Letters to Editor

Tracheal perforation in a neonate: A devastating complication following traumatic endotracheal intubation

Sir,

Tracheal injury in neonates following endotracheal intubation represents an uncommon complication rarely described in literature but carries high morbidity and a mortality rate of 70%.[1] We describe a case of neonatal tracheal perforation following multiple attempts at endotracheal intubation due to an unanticipated difficulty in an emergency situation in an undiagnosed case of Pierre Robin Sequence.

A 4-week-old female baby presented to the emergency department with respiratory difficulty. In view of severe respiratory distress and desaturation (SpO2- 60%) a decision was made to provide ventilatory support to the neonate. Multiple attempts were made at awake intubation by a junior doctor from the emergency department. Post-intubation, baby developed subcutaneous emphysema and desaturation. Intercostal drains were inserted bilaterally and patient was shifted to operation theatre for suspected tracheal injury.

Baby was noticed to have a small receding mandible. Respiratory movements were not transmitted to the breathing bag on connecting to Jackson Rees' circuit. Injection glycopyrrolate and fentanyl were administered intravenously along with infiltration with local anaesthesia at the proposed site of tracheostomy. Neck exploration revealed the tip of the endotracheal tube in the subcutaneous plane which was removed. Anaesthesia was continued with sevoflurane with oxygen through face mask, maintaining spontaneous ventilation. Airway was secured with tracheostomy and confirmed by end-tidal CO_2. Bronchoscopy revealed a tracheal perforation on the anterior wall at 12 O' clock position in subglottic region. Post-operatively, micrognathia, glossoptosis and cleft palate lead to a clinical diagnosis of Pierre Robin sequence.

A multi-factorial origin of tracheal injury has been proposed. Anatomical factors include extremes of ages, congenital tracheal malformations and weakness of pars membranosa. Mechanical factors include multiple forced attempts, inexperience, endotracheal tube introducers protruding beyond the tip, inappropriate size of endotracheal tube, cuff overinflation, cough and vigorous movements of head and neck.[2,3]

Neonatal tracheal injury is ascribed to factors like traumatic delivery, weak trachea, congenital tracheal stenosis, ring agenesis, metal stylets, rigid endotracheal tube, excessive external laryngeal pressure and prolonged ventilation.[1,4,5]

In our case, rigorous attempts at intubation along with excessive hyperextension of head and neck due to altered anatomy are likely to have contributed to tracheal injury. Multiple attempts at intubation are known to result in a false tract and are related to anterior tracheal lesions.[4]

Incidentally, our case was an undiagnosed Pierre Robins Sequence. A small receding mandible, tongue immobility and cleft palate are identified as independent factors for difficult airway with a risk of upper airway obstruction, difficult mask holding, difficult intubation, leak through the cleft resulting in inadequate ventilation as well as passage of the endotracheal tube into the cleft.[6] Successful airway management in such situation entails knowledge of airway, proper airway assessment, adequate training, experience and competent use of multiple airway devices.[6]

In our case, inadequate experience and delay in calling experienced colleague for help resulted in improper airway assessment and management. Increased risk of iatrogenic tracheal injuries as a consequence of emergency intubations in stressful situation has been observed, which also holds true in our case.[2,3]

The diagnosis is based on a high clinical suspicion with appearance of highly suggestive signs of air leak like subcutaneous emphysema, pneumothorax and occasionally pneumoperitoneum. The onset of subcutaneous emphysema is reflected as protective factor as its presence alerts one to the possibility of tracheal rupture, thus accelerating the procedures of definitive diagnosis and initiation of treatment.[1,2,4,5]

Management includes an approach ranging from conservative management to tracheostomy. Surgical treatment has traditionally been the mainstay of treatment[2-4] as in our patient taking severe respiratory distress and massive subcutaneous emphysema into consideration.

Conservative management includes passing an endotracheal tube beyond the perforation and ventilation, advocated in the presence of small

perforation with minimal non-progressive symptoms and no air leakage on spontaneous breathing. Important measures include drainage of air, use of low ventilatory pressures, high-frequency ventilation and sedation.[1,2,5]

Mechanical ventilation for 8-10 days ensures adequate healing of the injured area.[4]

Preventive measures like avoidance of forceful attempts at intubation, avoidance of hyperextension of the head, use of a satin-slip stylet, following difficult airway guidelines, availability of specialised equipment and adequate training of staff need to be practiced to minimise the incidence of iatrogenic tracheal trauma.[5] Awareness about clinical presentation with subcutaneous emphysema should alert the physician about possibility of tracheal perforation ensuring prompt detection and management.

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