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**ORIGINAL ARTICLE****Prospective Study**

- 1 Day case paediatric microlaryngobronchoscopy: A prospective study

El-Sheemy A, Virk JS, Ahmed J, Nikolopoulou E, Kazmi S, Bajaj Y

Contents

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Prospective Study

Day case paediatric microlaryngobronchoscopy: A prospective study

Arwa El-Sheemy, Jagdeep Singh Virk, Jay Ahmed, Eleni Nikolopoulou, Sahar Kazmi, Yogesh Bajaj

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Author contributions: El-Sheemy A analysed and interpreted the data alongside with drafting the manuscript; Virk JS and Ahmed J were involved in analysing the data and redrafting the paper; Nikolopoulou E and Kazmi S took part in data collection; Bajaj Y designed the study and is the lead clinician.

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Abstract

AIM

To assess the feasibility and parental acceptance of diagnostic microlaryngobronchoscopy (MLB) as day case surgery.

METHODS

A prospective study was performed over a 26 mo period at a tertiary paediatric ENT centre. Patients were selected in clinic using set criteria. All MLBs were performed using a standardised anaesthetic protocol and patients monitored post-operatively. Six weeks following surgery, parents underwent questionnaire surveys.

RESULTS

Ninety-four out of 101 MLBs was successfully performed as day case surgery over the set period. Seven patients required an overnight stay for further observation. Fifty-seven parents took part in the questionnaire of which 68.4% were highly satisfied with same day discharge.

CONCLUSION

MLB is feasible, safe and acceptable as day case surgery in carefully selected patients.

Key words: Child; Laryngoscopy; Anaesthetics; General; Microlaryngoscopy; Ambulatory surgical procedure; Microlaryngobronchoscopy; Bronchoscopy

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Core tip: Day case surgery is increasingly common and

cost effective. Paediatric microlaryngobronchoscopy is feasible, safe and an acceptable day case procedure in selected patients. Successful day case surgery relies on careful selection of patients in pre-assessment and outpatient clinic. Out of 101 consecutive microlaryngobronchoscopies performed at a tertiary centre, 94 (93.1%) were discharged on the same day. Most parents (68.4%) were highly satisfied with same day discharge. It is essential that time is spent explaining the general anaesthetic procedure and recovery to reduce anxiety and improve satisfaction of day case surgery with parents.

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INTRODUCTION

The advent of day case surgery has revolutionised the management of patients. Day case surgery has been shown to result in better post-operative outcomes and a higher patient satisfaction^[1]. Day case surgeries have also proven to be cost effective with higher turnover of procedures when compared with inpatient stay^[1]. These results have led to an increase in day case procedures and a drive towards day case surgery becoming the standard for more than 80% of surgeries in the United Kingdom^[2].

The success of day surgery, however, is dependent upon careful patient selection. Guidelines have been published to aid in selecting these patients^[2]. Patients are typically identified in clinic or in preoperative assessment.

Microlaryngobronchoscopy (MLB) is the gold standard for investigation, diagnosis and treatment of airway pathology in the paediatric population. Typically in the United Kingdom, patients require admission following the procedure for close monitoring as one of the serious complications is respiratory deterioration, occasionally requiring a definitive airway.

With careful selection preoperatively, MLBs theoretically can be performed as a day case procedure. Our recent pilot study created and used set criteria to aid in the selection of appropriate patients and was suggestive of clinical safety and parental acceptability^[3].

The aim of this prospective study was to review day case MLBs performed at a tertiary referral centre and assess clinical safety and parental satisfaction.

MATERIALS AND METHODS

We performed a prospective study over a 26 mo period (March 2012-May 2015) of MLBs performed at the Royal London and Barts Childrens Hospital. Careful selection of these patients was carried out

Table 1 Standardised anaesthetic protocol^[3]

Anaesthetic Room	Gas induction
	Local anaesthetic spray + Xylometazoline drops
	Dexamethasone
	Atropine
Airway adjunct	Nasolaryngeal airway
Maintenance	Either
	Inhalational anaesthetic (sevoflurane)
	or
	Total Intravenous anaesthesia (propofol + remifentanyl)
	As per anaesthetist's preference

using a combination of standard day case criteria^[2] and the criteria identified by our pilot study^[3]: No significant co-morbidity that could potentially affect post-op recovery including pulmonary disorders^[3]; No airway intervention was performed during MLB (however, tracheostomy patients where intervention is suprastomal were eligible for day case surgery)^[3]; No evidence of dynamic airway collapse whilst under general anaesthetic^[3]; Uneventful recovery from general anaesthetic^[3]. Patient selection was carried out during consultation in clinic and at pre-assessment. Patient age, gender, past medical history including airway pathology, MLB history and postoperative recovery was collected. In this subgroup, all MLBs were initially performed for diagnosis/airway assessment, although intervention was required in some cases, thus removing them from the patient pool in accordance with the outlined selection criteria above. The common indications included stridor/noisy breathing, failure to thrive, recurrent croup and aspiration alongside with post-repair airway assessment.

All MLBs were performed under a standardized general anaesthetic protocol as performed during the pilot study (Table 1)^[3]. Patients were spontaneously ventilating and examined with an intubating laryngoscope and zero degree Hopkins rod telescope (instead of a ventilating bronchoscope)^[3].

Post operatively, patients were monitored for a minimum of 4 h and had at least one post-operative review by the consultant prior to discharge^[3]. At 6 wk following the procedure, patients' parents were contacted for a telephone survey to gain a perspective on their experience (Table 2). Parents were asked to rate their level of anxiety and their overall satisfaction of day case surgery as low, moderate or high. Patients were also asked if they sought medical advice post op.

RESULTS

A total of 101 MLBs were performed in 79 patients over a 26 mo period. Fifteen (19.0%) patients had one or more MLBs during the set time period. Fifty-seven out of 79 (72%) parents took part in our telephone questionnaire.

Patient demographics

Ages ranged from 3 mo to 14 years and 6 mo (mean

Table 2 Parental telephone survey

Parental questionnaire	Low	Moderate	High	None	Phone	GP	Hospital
Level of anxiety				-	-	-	-
Medical advice sought	-	-	-				
Overall satisfaction of day case MLB surgery				-	-	-	-

MLB: Microlaryngobronchoscopy.

Table 3 Results of parental telephone survey *n* (%)

Parental questionnaire: Results	Low	Moderate	High	None	Phone	GP	Hospital
Level of anxiety	23 (40.4)	23 (40.4)	11 (19.3)	-	-	-	-
Medical advice sought	-	-	-	42 (70.2)	4 (7.0)	9 (15.8)	5 (8.8)
Overall satisfaction of day case MLB surgery	4 (7.0)	14 (24.6)	39 (68.4)	-	-	-	-

MLB: Microlaryngobronchoscopy.

3 years 8 mo). The commonest documented primary airway pathology was subglottic stenosis ($n = 34$) followed by laryngeal cleft with previous repair ($n = 18$). Twenty-one (26.6%) had no previous documented airway pathology. For 28 patients, this was their first MLB (35.4%). Our cohort had a female preponderance ($n = 46$, 58.2%).

Day surgery MLB

Of the 101 MLBs performed, 94 (93.1%) cases were discharged on the same day. Of those patients who had more than 1 MLB, the prior procedures were uneventful.

MLBs requiring inpatient stay

Seven patients were not discharged the same day (6.9%). One developed bronchospasm and vomiting following the procedure. The second patient was noted to have significant subglottic stenosis, requiring dilatation intraoperatively and therefore required inpatient admission for monitoring. The remaining 5 patients needed our routine planned monitoring but surpassed the day case discharge time for day case procedures and were thus admitted. It was the first MLB procedure in 3 of these 7 patients. All 7 patients were discharged the following day and did not require readmission.

Readmission rate

Of the 94 cases, 2 (2.1%) required readmission, one for treatment of a lower respiratory tract infection; the other for further monitoring at a different hospital. No surgical intervention was required for either patient.

Seeking medical advice

Of the 57 parents who took part in the telephone questionnaire, 15 reported seeking medical attention post op: 9 attended or called their GP, 5 attended

hospital emergency department, 4 telephoned the ENT department. One parent had attended both GP and hospital emergency department and another 2 parents called both GP and our ENT department. Of the 5 patients who attended a hospital emergency department, 2 were readmitted - both parents had not sought other medical advice. Of the parents seeking medical advice, except for the 2 who were readmitted, reassurance and advice on post op care was given.

Parental satisfaction

Thirty-nine of 57 parents (68.4%) rated their satisfaction as "high" in relation to care and management of their child. A total of 4 parents (7%) had a "low" satisfaction. On further questioning, this was due to different expectations of undergoing general anaesthesia and the parents felt they required more advice on postoperative care after a general anaesthetic (Table 3).

Parental anxiety level/concern about day care surgery

Twenty-three (40.4%) parents deemed their concern about the procedure itself and early discharge as "low". Eleven (20%) of parents were highly concerned about the procedure and early discharge. Six of those 11 sought medical attention post op. Of the 11, 2 were readmitted to hospital. Further questioning again indicated high levels of concern were mainly regarding the post operative effects of the general anaesthetic (Table 3).

Correlation of parental anxiety with parental satisfaction

Of the 23 parents who had deemed their concern as "low", 19 (82.6%) were highly satisfied with the care and management of their child. However of the 11 who were highly anxious, only 3 (27.3%) rated their satisfaction as "high" and 5 (45.5%) were "moderately" satisfied with their child's management. Of note, out of the 28 patients who had their first MLB in this study,

17 carried out the parental questionnaire. Thirteen (76.5%) of these parents rated their satisfaction as "high" and one patient rated their satisfaction as "low". Ten of the 17 (58.8%) parents rated their anxiety as "moderate" and 4 (23.5%) rated their anxiety as "high".

DISCUSSION

This study provides evidence that MLB is a feasible, safe and acceptable procedure for day case surgery in diligently selected cases. This study followed a strict guideline for selecting suitable patients and results highlight the need to follow pre-formed criteria for successful day case surgery. Planning of elective day case surgery is essential and this was carried out during clinic and pre-assessment. The study also shows that in order to reduce the number of anxious patients and for successful day care surgery, it is essential that sufficient time is spent with parents to explain the procedure and recovery after a general anaesthetic. We have since created a trust-wide MLB leaflet for all parents, alongside relevant contact numbers and advice. The study included 101 cases in 79 patients with a wide age range and variety of airway pathology. The small rate of unexpected admission (6.9%) (7/101) and extremely low readmission rate (2.1%) (2/94) provides strong evidence of the feasibility of day case MLB surgery. The study only investigated day case MLB surgery performed by one team and so may limit the transferability of day case surgery to other centres. In addition, the study did not compare post op results or parental anxiety and satisfaction rates with those of planned admission of MLBs performed at the Royal London. This study's results are consistent with the pilot study^[3] and provide evidence that day case MLB surgery is possible and safe. No other studies discuss paediatric MLBs as day case surgery, however it has been described for other ENT procedures such as tonsillectomy^[4] and myringoplasty^[5]. A recent study for laryngeal day surgery for paediatric patients with recurrent respiratory papillomatosis further supports the safety of day case surgery^[6]. All patients in this study however were admitted for their first operation for observation. Their admission rate was 10.75% ($n = 50$) over their study period including the required admission for their first procedure^[6].

This study provides evidence that MLB is a safe, achievable and socially acceptable day case procedure for the appropriate pre-selected patient. We recommend its use in other centres. It is important that patients and

parents are fully counselled preoperatively to alleviate anxiety.

COMMENTS

Background

Paediatric microlaryngobronchoscopy (MLB) is the gold standard diagnostic operative procedure for all children with upper aerodigestive symptoms. Day case surgery is increasingly common and cost effective. This study analyses the safety, clinical acceptability and parental response to day case paediatric MLB.

Research frontiers

Cost effective and safe surgery remains at the forefront, particularly in times of increasing austerity, strained health resources and economics.

Innovations and breakthroughs

This study extends the authors' previous pilot study into more robust data, confirming the safety and parental acceptability of day case diagnostic paediatric MLB.

Applications

This can have a significant impact on health care in the United Kingdom. In assiduously selected patients, day case surgery will be safe and reduce bed occupancy and costs associated thereof.

Peer review

This manuscript was well-written and documented. This study is clearly presented.

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