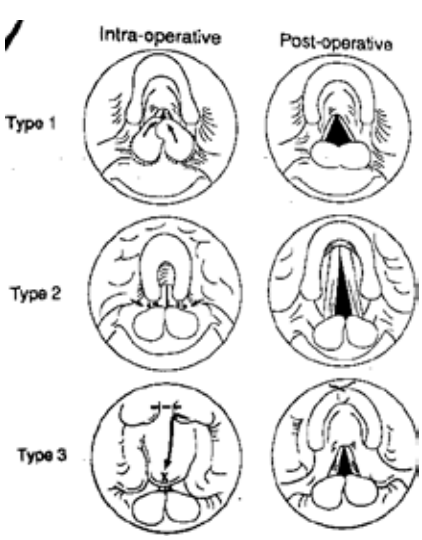
The exact pathophysiology of laryngomalacia remains obscure. It is however established that it leads to a dynamic supraglottic collapse in inspiration, and the following three anatomical abnormalities have been chiefly implicated. (1)

a. short AE folds

b. bulky arytenoids with loose mucosa which prolapses forward on inspiration.

c. a long curled epiglottis which prolapses posteriorly





The diagnosis is based on flexible laryngoscopy to confirm laryngomalacia and exclude other causes of supraglottic obstruction. Rigid endoscopy under general anaesthesia is required occasionally if there is absence of laryngomalacia on flexible laryngoscopy, presence of laryngomalacia with signs of severity, search for any associated lesions prior to surgery, discrepancy between the severity of symptoms and the appearance on flexible laryngoscopy .(3) In the present case rigid endoscopy under general anaesthesia was planned because the child was in severe respiratory distress . Rigid endoscopy under anesthesia has been shown to be more sensitive and specific than fibreoptic laryngo-bronchoscopy in infants who are awake. (3)

Children with severe retractions, cyanotic spells, and apneas during sleep may have obstructive sleep apnea associated with laryngomalacia. Approximately 10% of patients present with such severe congenital laryngomalacia and require surgical intervention because of failure to thrive, significantly elevated carbon dioxide or hypoxemia, severe obstructive sleep apnea, pulmonary hypertension, or cor pulmonale.[2,3,4]. In view of the clinical picture of severe respiratory distress and endoscopic finding of short aryepiglottic fold with omega shaped epiglottis surgery was planned in the present case.

The most consistent structural abnormality is the short aryepiglottic fold. It is believed that the short AE folds are responsible for tethering the epiglottis posteriorly. Incision of the folds midway along its length serves to release the epiglottis and allows it to move forward. Hasslinger, in 1928, is credited with the first description of such a procedure (1), and several authors have described it since then [5,6,7,8] Such division of the AE folds alone, is reported to be sufficient to relieve the airway obstruction in the vast majority of cases (90.6%). [7] We therefore relied on AE fold division as the procedure in this case and used Diode laser for the purpose. Diode laser contributes to a more selective and less invasive surgery, minimizing the risk and post-operative period in hospital. Surgery can be done with cold instruments or with lasers like Diode or CO2 or Radiofrequency cautery. [9,10]

Following such direct laryngeal manipulation, the resultant local inflammatory response to the surgical trauma may potentially cause transient compromise of the airway. Local edema and laryngospasm are ever-present dangers. The success of the procedure lies in limiting surgical trauma and in the availability of pediatric intensive care facilities in the post-operative period. Complications inherent to the procedure are minimal, provided adequate precautions are exercised. For fear of local tissue edema consequent to both the anaesthesia and the surgical procedure we kept the child intubated for a couple of days. The result is extremely gratifying on short and long term follow-up. The major benefit has been the avoidance of the potential morbidity and mortality of repeated intubation . The relief in airway compromise has also helped in correcting for feeding difficulties and in facilitating normal growth.

The success hinges on timely intervention with proper technique, minimum intraoperative trauma, and by expert pre and post-operative intensive care. The success was a result of close liason between the paediatric, otolaryngological and anaesthetic teams.

Volume : 5 | Issue : 3 | March 2015 | ISSN - 2249-555X

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