

## Anaesthetic Management of Mentosternal Contractures Where Resources Are Limited

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### Abstract

**Objective:** Perioperative airway management in postburn mentosternal contractures often pose great challenges to the anaesthetist as well as the plastic surgeon. This is more so where resources are limited.

**Method:** Patients with postburn mentosternal contracture who had surgery between January 2000 and December 2006 at the Jos University Teaching Hospital, Jos Nigeria were retrospectively reviewed. The information obtained from the anaesthetic chart as well as the patients' case notes included demographic data, type of anaesthetic induction and maintenance as well as the type of airway management.

**Results:** There were 15 patients (12 males and 3 females), aged between 6 and 65 years. A total of 17 procedures were performed on the patients. Five of the patients were induced with ketamine and maintained with the same drug until adequate release was achieved. In five others the release were done under inhalational anaesthesia using a facemask after induction with ketamine. Six of the cases had laryngeal mask airway (LMA) inserted while one patient had a tracheostomy under local anaesthesia. After adequate release endotracheal tubes were inserted except in those who had LMA which were maintained to the end of the surgery. The rest of the procedure was then continued under general inhalational anaesthesia.

**Conclusion:** Fixed flexion deformities in postburn mentosternal contractures could present serious airway challenges to the attending anaesthetist during contracture release and skin cover. This could be overcome by the use of ketamine, inhalational anaesthesia as well as the use of LMA before contracture release.

**Key words:** Postburn mentosternal contracture, Airway management, Laryngeal mask airway, Contracture release

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### INTRODUCTION

Burns around the face and neck region are a common occurrence. These injuries tend to heal with mentosternal contractures developing in some cases. These patients

often pose great challenges to the plastic surgeon as well as the anaesthetist in terms of restoration of form and function while trying to ensure safety. The greatest problem for the anaesthetist is in airway management.<sup>1-3</sup>

Difficult endotracheal intubation occurs when the contracture prevents extension of the head and lifting of the mandible; microstomia could also further complicate issues in the presence of facial burn scar. In most cases, predicting difficult intubation preoperatively could easily be done and adequate preparations undertaken. Where the contractures are extensive and difficult endotracheal intubation is anticipated, fiberoptic bronchoscopic intubation while the patient is awake is said to be the safest means of securing the airway.<sup>4,6</sup> However this technology and the expertise is often not available in our environment. Other methods of securing the airway and anaesthesia have been proposed by different authors.<sup>1, 3, 7</sup> We report our experience at the Jos University Teaching Hospital in the management of 15 patients with severe mentosternal contractures.

### PATIENTS AND METHODS

The anaesthetic management of all patients with severe postburn mentosternal contractures who had release and skin cover at the Jos University Teaching Hospital between January 2000 and December 2006 were retrospectively reviewed. These patients were managed by the anaesthetist and the admitting Surgeon. The information obtained from the anaesthetic chart as well as the patients' case notes included demographic data, type of anaesthetic induction and maintenance as well as the type of airway management. The study population was described in rates and proportion.

### RESULTS

The ages of the patients ranged between 6 and 65 years with a mean of 16.4 years. There were 12 males and 3 females with a male to female ratio of 4:1. A total of 17 procedures were performed on the patients. The duration between the time of occurrence of burns and time of surgery was between six months to four years. These patients mainly belonged to the type 2 and 3 of Onah's classification of post burn mentosternal contracture (figs 1 and 2).

In five of the procedures the patients were induced with ketamine (1-2mg/kg) and maintained with ketamine (0.5-1mg/kg) until after adequate release was achieved. Five of the surgeries for release of the contracture were done under inhalational anaesthesia using a facemask after induction with ketamine. In six other cases a laryngeal mask airway (LMA) was inserted (one of them was converted because of inadequate mask ventilation) after induction of anaesthesia with ketamine and taking the patient deep with halothane, nitrous oxide and oxygen combination by facemask. One patient had a tracheostomy under local anaesthesia before induction and surgical release of his contracture. His contractures were very extensive with severe restriction of mouth opening.

After adequate release the patients were then intubated. The release was said to be adequate enough to permit intubation if the anaesthetist was able to view the glottis after laryngoscopy. The endotracheal tube was then inserted and the procedure was continued under general inhalational anaesthesia using halothane, nitrous oxide and oxygen. For those who had LMA this was continued until the end of the surgery with general inhalational anaesthesia.

## DISCUSSION

Our patients belonged to class 2 and 3 of Onah's classification of post burn mentosternal contracture<sup>8</sup>. In these groups of patients neck extension is severely limited thus making intubation difficult or impossible by direct laryngoscopy. Fibreoptic assisted awake intubation has been suggested as the method of choice for securing the airway prior to anaesthesia in these patients.<sup>6,7,9</sup> However this technology was not available in our hospital. Moreover fibreoptic assisted awake intubation would require a cooperative patient which is often not the case with these types of patients who are usually very anxious. Blind nasal intubation is an alternative though this method of securing the airway may be hampered by the inability to properly position the head and neck for the procedure.

Our experience with ketamine anaesthesia during surgical release shows that this method is quite safe as has been shown in other studies.<sup>1,2,10</sup> Ketamine has the advantage of preserving respiration and swallowing reflex. However ketamine should be injected slowly because rapid injection has been known to cause apnoea. Since the pharyngeal and laryngeal reflexes may not always be guaranteed the surgeon should be ready to perform an emergency neck release in case serious airway problems arise during ketamine anaesthesia so that the patient could be readily intubated. We did not

experience this problem with any of our patients. Ketamine anaesthesia has indeed been used during both release and skin cover without intubation in patients with mentosternal contractures<sup>10</sup>. This is desirable because intubation after release may be inconvenient and may cause contamination of the surgical field<sup>10</sup>.

Contracture release under local anaesthesia prior to induction and intubation has also been reported.<sup>7,10</sup> Securing the airway through retrograde intubation is another option for intubation but this was not practicable because the scar in the neck obscures the anatomical reference points in these types of patients.

For 6 of the procedures in our case, facemask was used to maintain anaesthesia during contracture release. However because of the proximity of the mask to the site of operation there is increased risk of contamination and surgical wound infection.<sup>10</sup> At the time when those cases were done, most of the anaesthetists in our department were not conversant with the use of the LMA. As the anaesthetists became proficient with the use of the LMA, the LMA was utilized in the management of subsequent cases. The LMA is an invaluable tool in the management of the difficult airway.<sup>11,12</sup> The use of the LMA in this case ensures better control of the airway compared to when using the facemask or during ketamine anaesthesia. It also decreases the risk of surgical site contamination since its use could continue after the neck contracture release during skin cover without the need for intubation. However microstomia or severe restriction of mouth opening may preclude the use of LMA. Occasionally too the acute angle formed between the pharyngeal and oral axis in patients with fixed flexed neck deformity may make LMA insertion difficult or unsuccessful.<sup>12</sup> This may be the reason why one of our patients had inadequate ventilation with the LMA. In such situations we suggest that if airway patency could be maintained with ketamine anaesthesia, this should be used to achieve contracture release before intubation or attempt at reinserting the LMA.

## CONCLUSION

Fixed flexed neck deformities resulting from postburn mentosternal contractures could present serious airway challenges to the attending anaesthetist during contracture release and skin cover. In our experience we found the use of ketamine anaesthesia before contracture release and intubation and the use of LMA as safe and effective methods of maintaining the airway.

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