Fiberoptically Guided Intubation in Children with Gangrenous Stomatitis (Noma)

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Noma (cancrum oris) is a gangrenous stomatitis occurring in children and affecting the orofacial tissues. It may lead to severe facial deformity, circumferential scarring, and stenosis of the mouth, which together with an extra-articular ankylosis of the temporomandibular joint severely restrict mouth opening. Both ventilation via mask and tracheal intubation are difficult, and so these children present a problem for the anesthetist because they often require multiple anesthetics for correction of their surgical deformity. Fiberoptic intubation seems appropriate in this situation, and we report a series of four children with noma who underwent fiberoptic intubation on 20 occasions.

CASE REPORT

Four children, 4–9 yr of age and with a diagnosis of noma, underwent a total of 20 anesthetics.

The day before the first anesthetic, a diagnostic fiberoptic examination to establish patency of the nasal airways and the anatomy of the nasopharynx and larynx was performed with the patient in the sitting position under benzodiazepine sedation.

Patients received diazepam 0.3–0.5 mg/kg rectally and atropine 0.01 mg/kg im 1 h before surgery. EMLA® cream 5% (Astra, Sweden) was applied to the back of both hands 90 min preoperatively, to provide topical anesthesia.

In the anesthetic room an intravenous cannula was inserted and an iv infusion of 5% dextrose saline begun. All children were monitored with standard lead II ECG, noninvasive blood pressure, a pulse oximeter (SpO2), and precordial stethoscope.

Children breathed oxygen for 5 min before induction of anesthesia. With the child supine and the head in a neutral position, anesthesia was induced with midazolam 0.15 mg/kg iv and or ketamine 2 mg/kg iv. If necessary, this was supplemented by halothane 1–3% in oxygen via a face mask. A transaryngeal anesthesia was performed by injecting 2 ml 2% Xylocaine via the cricothyroid membrane using a 22-G needle. The 60-cm Olympus LF-1 fibroscope with an external diameter of 4.0 mm was used for all intubations. A well-lubricated 4.5- or 5-mm cuffed or uncuffed endotracheal tube (Mailinckrodt) was threaded over the fibroscope before it was introduced through the nostril least involved by the disease process, as determined at the preliminary examination. The fibroscope was advanced into the nasopharynx and the head flexed if necessary to aid visualization of the larynx, and the fibroscope then was passed through the vocal cords down to the mid-trachea. The fibroscope was held in this position while the endotracheal tube was passed over the fibroscope into the trachea. The position of the tube was then verified with the fibroscope. If difficulty was encountered when introducing the tube or if the SpO2 decreased to less than 90%, the fibroscope was withdrawn and the child given oxygen, before a further attempt was made.

A means of transtracheal jet ventilation was always available during the induction of anesthesia, in the event that control of the airway was lost during intubation and it was not possible to ventilate the lungs.

On two occasions, due to rapid movement of the larynx with respiration, succinylcholine was given to facilitate theatraumatic passage of the fibroscope.

DISCUSSION

Noma has virtually disappeared from Europe, but is still found in certain parts of Africa, South America, and Asia. Most commonly, the disease affects children between the ages of 2 and 5 yr. Predisposing factors are malnutrition, poor oral hygiene, and certain illnesses such as measles, scarlet fever, typhoid, syphilis, tuberculosis, and leukemia.1 The probable etiologic agents are Borrelia vincenti, Fusiformis fusiformis, or Bacteroides. The disease starts as a small ulcer, or ulcers on the buccal mucosa, which rapidly progress to an area of necrosis resulting in a deep penetrating ulcer with perforation of the lips or cheek. Rapid treatment with antibiotics is usually effective and has significantly decreased mortality from the disease, but if an early diagnosis is not made—as is often the case—there is an appreciable morbidity.2 Staged surgery is then necessary to repair the soft tissue defect of the cheeks and release the temporomandibular ankylosis.

Various methods have been used to overcome the intubation problems posed by these cases. Blind nasal endotracheal intubation may be dangerous, since it can provoke hemorrhage or dislodge sequestra.1 Waters3 described the technique of guided blind endotracheal intubation in 1968, but it has several potential disadvantages.4 Transtracheal ventilation has also been used,5 but does not provide complete security of the airway. Recently, fiberoptically guided intubation has become a more

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frequently used technique in the management of difficult pediatric intubation,6–8 and in children with noma it may prevent the possible need for a tracheostomy.

Ovassapian and Dykes6 proposed that awake fiberoptic nasotracheal intubation is the technique of choice in the management of difficult pediatric intubation. In our patients intubation under local anesthesia was not an option, since it was impossible to communicate with the children, who were separated from their parents and in a foreign environment. In addition, no past medical history was available from the patients. Intubation under general anesthesia, however, carries the risk that control of the airway may be lost and ventilation may prove impossible. In these patients, in whom the airway was severely distorted by the disease process, we therefore performed a preliminary fiberoptic examination of the nose and nasopharynx under light sedation to exclude involvement of the nasal passages by the disease or other coincidental abnormalities such as retrognathia or nasopharyngeal occlusion. We were also able to evaluate the position of the glottis; this enabled us to perform fiberoptic intubation under general anesthesia more rapidly and with a greater measure of safety.

Had we believed that fiberoptic intubation was not possible, we then would have proceeded directly to a tracheostomy. Acute events during intubation, such as obstruction of the airway due to laryngospasm, cannot be predicted, and a means of transtracheal jet ventilation as described by Benumof and Scheller9 should always be immediately available when fibroptic intubation is performed under general anesthesia. Since there is no standard regime for the induction of anesthesia during fiberoptic intubation, we used a combination of ketamine and midazolam in order to preserve spontaneous respiration and pharyngeal muscle tone. This is important, since controlled ventilation by mask is difficult in these children because of their severe facial deformity.

We did not use a nasal vasoconstrictor, but encountered only one episode of epistaxis, which stopped spontaneously. However, the use of oxymetazoline hydrochloride 0.05% nose drops or 10% cocaine drops have been reported.10,11

The presence of excess pharyngeal secretions makes visualization of the larynx impossible and may be exacerbated by the use of ketamine. Despite preanesthetic medication with atropine, upper airway secretions were not completely abolished, but the advantage of the 4.0-mm fiberscope is that they can be easily cleared with the suction channel of the fiberscope.

Of the 20 intubations, 13 were uneventful, but in 7 cases more than one attempt was needed to pass the fiberscope through the vocal cords, and occasionally it had to be withdrawn in order to oxygenate the child. In these cases, we found that the pulse oximeter was invaluable in determining the safe duration of each attempt. The use of an anesthesia mask with a diaphragm that allows the passage of the fiberscope while oxygenation and depth of anesthesia are maintained during intubation12 was not available to us, but would have been useful. Increased flexion of the head or rotation of the endotracheal tube through 90° counterclockwise as it is advanced towards the larynx also would have made insertion easier.13

No problems were associated with cricothyroid block, which was easy to perform and provided good anesthesia of the trachea and larynx.

Fiberoptically guided intubation is becoming a more popular technique in pediatric anesthesia. In our series we found it to be quick and atraumatic since intubation is performed under direct vision. A preliminary fiberoptic examination of the nasopharynx provides useful information that may determine potential problems at intubation. Although fiberoptic intubation is not always available in countries where these children undergo surgery, we believe that the technique is appropriate in these children with noma, in whom visualization of the upper airway is difficult. However, the procedure requires skilled assistance and an experienced anesthesiologist.

References