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The changing face of the paediatric microlaryngobronchoscopy (MLB): A two year prospective study

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ABSTRACT

Background: Changes in the management and survival of paediatric patients with airway complaints combined with improving survival rates of premature babies have resulted in a different patient population for the paediatric airway surgeon than that previously described in the literature.
Objectives: To examine the presentation, diagnosis, clinical course and outcomes for patients undergoing microlaryngobronchoscopy (MLB).
Study design: 2 year prospective longitudinal study.
Study population: 210 microlaryngobronchoscopy examinations were performed on a total of 102 patients. Mean age at initial examination was 29.4 months with a male preponderance (68%).
Results: 72 (71%) patients had other documented medical co-morbidities with 30 children having no previous medical history. Of the 102 patients the primary diagnoses were: Subglottic Stenosis (29.4%), Laryngomalacia (20.6%), Laryngeal Cleft (16.7%), Normal Anatomy (11.8%) and Vocal Cord pathology (5.9%). The average rate of diagnoses per patient for the whole cohort was 1.57. Of those patients with a diagnosis on examination, 40 had a solitary diagnosis whilst 50 patients (55.5%) were found to have multiple diagnoses, equating to 2.35 diagnoses per patient. Children with a history of prematurity accounted for 18.6% of our cohort with a 100% rate of laryngo-tracheal pathology on examination and an average number of diagnoses per child of 2.21.
Conclusion: Our cohort illustrates the varied population served by today's paediatric airway surgeon alongside common diagnoses and co-pathologies affecting our patients.

1. Introduction

Traditional teaching on paediatric airway diagnosis and the range of laryngeal anomalies suggests that the most common cause of stridor was laryngomalacia. However evidence is emerging to indicate that, whilst laryngomalacia undoubtedly continues to play a large role in neonatal and paediatric airway disease, there is a rising incidence of multiple laryngeal diagnoses and subglottic stenosis in the child with airway problems [1–4]. New developments in neonatal care and the subsequent increased survival of pre-term infants have changed the population the paediatric airway surgeon now serves.

The gold standard investigative tool of choice for airway disorders in these patients remains microlaryngobronchoscopy (MLB) [1–5]. This is performed under general anaesthetic and spontaneous ventilation with a rigid zero degree endoscope to fully visualise the upper airway. There is a minimum dataset which must be documented for every procedure including grading of view and findings in the supraglottis, glottis, subglottis and upper trachea/bronchi [6]. The term MLB is still retained throughout the UK and most of Europe, although, as described, technically a rigid endoscope is now preferred to the microscope.

Our series prospectively examines the diagnoses, referral sources and co-morbidities of all children who underwent a MLB at a tertiary referral centre in order to quantify the emerging population demographics of children with airway disorders.

2. Materials and methods

Data was collected in a prospective manner for all children undergoing a MLB at the Barts Children's and the Royal London Hospitals under the senior author from January 2012 to December 2013 inclusively, a two year period. All children were given a primary diagnosis at the time of first examination and each child was examined specifically looking for further laryngeal diagnoses or abnormalities at each of the subsites (supraglottic, glottic,

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subglottic, trachea and carina). Qualifying and demographic data for each child, including referral source, age, gender, co-morbidities and prematurity were collected at the time of first clinical assessment of the child.

This study was registered and approved by the hospital clinical governance and audit board.

3. Results

3.1. MLB data

210 MLBs were performed on a total of 102 patients in this time period. 49 (48%) patients required repeat procedures. Mean age at initial examination was 2 years and 164 days (29.4 months) with a male preponderance (n = 69, 68%). Median age was 22 months. 72 (70.6%) patients had other documented medical co-morbidities.

3.2. Nights stay

The vast proportion of the 210 procedures were performed with an overnight stay (183; 87.1%). 11 cases stayed in for two nights (5.2%). 5 were day cases (2.4%) and since this series, we have increased the proportion of day cases markedly. The remainder (11, 5.2%) were longer stays (more than or equal to 3 nights) including the patients who underwent tracheostomy or laryngo-tracheal reconstruction (LTR).

3.3. Primary pathology

In the 102 patients, the primary diagnoses were: Subglottic Stenosis (29.4%), Laryngomalacia (20.6%), Laryngeal Cleft (16.7%), Normal Anatomy (11.8%) and Vocal Cord pathology (5.9%). The average rate of diagnoses per child for the whole cohort was 1.57 (Figs. 1 and 2).

3.4. Secondary pathology

Of those patients *with* a diagnosis (90), 50 (55.5%) were found to have multiple laryngo-tracheal diagnoses, at a rate of 2.35 diagnoses per child. These are summarised in Table 1.

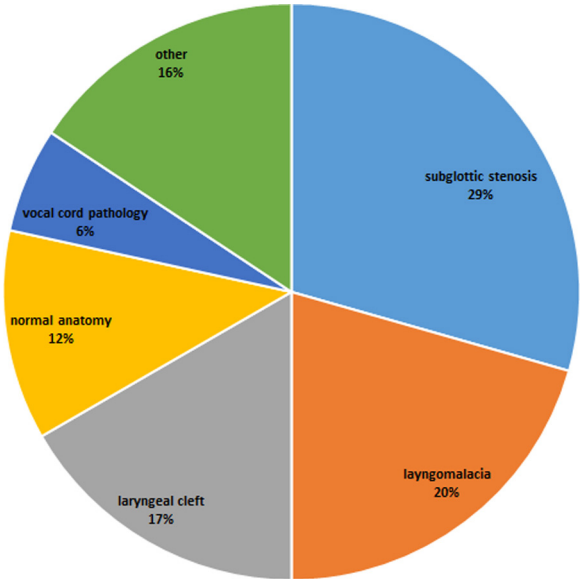

Fig. 1. Primary diagnosis.

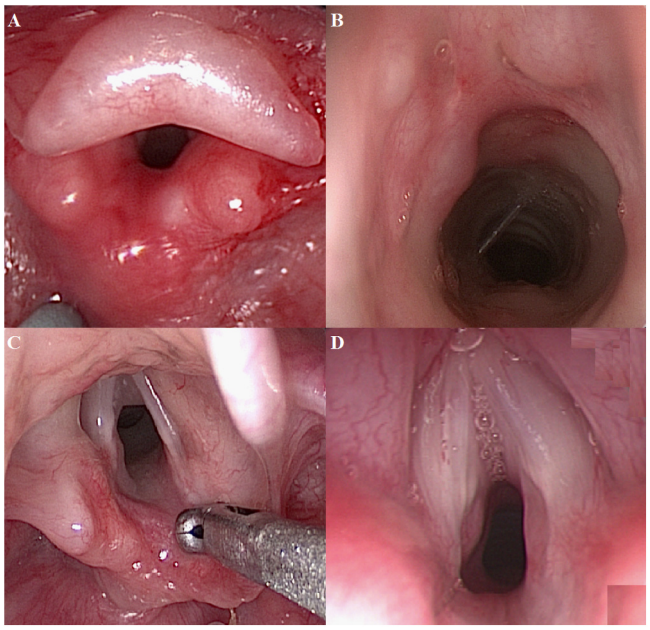

Fig. 2. Microlaryngobronchoscopy images demonstrating (A) Laryngomalacia (note typical features of omega shaped epiglottis and short aryepiglottic folds) (B) Subglottic cysts (C) Type 1 laryngeal cleft (with subglottic cyst) (D) Subglottic stenosis (Myer-Cotton Grade 2).

3.5. Repeat procedures

49 patients had repeat procedures (48%). Those requiring repeat procedures, underwent a mean of 3.2 procedures per patient. Patients with subglottic stenosis and laryngomalacia had a higher proportion of the repeat procedures.

3.6. Subglottic stenosis

In this subgroup of patients (30), 80% (24) had secondary laryngeal abnormalities diagnosed, with 30% (9) demonstrating laryngomalacia.

3.7. Laryngomalacia

62% (13) of children diagnosed with laryngomalacia (21) had secondary diagnoses, with 19% having laryngeal cleft (4) and 19% subglottic stenosis (4).

3.8. Laryngeal cleft

Laryngeal cleft patients (17) had a 29.4% prevalence of supraglottic pathology (5) and 17.6% had significant findings of tracheal reflux (3). There were 15 Benjamin-Evans Type 1 and 2 Type 2 clefts [7].

Table 1
Secondary diagnosis by anatomical subsite.

Primary diagnosis	Secondary findings by anatomical subsite			
	Supraglottis	Glottis	Subglottis	Trachea/carina
Subglottic stenosis (30)	14 (47%)	5 (17%)	–	4 (13%)
Laryngomalacia (21)	–	6 (26%)	4 (19%)	4 (19%)
Laryngeal cleft (17)	5 (29%)	1 (6%)	1 (6%)	3 (18%)
Vocal cord pathology (6)	4 (67%)*	–	4 (67%)*	1 (13%)

* Please note several patients had more than two pathologies.