

## Airway management in an infant with congenital trismus: the role of retrograde intubation

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### Abstract

Congenital trismus is a serious anomaly, and establishment of an airway for surgical correction is a challenge. In the case of limited mouth opening, the nasal route is the only available option to secure the airway via the supraglottic route. Various airway management options include blind intubation, retrograde intubation and fibre-optic intubation, failing which a tracheostomy might be needed. We present the airway management of a seven-month-old infant with congenital trismus who was scheduled for corrective surgery. After several unsuccessful attempts at blind nasal intubation, with the infant on spontaneous ventilation, breathing sevoflurane in oxygen, we managed to secure the airway successfully by retrograde intubation.

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### Introduction

Congenital trismus at birth is a serious anomaly, and although the causes are not properly elucidated, the condition has to be managed at the earliest opportunity, or else may result in poor caloric intake, compromised speech development, defective facial development and appearance, poor oral hygiene and improper dental care.<sup>1</sup> In 1969, Hecht and Beals described a rare autosomal syndrome for the first time. It was characterised by reduced mouth opening, pseudocamptodactyly, short stature and foot deformities.<sup>2,3</sup> Skinner and Rees reported a case of congenital trismus secondary to masseter bands, in which the reduction in the mouth opening was attributed to shortening of the mastication muscles.<sup>4</sup> However, until now, there has been no consensus on the optimal management of temporomandibular joint trismus.<sup>5</sup>

Establishment of an airway for surgical correction is always a challenge for the anaesthesiologist, and especially in an infant, because of the limited options. With a severely restricted mouth opening, the options are further reduced to blind nasal intubation, retrograde intubation, fibre-optic intubation and tracheostomy.<sup>6</sup> There is no ideal technique to secure an airway in an infant with congenital trismus. In this

article, we report on the airway management challenges that were encountered in an infant with congenital trismus, and highlight the utility of the retrograde intubation technique for this condition.

### Case report

An infant with congenital trismus and temporomandibular joint ankylosis was scheduled on day seven after delivery for corrective surgery. Preoperative airway evaluation revealed severely restricted mouth opening (Figure 1). Fortunately, the infant did not have any other associated midline congenital anomalies. A formal plan of airway evaluation under sevoflurane anaesthesia with preservation of spontaneous ventilation was planned, with tracheostomy as a backup option. The primary intubation plan was a blind nasal technique in the absence of a paediatric-sized fibrescope or lightwand in our institution. On induction of anaesthesia, it was noticed that even the tip of a paediatric magill's forceps could not be introduced into the mouth. Following three failed blind nasal intubation attempts, further plans for airway manipulation were aborted. Since it was possible to maintain the airway with a bag and mask while the infant was breathing spontaneously, it was



**Figure 1:** An infant with congenital trismus and no mouth opening

decided to attempt surgery with intermittent delivery of sevoflurane in oxygen. The surgeon achieved partial mouth opening with the thinnest of the copper retractors, using some force. This was continued until Kocher's forceps could be introduced, and the oral cavity was further opened up by a few more millimeters. This revealed several alveolar bands that prevented the mouth from opening further. A partial division of these bands was conducted using diathermy, and definitive airway surgery was planned for a later date. Recovery was uneventful and enteral feeding was established through a liquid diet through a nasogastric feeding tube.

At seven months of age, this infant was scheduled for definitive surgery with blind nasal intubation as the primary technique. Retrograde intubation was an alternate technique, and tracheostomy was a backup option for airway management. The infant was maintained on spontaneous ventilation with sevoflurane in oxygen until the airway was secured. Following two failed attempts at blind nasal intubation, retrograde intubation was attempted with the infant positioned supine with a shoulder roll and a head ring. The cricothyroid puncture was carried out under local anaesthesia. An 18G Tuohy epidural needle was inserted into the cricothyroid membrane, and after confirming its position by aspiration of air, the needle hub was positioned cephalad.

An epidural catheter was guided into the oral cavity with the bevel facing rostrally (Figures 2 and 3). The catheter was ultimately railroaded using a 5F infant feeding tube, and brought out of the right nostril from the oral cavity. The rest of the length of the catheter was firmly secured and taped with an umbilical clamp after removing the Tuohy needle (Figure 4). A 4-mm endotracheal tube with a Murphy's eye was selected and the nasal end of the epidural catheter was tied to the Murphy's eye. After good lubrication, the tube was guided into the oropharynx and then pulled into the larynx, while firmly holding on to both ends of the epidural catheter



**Figure 2:** Retrograde intubation using a Tuohy needle



**Figure 3:** Tuohy needle inserted into the cricothyroid membrane



**Figure 4:** The epidural catheter was pulled out through the oral cavity



**Figure 5:** The epidural catheter was pulled out through the nasal cavity

(Figure 5). A little resistance at the vocal cords level was overcome by applying gentle cricoid pressure. Once it was felt that the tube was beyond the vocal cords, placement was confirmed by breath sounds and a capnogram. The procedure was completed uneventfully under general anaesthesia with non-depolarising neuromuscular blockade. At the end of surgery, the neuromuscular blockade was antagonised and the trachea extubated, after ensuring a completely awake and alert infant.

## Discussion

Congenital trismus is a serious anomaly that is associated with severely restricted mouth opening. It needs to be managed at a very early age in order to minimise feeding difficulties. Therefore, surgical correction is an accepted and long-term solution. The available options for airway management in these patients are limited due to the inability to use the oral route for intubation. Therefore, the anaesthesiologist is left with a few options for airway management, namely blind nasal intubation, retrograde intubation, fibre-optic intubation and tracheostomy.<sup>5</sup> Six cases of trismus pseudocamptodactyly with limited mouth openings were managed by either maintaining the airway with a face mask, oral intubation or blind nasal intubation.<sup>7</sup> These patients were scheduled for non-airway surgery. However, in our case, the surgery was planned on the airway itself, and hence there was a need for a definitive airway. Unfortunately, attempts at blind nasal intubation failed. Lack of a paediatric-sized fibroscope or lightwand compounded the problem. Although several reports of retrograde intubation in the paediatric age group<sup>8-9</sup> are available, we had limited experience in paediatric retrograde intubation. It has been well recognised that retrograde intubation is much more difficult in infants than it is in older children, and guiding the tracheal tube into the trachea is a

challenge in this age group.<sup>10</sup> Fortunately, with the help of cricoid pressure, we succeeded in our attempt to overcome difficulties in railroading the tracheal tube into the trachea.

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