
CLINICAL INVESTIGATIONS

Difficult laryngoscopy in cleft lip and palate surgery

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Summary

We studied prospectively 800 paediatric patients undergoing repair of cleft lip and palate to determine the predictors of difficult laryngoscopy. The incidence of difficult laryngoscopy (Cormack and Lehane grade III and IV) was 2.95 % in patients with unilateral cleft lip, 45.76 % in bilateral cleft lip and 34.61 % in patients with retrognathia. Tracheal intubation was successful in 99 % of patients in whom laryngoscopy was difficult. There was a significant association between age and laryngoscopic view ($P < 0.01$). (*Br. J. Anaesth.* 1996; 76: 757–759)

Key words

Anaesthetic techniques, laryngoscopy. Larynx, laryngoscopy. Surgery, plastic. Anaesthesia, paediatric.

Successful management of cleft and palate requires early surgery. It is imperative that the trachea of these patients be intubated, not only to maintain the airway, but to prevent aspiration. However, intubation may be difficult in the paediatric patient because of normal variations in airway anatomy. The difficulty may be exaggerated by the congenital anatomical anomaly.

Difficulties with intubation continue to be a major cause of anaesthesia-related morbidity, mortality and litigation [1, 2]. Preoperative identification of patients in whom intubation may be difficult may save lives. The existing bedside tests as predictors of difficult intubation [3–5] are not practical in children. Also, they are not sensitive or specific enough for routine use [6, 7]. The aim of this study was to determine the predictors of difficult laryngoscopy in paediatric patients presenting for repair of cleft lip and palate.

Patients and methods

During a 10-yr period (1985–1994), we studied prospectively 800 consecutive ASA I patients, presenting for cleft lip (533) and cleft palate (267) surgery. Patients were aged 2 months to 8 yr (65 % were less than 1 year of age) and 49 % were males.

Anaesthesia was induced with halothane and nitrous oxide in oxygen. Neuromuscular blockers were not administered. A towel roll was placed under the shoulders and laryngoscopy was performed with a small curved blade (Macintosh) laryngoscope when

there was adequate jaw relaxation. The larynx was seen with the aid of external laryngeal compression. The distal end of the Portex tracheal tube was curved appropriately using a flexible introducer to aid in intubation.

The appearance at direct laryngoscopy after application of laryngeal pressure was recorded by the anaesthetist using the classification of Cormack and Lehane [8]. The relationship between congenital anomaly and laryngoscopic view and the association between age and view on laryngoscopy were studied. Data were analysed using the chi-square test.

Outcome of tracheal intubation was classified as easy (successful with one or two attempts), difficult (two to four attempts) and failed, when intubation was not possible with four attempts.

The lowest arterial oxygen saturation (Sp_{O_2}) and heart rate recorded during laryngoscopy were compared with values before laryngoscopy.

Results

The cleft lip was unilateral in 474 patients (172 involved the right or left lip with or without involvement of the alveolus, and in 302 the clefts involved the lip, alveolus and palate). In the 59 patients with bilateral cleft lip, the cleft passed down both sides of the premaxilla into the palate. Of the 267 patients with isolated cleft palate, 52 had retrognathia.

Laryngoscopy was easy (grade I or II) in 741 (92.62 %) and difficult (grade III or IV) in 59 (7.38 %) patients (fig. 1). There was a highly significant association between anomaly and laryngoscopic view ($P < 0.01$). The incidence of difficult laryngoscopy in each anomaly is shown in figure 2. In the bilateral clefts of the lip and alveolus, the protruding premaxilla obstructed the laryngeal view.

Of the 59 patients with difficult laryngoscopy, 39 (66.10 %) were less than 6 months of age, 12 (20.34 %) were 6–12 months and 8 (13.56 %) were 1–5 yr old (table 1). There was a significant association between age and laryngoscopic view ($P < 0.01$). Laryngoscopy was easier with increasing age. The incidence of difficult laryngoscopy was 11.14 % in children less than 6 months of age, 7.05 % in the age group 6–12 months and 4.12 % in 1–5 yr olds

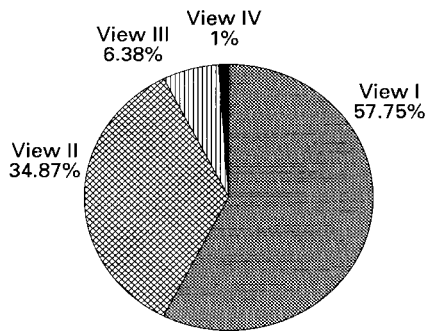


Figure 1 Percentage of patients in relation to laryngoscopic view.

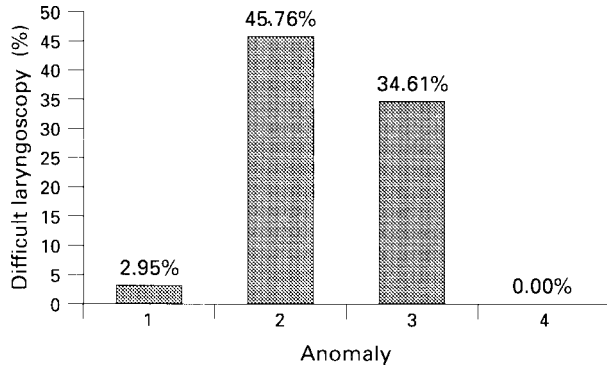


Figure 2 Relationship between anomaly and difficult laryngoscopy. 1 = Unilateral cleft lip, 2 = bilateral cleft lip, 3 = isolated cleft palate with retrognathia and 4 = isolated cleft palate with no retrognathia.

Table 1 Frequency of laryngoscopic views in relation to the age of the patient (number of patients)

Age	Laryngoscopic view				Total
	I	II	III	IV	
0-6 mth	150	161	35	4	350
6-12 mth	80	78	11	1	170
1-5 yr	155	31	5	3	194
5-8 yr	78	8	0	0	86
Total	463	278	51	8	800

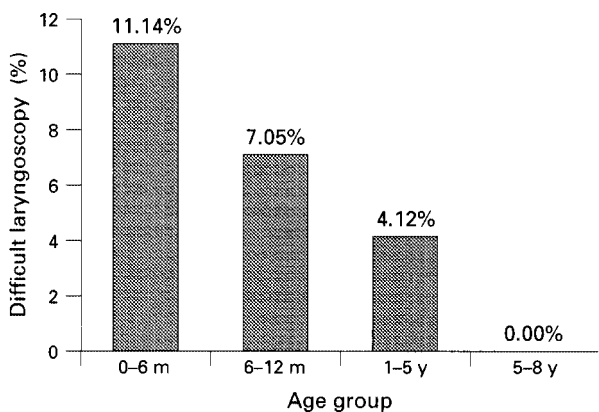


Figure 3 Relationship between age and laryngoscopic view.

(fig. 3). Laryngoscopy was not difficult in children more than 5 yr of age.

Figure 4 shows the distribution of ease of tracheal

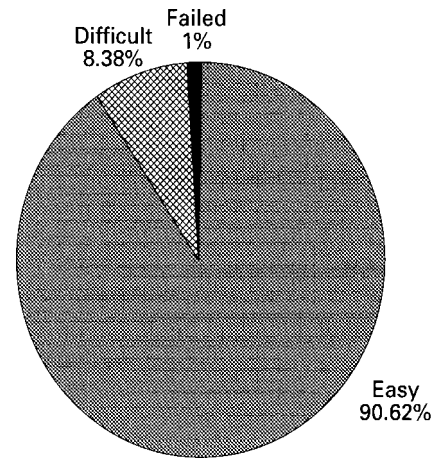


Figure 4 Distribution of ease of tracheal intubation.

Table 2 Ease of tracheal intubation in relation to laryngoscopic view (number of patients)

Laryngoscopic view	Tracheal intubation			Total
	Easy	Difficult	Failed	
I	459	3	0	462
II	266	13	0	279
III	0	48	3	51
IV	0	3	5	8
Total (%)	725 (90.62)	67 (8.38)	8 (1)	800

Table 3 Adverse outcomes with laryngoscopy and intubation

Adverse outcome	No. of patients (%)
Airway bleeding	21 (3)
Pulmonary aspiration of blood	5 (0.6)
Arterial oxygen desaturation < 94 %	6 (0.8)
Bradycardia (< 80 beat min ⁻¹)	9 (1)
Oesophageal intubation	7 (0.9)

intubation. Table 2 shows the distribution of ease of tracheal intubation in relation to laryngoscopic view. Tracheal intubation was easy in the majority (90.62 %) of patients. All had a grade I or II view. Intubation was difficult in 67 (8.38 %), of whom 51 (76.12 %) had a grade III or IV view and 16 (23.88 %) a grade I or II view. Intubation failed in eight patients (1 %); all had a grade III or IV laryngoscopic view and were less than 6 months of age. Four had bilateral cleft lip and alveolus with protruding premaxilla and the remaining four had cleft palate with retrognathia.

Table 3 shows the adverse outcomes associated with laryngoscopy. There was no loss of airway control or any postoperative airway problems. There was no significant decrease in Sp_O₂ or change in heart rate during laryngoscopy or intubation.

Discussion

In these patients, the airway was patent and not compromised, and the larynx was inaccessible and difficult to view because of various anatomical anomalies. The incidence of difficult laryngoscopy was 7.38 %. Comparison with other published reports is difficult because of differences in definition

[9–12]. The age groups and mitigating factors (use of neuromuscular blockers, type of laryngoscope blade) also differed between studies.

The use of optimal laryngeal pressure improves the laryngoscopic view and increases the intubation angle in high anterior larynx. The incidence of grade III view is reduced from 9% to 5.4–1.3% by routine use of external laryngeal pressure [13].

Difficult laryngoscopy was not synonymous with difficult intubation. The incidence of failed intubation was only 1%. Poor outcome with failed or difficult tracheal intubation was avoided by maintenance of spontaneous ventilation and adequate ventilation with face mask and airway in between attempts. There was no instance of “cannot intubate and cannot ventilate by mask”, the reported incidence of which is 0.001–0.02% [9].

In summary, extensive clefts, retrognathia and age less than 6 months were found to be associated with difficult laryngoscopy. These factors must be considered in planning the anaesthetic technique. Where difficulty is anticipated, senior skilled personnel should be present.

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