Unique Presentation Of Epiglottis In Corrosive Poisoning: A Case Report

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Abstract

Ingestion of corrosives is a cause of concern because of the extreme morbidity associated with it. Two subgroups are especially vulnerable, the pediatric population suffering from accidental ingestions, and the adolescent to adult age group in whom almost all of these ingestions are related to suicidal attempts. The literature is full of the gastro-esophageal injuries and their surgical correction but limited information is available on airway and anaesthetic difficulties in managing such cases. We present a series of two such cases in which we found abnormal glottic views on laryngoscopy and the difficulties encountered by the anaesthesiologists in their intraoperative management.

INTRODUCTION

Corrosive solutions can largely be grouped into two categories, strong acids and strong bases . The exposure of the lining of the aerodigestive tract to these substances at the two extremes of the pH scale results in injury through coagulation necrosis (acids) or liquefaction necrosis (bases). Liquefaction necrosis typically occurs through direct extension and deeper injuries are the rule. Coagulative necrosis results in the formation of a somewhat protective coagulum layer at the site of injury and can limit the depth of injury, although full thickness injuries after acid ingestion can occur. The major variable that determine the extent of the injury are the amount and concentration of the ingested material, the form of the material (solid vs liquid), and whether or not emesis and or aspiration has occurred. Alkaline substances account for the vast majority of reported cases because of their easy availability in the form of toilet cleaning solutions and their tasteless odurless nature. Severe airway compromise, dysphagia, odynophagia, and change in voice account for its morbidity. The management consists of securing an airway (by emergency tracheostomy in severe cases), restoration of gut continuity and social and occupational rehabilitation.

CASE REPORT 1

A 26 year old emaciated man weighing just 37 kg reported to the hospital with history of corrosive acid ingestion. He had developed corrosive stricture of the esophagus which ended as a blind pouch distally at the level of the cricopharynx. A tracheostomy had been done for emergency airway control which was later closed. A gastric pull up surgery had been done which included substernal gastric bypass, cervical exploration, pharyngoplasty and pyloroplasty under general anaesthesia with epidural analgesia, which was uneventful. But despite the surgery he was unable to swallow. The opening of the gastric pull up lay superior and to the left of the esophageal orifice and the food was not going into the new stoma. A feeding jejunostomy was created and for the past 1 year the patient was on liquid diet through the tube. Barium swallow was unsuccessful. A direct laryngoscopic examination by the surgical team under anaesthesia had revealed a scarred epiglottis but normal mobile vocal cords. A hypopharyngoscope revealed the constricted hypopharynx continued up to the level of cricopharynx about a depth of 20 cm beyond which the scope could not be negotiated and the esophagus ended as a blind pouch. An attempt to divide the septum between the gastric pull up and the hypolaryngopharynx had been done. Over this time, the patient had been constantly losing weight, experienced persistent dysphagia, cough and gagging every time he tried to swallow his saliva and was unable to speak because of pooling of saliva in the mouth which he couldn't swallow. A second stage division of the septum using a carbon dioxide laser, ie Dohlman's procedure was planned. The patient was given inj.glycopyrrolate 0.2 mg intramuscularly half an hour before shifting to the operation theatre to control his excessive salivation (approx.1-2 litres/day). For the laser

surgery, preoperatively we examined the cuffed laser tube we had and to our dismay, we found the cuffs leaking. Airway protection was especially important in this patient who had copious oral secretions and we could not use a PVC endotracheal tube because of laser use. So we fashioned a new tube by cutting out the cuff of a 7.5 mm cuffed pvc tube with its inflating lumen and the inflating tube intact with the pilot balloon. We softened this cuff with warm saline bath and then slid it over another plain uncuffed 6.0 mm I.D. laser tube we had. The entire process was done under strict aseptic precautions. The patient was preoxygenated for 3 minutes and then we tried to intubate the trachea (following a rapid sequence induction with thiopentone 5 mg/kg and succinylcholine 1.5 mg/kg) with our new device. Laryngoscopy revealed a grossly distorted airway . The epiglottis was such badly scarred that it formed a complete veil inside and was stuck to the pharyngeal walls all around the periphery. There was a narrow hole in its centre behind around 1 cm of which lay the glottic opening. The trachea was intubated with great difficulty in second attempt using a stylet inside the laser tube. Once intubated, air entry was checked and confirmed. The patient had developed bronchospasm and halothane was switched on instead of isoflurane, and asthalin puffs were given via the endotracheal tube. Soon the spasm subsided and the airway pressures were well maintained subsequently. The laser procedure then proceeded uneventfully. Patient was given injection dexamethasone 6mg intraoperatively. At the end of procedure which lasted about 60 minutes, the anaesthesia was reversed with inj.glycopyrrolate 10 microgram/kg body weight + inj.neostigmine 50 micrograms/kg body weight and the patient extubated when fully awake. Post operatively, the patient was shifted to a post anaesthesia care unit where he was administered oxygen via a face mask and observed till he was fully awake and considered fit for transfer to the ward. One week after the surgery, patient could slightly swallow his saliva better than before, was able to speak a little more but still could not eat food orally. He was discharged to home with advice to follow up in ENT OPD after two weeks.

CASE REPORT 2

A 20 year old girl weighing 45kg presented with history of ingestion of a toilet cleaning solution. She developed severe vomiting, frothy sputum from mouth and voice change. She could speak only a few words that too with great difficulty. The patient could not swallow even her saliva and spit out about a thousand ml per day. A ryles tube was put by the primary hospital to which she was initially taken and started on small amounts (about 800 ml/day) of ryles tube feeding. A barium swallow to study the internal anatomy was attempted but failed. On examination of airway, the soft palate and posterior pharyngeal walls were inflamed and congested. An indirect laryngoscopy revealed a scarred and ulcerated epiglottis, and so were the mucosa of the arytenoids, aryepiglottic fold and the pyriform fossae. The cartilage of epiglottis lay exposed. The cords could not be visualized. The patient was referred to gastrophysician for fiberoptic esophagoscopy which revealed a tight stricture at cricopharynx level in the esophagus and a 5 mm scope was not negotiable beyond it. A barium study via the ryles tube revealed antral ulcers with strictures in adjacent pylorus and duodenum. The gut distal to it was normal. A feeding jejunostomy was performed subsequently. Now she had been posted for a direct laryngoscopic and hypopharyngoscopic examination under anaesthesia. The patient had been given injection glycopyrrolate 0.2 mg intramuscularly half an hour before shifting to operation theatre in addition to other premedications. After adequately preoxygenating her with 100% oxygen, induction with 2 mg/kg of propofol and 1.5 mg/kg of succinylcholine was done and laryngoscopy was attempted. We saw scarring in the supraglottis and vallecula, with a hooded epiglottis. A small hole was seen below the epiglottis but the vocal cords could not be visualized. We could not intubate the trachea with a 6.0., 5.5 and even a 5.0 mm PVC endotracheal tube. A rigid bronchoscope, which was kept ready by the ENT surgeons was introduced and the airway dilated with it. Then it was serially dilated with cuffed PVC endotracheal tubes of sizes 5.0, 5.5 and 6.0 mm ID. The trachea was then intubated with a 6.0 mm cuffed endotracheal tube and airway controlled. The scar tissue of the stricture in esophagus was divided with diathermy at 3'o clock and 9'o clock positions. Till the time airway was secured, the patient was given 3 repeated boluses of 10 mg succinylcholine mixed with atropine. Once the patient was intubated, an intermediate acting muscle relaxant, vecuronium 3 mg was given. Injection hydrocortisone 100 mg was given intraoperatively to reduce laryngeal edema. The total procedure lasted 45 minutes and the patient was reversed and extubated when fully awake. She was observed in the post operative care unit and later transferred to the ward. The patient reported a marginal improvement in swallowing after a few days of surgery and was discharged home with instructions for repeat dilation after 3 weeks.

DISCUSSION

We present a series of two cases of suicidal ingestion of highly caustic substances. A thorough search of literature

revealed numerous reports of acid/alkali ingestion, their after effects on the gastrointestinal tract and the surgical correction modalities. However, very few accounts of the destruction of larynx, and the abnormal presentation of epiglottis and the glottic structures is available. Our first case describes the traumatic effects of corrosive acid ingestion on the airway in a 26 year old man. The second case describes the unusual presentation of epiglottis in caustic alkali ingestion. The epiglottis was found to be scarred and abnormally adhered to its surrounding tissues in both the cases. There was only a slit like hole in its centre behind which lay the glottic opening. The laryngoscopy as well as securement of airway in these patients was a challenge for the anaesthesiologists. Conventional rigid laryngoscopy inevitably involves the distortion of upper airway anatomy in order to bring the glottis in line of sight for achieving successful endotracheal intubation. Since there is no guarantee that distortion of oropharyngeal structures with the conventional laryngoscope will always succeed in bringing the glottis into view, airway mismanagement remains an important cause of mortality and morbidity in anaesthetic practice[1]. In fact, conventional rigid direct laryngoscopy aids tracheal intubation in 98.1 % of the cases[2]. Thus, alternative equipment and techniques must be readily available for rest of the 1.9 % cases. The various options include[3] : flexible fiberoptic intubation, Intubating Laryngeal Mask Airway [ILMA Fastrach™], Lightwand [Trachlight™] , Indirect fiberoptic laryngoscope [Bullard™, Upsher Scope™], gum elastic bougie and retrograde intubation. Since the upper airway anatomy was distorted, awake intubation with nerve block aided fiberoptic bronchoscope could have failed. The use of the lightwand, ILMA and retrograde intubation techniques could have been similarly difficult in view of scarred and distorted tissues. There was no difficulty in ventilation with a face mask. Dysphagia and resultant excessive oral secretions necessitated a rapid sequence induction (RSI). We had also kept a stylet and an intubating bougie ready in anticipation of a difficult airway, alongwith laser endotracheal tubes. Previous records of a direct laryngoscopy (prior to surgery) had revealed the presence of a scarred epiglottis but mobile vocal cords. Hence, we decided to go ahead with RSI and direct rigid laryngoscopy. In 2 similar cases of almost total obliteration of the pharynx, Divatia et al[4] have described the successful use of fiberoptic intubation to secure the airway. Chen et al[5] describe a rare and potentially lethal incidence of delayed occurrence of supraglottic stenosis following alkali ingestion. Intubation with very small endotracheal tube under fiberoptic laryngobronchoscopic guidance has been described.

A preanaesthetic cockpit drill of equipment check revealed that the special double cuffed laser tube with us was damaged since the cuffs were leaking. Various options have been described[6] for ventilation and securing the airway in case of laser surgeries. However, an 'ideal tracheal tube,' which does not ignite and yet has all of the characteristics of conventional tracheal tubes specified in ASTM F1242 (standard specification for cuffed and uncuffed tracheal tubes), does not exist. Use of PVC, red rubber and silicone rubber endotracheal tubes with saline filled cuffs and protection in form of wrapping with metallic tape, metallic backed surgical wet sponges, or other materials to shield the flammable material from laser contact is an option very often practiced, but not without drawbacks[7,8].

Ready to use laser resistant tubes are now available[6]. These are commercially available products designed for use during operations on the upper airway in which a laser is used. Many of these products have flammable components that can ignite if manufacturers' warnings, precautions, and directions for use are not followed. These include Aluminum and silicone rubber spiral with a silicone covering and a self-inflating foam sponge cuff (Fome-Cuf, Bivona), Airtight stainless steel corrugated spiral with a PVC Murphy eye tip and double cuffs (Laser Flex. Mallinckrodt), Silicone rubber tube covered with an aluminum-filled silicone layer (Laser-Shield. Xomed. Inc.), Silicone rubber tube wrapped with aluminum and wrapped over with Teflon, no adhesive is used in this process (Laser-Shield 11. Xomed. Inc), etc. In our first case, when forced to search for an immediate alternative, we describe the technique of making a pvc cuff slide over a plain uncuffed metal tube to secure the airway in CO2 laser surgery. In the second case, the glottic opening was so small that it had to be dilated with a rigid bronchoscope to permit tracheal intubation.

Following ingestion of a corrosive substance, laryngitis, hoarseness, or stridor indicate laryngeal injury and impending airway compromise. Chest pain, hypotension, peritonitis, and fever are strongly indicative of visceral perforation. Initial management, as with other emergencies, centers on assessment and management of the airway, followed by support of the patients vital signs with resuscitation measures as needed and evaluation and treatment of electrolyte disorders that can result from large ingestions. Life threatening profound atelectasis following intubation for alkaline corrosive injury to the upper airway

has been reported[9]. Thorough examination of the accessible upper aerodigestive tract may be especially difficult in young agitated children, making flexible nasopharyngoscopy/laryngoscopy very valuable. Adults who cannot tolerate indirect laryngoscopy should also undergo flexible endoscopy of the pharynx and larynx. Progressive dysphagia heralds the formation of esophageal strictures and can occur as early as three weeks post ingestion. Esophageal dilation is the mainstay of management, as we saw in the second case, and patients may have to undergo many procedures to maintain patency and minimize dysphagia.

Through our case reports, we want to highlight the abnormal presentation of the epiglottis and the surrounding pharyngeal structures in cases of corrosive poisoning. The anaesthesiologists should be prepared for difficult intubation in anticipated difficult airway as seen in our cases. Versatility in using the available methods as well as the skill to improvise at the hour of need serve in effectively managing the anticipated difficult airway.

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