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SHORT COMMUNICATION

Post-operative respiratory distress following primary cleft palate repair

D SMITH[1], S E F H J ABDULLAH[1], A MOORES[2], D M WYNNE[3]

[1]University of Glasgow Medical School, Departments of [2]Anaesthesia and [3]ENT Surgery, Royal Hospital for Sick Children, Yorkhill Hospitals, Glasgow, Scotland, UK

Abstract

Introduction: Infants are obligate nasal breathers. Cleft palate closure may result in upper airway compromise. We describe children undergoing corrective palatal surgery who required unplanned airway support.

Setting: Tertiary referral unit.

Method: Retrospective study (2007–2009) of 157 cleft palate procedures (70 primary procedures) in 43 patients. Exclusion criteria comprised combined cleft lip and palate, secondary palate procedure, and pre-existing airway support.

Results: The children's mean age was 7.5 months and their mean weight 7.72 kg. Eight children were syndromic, and eight underwent pre-operative sleep studies (five positive, three negative). Post-operatively, five developed respiratory distress and four required oxygen, both events significantly associated with pre-operative obstructive sleep apnoea ($p = 0.001$ and 0.015, respectively). Four desaturated within 24 hours. Five required a nasopharyngeal airway. Hospital stay (mean, 4 days) was significantly associated with obstructive sleep apnoea ($p = 0.002$) and nasopharyngeal airway insertion ($p = 0.017$).

Discussion: Pre-operative obstructive sleep apnoea correlated significantly with post-operative respiratory distress, supplementary oxygen requirement, nasopharyngeal airway insertion and hospital stay. We recommend pre-operative sleep investigations for all children undergoing cleft palate repair, to enable appropriate timing of the procedure.

Key words: Cleft Palate; Airway Obstruction; Sleep; Respiratory Distress Syndrome, Newborn

Introduction

Cleft palate is the most common craniofacial anomaly, with an incidence of 1 in 700–800 live births.[1,2] Primary corrective palatal surgery is often performed between 6 and 12 months in the UK.[3] Children are obligate nasal breathers for the first few months of life.[4] Closure of the palatal muscles may result in upper airway compromise.[5,6]

Method

A retrospective case note review was performed on all children requiring palatal surgery between January 2007 and December 2009 at the Royal Hospital for Sick Children, Glasgow, Scotland, UK. Children between the ages of 6 and 15 months who had undergone a primary palatoplasty were selected. The inclusion criterion used in this study was primary cleft palate repair only, with or without associated syndromes. There was a total of 157 cleft palate cases; and a total of 70 isolated cleft palate repairs was included using the above criterion. Of these 70 cases, 43 completed data sets were analysed. Data were collected regarding demographic details, pre-operative assessment, anaesthetic details and post-operative management details. These were extracted from medical records.

Approval for the study was obtained from the research and ethics department, Royal Hospital for Sick Children.

Results

Forty-three patients were identified. The children's mean age was 7.5 months and their mean weight 7.72 kg. Eight children were syndromic: five had Pierre Robin sequence, two had Stickler's syndrome and one had Di George syndrome. Eight children underwent pre-operative sleep studies: five had positive results and three had negative results.

Of the eight children with syndromes, five underwent a pre-operative sleep study (three were negative, while one had mild and one moderate obstructive sleep apnoea (OSA)). One child with moderate OSA required a post-operative nasopharyngeal airway.

Within 24 hours of surgery, five children developed respiratory distress (12 per cent). There was a significant correlation between pre-operative OSA and post-operative respiratory distress ($p = 0.001$). There was no significant association between post-operative respiratory distress and age, weight or the presence of a syndrome.

The mean stay in the high dependency unit (HDU) was 19.56 hours. There was no association between increased length of stay in this unit and age, weight, pre-admission OSA or the presence of a syndrome. Four children desaturated (i.e. saturated oxygen percentage of less than 94 per cent) on the first post-operative night. Five children required a nasopharyngeal airway. Again, we found a significant

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correlation between pre-operative OSA and post-operative oxygen requirement ($p = 0.015$).

The mean length of hospital stay was 4 days. Children with OSA and those who required a nasopharyngeal airway were found to have a significantly increased hospital stay ($p = 0.002$ and 0.017, respectively). There was no association between increased hospital stay and age, weight or history of syndromes. No child was discharged with a nasopharyngeal airway in situ.

Discussion

This study identified a group of children developing post-operative respiratory distress following primary cleft palate repair.

We analysed several factors that may influence the peri- and post-operative management outcomes of cleft palate repair. This study did not show any significant association between syndromic children and prolonged hospital stay. Post-operative outcomes did not differ significantly between syndromic and non-syndromic children, nor did nasopharyngeal airway or oxygen use. This may imply that children with syndromes do not need any extra care post-operatively and can be managed similarly to their non-syndromic counterparts. This finding differs from an earlier report that patients with Pierre Robbin sequence or other congenital anomalies have a significantly increased risk of airway obstruction ($p = 0.005$).[7]

We found a significant correlation between a history of OSA and the requirement for post-operative oxygen therapy ($p = 0.015$). Children with such a history were also found to have a statistically significant increased risk of developing post-operative respiratory distress ($p = 0.001$). They also had a significantly longer hospital stay ($p = 0.002$).

The presence of a syndrome in conjunction with a cleft palate was not an indicator that the child was at a higher risk of post-operative distress following repair. However, the association between post-operative distress and pre-operative OSA was much more significant. Children with known pre-operative OSA tended to stay in hospital longer and to be more likely to need a nasopharyngeal airway. Children who had no history of pre-operative OSA but who unexpectedly developed respiratory distress behaved similarly to this group.

In agreement with others, our findings indicate that the availability of specialised post-operative care with experienced medical and nursing staff is as important as careful pre-operative evaluation and safe intra-operative care.[8] Identifying OSA as a risk factor allows affected children to be managed appropriately so that complications can be minimised; consequently, this could shorten these children's hospital stay. A decreased hospital stay not only diminishes the cost burden on the National Health Service but may also reduce pressure on hospital facilities such as bed availability.

Conclusion

We recommend that pre-operative sleep investigations be performed for all children undergoing palate repair, so that the procedure can be timed appropriately to reduce post-operative morbidity. Post-operatively, children should be monitored in an environment with medical and nursing staff who are experienced in the management of upper airway obstruction. In addition, parents of children with known OSA should be counselled that their child's hospital stay may be prolonged, and that respiratory support may be required during the child's post-operative recovery.

Although this study included only a small number of patients, our findings emphasise the importance of recognising OSA in the cleft palate population.

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Address for correspondence:
Mr David M Wynne,
Department of ENT Surgery,
Royal Hospital for Sick Children,
Yorkhill Hospitals,
Glasgow G3 8SJ, Scotland, UK

Fax: +44(0)141 201 0865
E-mail: david.wynne@nhs.net

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