A Rare Case of Laryngeal Web Excision by CO2 Laser in a Child: An Anaesthetic Challenge

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CASE REPORT

A 12 year old child ASA grade 1 weighing 25kg had developed laryngeal web following trauma to neck by a bicycle handle 2 months back. History revealed that he had developed breathlessness just after sustaining trauma which had resolved spontaneously. At that time a CECT scan neck was done which was normal. Gradually he developed hoarseness of voice. Routine preoperative evaluation was within normal limits. Laboratory investigations such as haemogram and urine examination were within normal limits. Indirect laryngoscopy and fibreoptic laryngoscopy done by ENT surgeons revealed anterior web at the level of vocal cord covering 75% of glottic opening with restriction of movement of vocal cords. The patient was posted for CO2 laser excision of laryngeal web.

In the operative room, after attaching standard monitors, induction was carried out with Inj Fentanyl 35µg IV, Inj Propofol 70mg IV. Once bag and mask ventilation was established, Inj Vecuronium 2mg IV was given. In view of age of the patient and presence of web, endotracheal intubation was attempted with a cuffed MLS tube 5 mm ID which could not be negotiated through the glottic opening. Since there was no difficulty in bag and mask ventilation intubation was reattempted with cuffed MLS tube 4 mm ID which also could not be negotiated. Intubation was possible with uncuffed PVC tube 4 mmID during third attempt. After confirmation of bilateral equal air entry, the endotracheal tube was secured. During this period, the vitals and oxygen saturation was within normal limits.

Anaesthesia was maintained with oxygen, nitrous oxide and isoflurane and intermittent dose of Inj vecuronium 0.5mg IV. The surgeon placed wet cotton pledgets around the tube under vision for protection against laser burns to airway. The laryngeal web was excised with CO2 laser, A 0.5mm thick butterfly shaped silastic sheet used as a keel, was placed in the anterior commissure and was secured, in front of the neck above and below the thyroid cartilage with monofilament sutures.

Throughout the surgery oxygen saturation and vitals remained stable. In view of airway handling and expected edema Inj Dexamethasone 4mg was given intravenously. Once spontaneous respiration resumed, neuromuscular blockade was reversed with Inj Neostigmine and Inj Glycopyrolate. Trachea was extubated with surgeon as a standby for any emergency. Soon after extubation, patient developed features of upper airway obstruction. 100% oxygen and CPAP were applied as a routine measure. But the obstruction was not relieved. In view of expected airway edema, nebulization with adrenaline was given on OT table but was unable to relieve the obstruction. At this point it was thought prudent by both the surgeons and the anaesthetist to tracheostomize the patient, as against the option of re-intubation of trachea.

Tracheostomy was performed immediately. The postoperative course remained uneventful. The patient was sent to ward and the trachea was decannulated on the third postoperative day. Stent removal was planned after a month. As the Fibreoptic laryngoscopy in the follow up revealed granulation tissue at the level of vocal cords, surgeons decided to excise the granulation tissue 15 days following the surgery. This time in view of smaller glottic space with stent in situ and due to presence of granulation tissue the trachea was intubated with uncuffed PVC tube 4 mmID. The subglottic granulation tissues were excised and a thicker and bigger silastic sheet was reinserted and secured as earlier.

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The intra operative period was uneventful. After completion of surgery and return of spontaneous efforts the trachea was extubated. A mild upper airway obstruction was noticed but this time it was relieved with application of 100% Oxygen, CPAP and nebulization with Adrenaline. Recovery was uneventful. A third surgery was planned to remove the stent after 1 month. GA was administered by the same technique and agents as was used in the previous surgeries. The stent was removed. The surgeon applied Inj Mitomycin 0.4mgm\(^{-1}\) topically and Inj Triamcinolone 40mgm\(^{-1}\) was injected in the granulation tissue. The anaesthetic course was uneventful and patient's trachea was safely extubated. The patient was discharged from hospital 1 week later.

**DISCUSSION**

Laryngeal web is a rare entity. When congenital in origin, this may be associated with various syndromes like Di-George syndrome, CATCH 22 syndrome and Velo cardiofacial syndrome. In our patient the cause of development of web was trauma to neck. 98% of laryngeal webs are anterior in location.\(^1\)

They are classified based on the degree of airway obstruction.\(^2\)
- Type I - <35% of airway obstruction
- Type II - 35 -50% of airway obstruction
- Type III - 50-75% of airway obstruction
- Type IV - 75-90% of airway obstruction

Our patient had type III laryngeal web. (Fig. 1)

Clinical presentation of patients with laryngeal web can be varied. Patients may remain asymptomatic and present as unanticipated cases of difficult intubation.\(^1,3,4\) They can also be misdiagnosed as bronchial asthma and COPD specially if the web is subglottic in location.\(^3\) The clinical symptoms can vary from hoarseness of voice as in our patient, to respiratory distress, stridor, croup, and dysphagia.\(^1\)

Asymptomatic patients do not require treatment, others are commonly managed by surgical division using CO\(_2\) laser. Surgical division can also be achieved by laryngeal knives, laryngeal microscissors, galvanocautery or radiofrequency current. Extensive webs require laryngeal reconstruction.\(^2\) Correction of webs results in two opposing surfaces with denuded epithelium which again tends to heal together and form a web. A stent or a keel prevents this problem. Topical corticosteroid injections and local application of mitomycin also prevents scarring. Presence of laryngeal web in our patient had pre warned us about a possible difficult airway.

Since our patient did not have any airway obstruction and bag and mask ventilation was easily achieved after induction, intubation was initially attempted with cuffed MLS tube 5mmID. Non availability of laser tubes in smaller sizes (<4mm ID) necessitated the use of uncuffed plain PVC tube of size 4mm ID.

Laser surgery mandated protection of ET tube and cuff. In this case since aluminium foil wrapping of tube was not possible because of the use of already smaller sized tube, the surgeons placed wet cotton pledgets around the tube as a precautionary measure.

We were also very careful throughout surgery for fear of dislodgement of ET tube specially after resection of web. Since recurrence is a problem in such cases, we were careful during repeat surgeries, because of presence of the stent which can fold or dislodge during repeat intubation.

In the postoperative period loss of airway was our major concern. Causes postulated are airway edema and presence of stent. We did face problem of airway obstruction in our patient after the first surgery. Although we had taken measures to reduce airway edema we had the surgeon as standby with adequate preparation for securing a surgical airway. Re-intubation was not considered because of increased airway resistance and necessity for elective ventilation which could have prolonged recovery. The presence of stent was another reason to avoid intubation.

Early tracheostomy is a better option in such patients. Other complications of laryngeal web surgeries include development of subcutaneous emphysema, infection or recurrence.

To conclude close monitoring and preparedness for difficult airway management is mandatory for laser surgeries. Working as a team with the surgeon can avoid disaster and lead to better outcome.

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