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Microlaryngeal surgery on a day case basis

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The aim of this study was to assess the clinical safety of performing microlaryngeal surgery (MLS) under general anaesthesia in selected patients in the ambulatory setting. Twenty-two adult patients were scheduled to have tissue specimens of the larynx taken by biopsy (54%), for vocal cord polypectomy (41%) or for vocal cord cyst excision (5%). Twenty-one ASA I and II patients (95%) were discharged home the same day of the procedure. Two of them presented with laryngospasm after extubation of the trachea. One ASA III patient (5%) had to be admitted overnight because of severe laryngospasm and bronchospasm, but was discharged the day after the operation. None of the patients had significant complications after leaving the recovery room (mean stay 85 min). There were no re-admissions to the hospital. Our data suggests that microlaryngeal surgery in selected patients can be safely performed on a day case basis.

Key words: Microlaryngeal surgery, microsurgery, direct laryngoscopy, microlaryngoscopy, general anaesthesia, ambulatory surgery

Introduction

Departments of Health, Royal Colleges and employer groups throughout Europe encourage the utilization of ambulatory surgery. Many set a target of 50% ambulatory activity for elective surgical procedures. This has resulted in a continually increasing list of operations being performed on a day case basis[1]. Cost control has been a major reason for this phenomenon. Nevertheless, before another procedure is recommended as suitable for the ambulatory setting, patient safety and quality of care have to be assessed[2].

Many otorhinolaryngology procedures are currently undertaken on an ambulatory basis. Tonsillectomy and adenoidectomy, with or without myringotomy and tympanic tubes insertion, constitute the majority of cases, especially in paediatric patients[3]. Septal surgery is also a routine day procedure at some hospitals[4]. Closed reduction of nasal fracture, foreign-body removal, mastoidectomy, stapedectomy or tympanoplasty have also been promulgated[5]. Microlaryngeal surgery (MLS) assists in the diagnosis and treatment of several laryngeal lesions, and it is common practice for it to be performed under general anaesthesia, keeping the patient in hospital overnight[6]. However, significant complications are very rare after the immediate postoperative course[6].

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The aim of the present study was to assess if MLS under general anaesthesia is safe and convenient in selected patients when conducted on an outpatient basis.

Methods

Setting

Sierrallana's hospital is a basic general hospital of the Spanish National Health Service, located in an industrial area near Santander. It provides primary to secondary healthcare to 166 654 people. A 10-bed day hospital, located beside the operating theatre, acts as an outpatient anaesthesia clinic and as an admission/discharge ambulatory setting. The operating rooms, the postoperative recovery room and the staff are all integrated, not being specifically dedicated for ambulatory surgery.

The study protocol was approved by our Institutional Ethical Committee.

Selection criteria

We only included in the study cases that presumably would not cause extensive trauma to the airway, such as the excision of small lesions, like polyps, or biopsies of neoplasms of the larynx. Large masses and subglottic lesions that could produce significant airway obstruction due to inflammatory reaction or haemorrhage were excluded. Before taking the decision to perform the procedure under general anaesthesia, an attempt with topical anaesthesia was undertaken in the case of every

patient, using a flexible fibroscope with a work channel, as in the method described by Riancho et al.[7].

Patients initially considered to be appropriate candidates for ambulatory MLS were those in physical status I (healthy patient) and II (patient with mild systemic disease) of the American Society of Anesthesiologists (ASA) classification. If the patient had a non-incapacitating severe systemic disease (physical status III) it was essential to take into account the stability of his/her condition. The chronological age of the patient was not part of the selection criteria. Instead, the physiological age and functional state were evaluated. The likely ease of tracheal intubation was always assessed. If the patient had a short neck, prominent tongue, limited ability to open the mouth, micrognathia or morbid obesity, he/she was excluded from the study.

The patients had to be able to understand and follow instructions, and had to be accompanied by a responsible person who would transport them back home and supervise them during the first postoperative day. They had to have a telephone at home and a travelling time to hospital of less than 60 min. Preoperative written instructions were always provided and written informed consent was obtained from all candidates.

Anaesthetic technique

Ondansetron was used for the prevention of postoperative nausea and vomiting; 4 mg being diluted with 100 ml 0.9% sodium chloride solution and administered intravenously over 20 min before the start of surgery. Premedication was not routinely used. In the operating room standard monitoring was established. After administration of atropine 0.5 mg iv, general anaesthesia was induced with propofol 2 mg kg^{-1}. The trachea was intubated with a microlaryngeal tube with cuff after intravenous administration of vecuronium 0.1 mg kg^{-1}. Anaesthesia was maintained with a propofol infusion at 10 mg kg^{-1} h^{-1} and air in 40% oxygen. The lungs were mechanically ventilated to control end tidal carbon dioxide between 35 and 40 mm Hg. Alfentanil was given to obtain analgesia at a dose of 10–15 mg kg^{-1}. Methylprednisolone 1 mg kg^{-1} iv was routinely given. Before extubation of the trachea, neuromuscular paralysis was reversed using neostigmine 0.05 mg kg^{-1} and atropine 0.01mg kg^{-1}. Postoperative analgesia was achieved with metamizol 2 g iv. Tramadol 1 mg kg^{-1} iv was used in patients with intolerance or allergy to metamizol, or in case the analgesia was insufficient.

Surgical technique

Surgery was performed in the Boyce-Jackson position using the Kleinsasser laryngoscope, which was introduced and positioned with a suspension apparatus. The endolaryngeal structures were visualized with a binocular microscope through a 400 mm lens.

Discharge criteria

Patients were transferred to the recovery room, where they stayed at least 1 h with a score of 10 on the conventional Aldrete score. After that period of time and in the absence of complications (bronchospasm, laryngospasm, pain, nausea or vomiting) they were moved to the day hospital for further observation. Discharge home was planned after a minimum of 5 h postoperatively, when they were oriented and apyrexial, had stable vital signs, spontaneous diuresis and tolerance of oral fluids. Clear fluids were offered in small quantities no sooner than 2 h after arrival in the day hospital. Clinical symptoms or signs of laryngospasm, bronchospasm, nausea, vomiting, pain, sleeplessness or instability on walking had to be completely absent. Before discharge, an oropharynx direct visualization and an indirect laryngoscopy or fibroscopy were performed in every patient in order to rule out the presence of a haematoma and/or oedema. If the patients did not fulfil all the previous criteria, or required medical or nursing care after 10.00 pm, they were admitted to the hospital overnight.

Postoperative control

Verbal and written advice regarding postoperative home care were given, pointing out the telephone number where they could contact the anaesthetist on-call 24 h a day. Patients received clinical information about the procedure that included the date and hour when they had to be re-examined by the surgeon (normally 7 days after the operation). They also received sufficient oral medication for pain relief during the first 24 h. A nurse telephoned the patient 12 and 24 h after the operation to enquire about any postoperative complications.

Cost analysis

According to the data registered by the Admission and Clinical Documentation Department we calculated the average length of stay of the patients that underwent MLS on an inpatient basis. The average cost of stay per day in the hospital and in the day hospital was calculated, including nurse and auxiliary personnel salaries, accommodation, dressings, drugs and general material costs. We excluded surgery and anaesthetist ambulatory consulting costs, operating room costs and costs from other departments (laboratory, radiology, emergency, admission, clinical documentation and others), because our ambulatory programme is totally integrated.

Results

Following the previous criteria 22 adult patients (19 men and 3 women) were scheduled for MLS under general anaesthesia between February and September 1995. The age of patients ranged from 20–74 yr (49 ± 16 yr, mean ± SD). Thirteen patients were ASA I, eight

Table 1. Patient data (n = 22)

Sex	*Age*	*Preoperative diagnosis*	*Pathology*	*ASA*	*Associated diseases*	*OT*	*PACU*	*DH*	*Complications*	*Outcome*
F	64	Vocal cord polyp	Polyp	II	COPD	30	90	7	Mild laryngospasm	Discharge
F	30	Vocal cord polyp	Polyp	I	–	20	60	4	–	Discharge
M	20	Vocal cord polyp	Polyp	I	–	30	85	6.5	–	Discharge
M	74	Chronic laryngitis	Epidermoid carcinoma	II	COPD, AHT	90	240	2.5	Moderate laryngospasm	Discharge
M	64	Chronic laryngitis	Leucokeratosis	I	–	40	60	4	–	Discharge
M	58	Laryngeal neoplasm	Epidermoid carcinoma	II	COPD	45	90	3.5	–	Discharge
M	47	Laryngeal neoplasm	Epidermoid carcinoma	I	–	60	85	5	–	Discharge
M	57	Intracordal cyst	Ductal cyst	I	–	60	75	7.5	–	Discharge
M	20	Vocal cord polyp	Polyp	I	–	30	90	6.25	–	Discharge
M	40	Vocal cord polyp	Polyp	II	AHT	25	75	6.25	–	Discharge
M	60	Oedematous laryngitis	Chronic inflammation	I	–	35	60	4.5	–	Discharge
M	51	Laryngeal neoplasm	Epidermoid carcinoma	II	COPD	10	75	6	–	Discharge
M	30	Laryngeal neoplasm	Keratosis	I	–	35	60	5.5	–	Discharge
M	68	Laryngeal neoplasm	Epidermoid carcinoma	II	Aortic stenosis	60	60	8	–	Discharge
F	34	Vocal cord polyp	Mucous cyst	I	–	28	60	5.5	–	Discharge
M	48	Laryngeal neoplasm	Epidermoid carcinoma	II	COPD, alcoholism	30	60	6.5	–	Discharge
M	59	Vocal cord polyp	Polyp	I	–	35	60	5	–	Discharge
M	44	Vocal cord polyp	Polyp	I	–	30	60	5	–	Discharge
M	30	Vocal cord polyp	Polyp	I	–	15	60	7	–	Discharge
M	63	Laryngeal neoplasm	Papillomatosis	II	COPD, AHT	20	60	5	–	Discharge
M	71	Laryngeal neoplasm	Epidermoid carcinoma	III	COPD	35	240	–	Laryngo-bronchospasm	Admission
M	43	Chronic laryngitis	Chronic inflammation	I	–	25	75	5	–	Discharge

F, female; M, male; ASA, American Society of Anesthesiologists physical status classification; COPD, chronic obstructive pulmonary disease; AHT, arterial hypertension; OT, operative time (min); PACU, postoperative care unit stay (min); DH, day hospital stay (h).

patients were ASA II and one patient was ASA III. Detailed demographic data, length of operation, postoperative care unit stay, complications and outcome of every patient are shown in Table 1. Biopsies accounted for the majority of the cases (54%), followed by polypectomy (41%) and cyst excision (5%). Mean length of the procedure was 36 min (range 10–90 min), mean postoperative care unit stay was 85 min (range 60–240 min) and mean stay in the day hospital was 5.5 h (range 2.5–8 h).

Twenty-one patients (95%) were discharged home the same day of the procedure. Two had mild or moderate laryngospasm after extubation of the trachea in the operating room that disappeared after a few minutes with oxygen via face mask. No other complications were seen in the immediate postoperative course. They were all interviewed by telephone 12 and 24 h after the operation. Only two suffered from a mild sore throat and another two from a mild headache that gradually disappeared with the oral analgesic. No patients had to phone back to the hospital, come to the emergency unit, or be admitted to the hospital.

One ASA III patient (5%) presented with severe laryngospasm in the operating room, followed by bronchospasm in the recovery room in combination with delayed recovery. He was kept in the hospital overnight and discharged home the following morning, having not presented with further complications.

Microlaryngeal surgery for polypectomies or biopsies, performed as an inpatient procedure, had an average stay of 1.9 days at a cost of 12 826 pesetas per day in our hospital. One day's stay in our day hospital cost an average of 15 346 pesetas. This represents a total saving of 9023 pesetas per case.

Postoperative satisfaction was complete in 97% of the patients, who would choose an ambulatory procedure a second time.

Discussion

Microlaryngeal surgery is generally performed on an inpatient basis. Robinson[6] reported a series of 294 patients requiring direct laryngoscopy or MLS. They were all admitted to hospital and observed for at least one night postoperatively. In 98% of the patients the postoperative course was entirely uncomplicated, four patients developed a non-fatal complication and one died of myocardial infarction. The study concluded that significant postoperative complications after MLS are rare. Based on this data we analysed the possibility of moving selected patients to the outpatient setting.

Indications for MLS are clinical diagnosis and treatment of several laryngeal diseases. These include a variety of malignant tumours and premalignant and benign lesions, such as vocal fold nodules, laryngeal microwebs, laryngeal cysts, airway granulation tissue, Reincke's oedema, papillomatosis, granulomas and haemangiomas. Some of these lesions may jeopardize the management of the airway when excised, caused by massive oedema or haemorrhage, which could occur with large masses or subglottic tissues. We considered that these lesions should not be dealt with on an outpatient basis. Nevertheless, our results suggest that polyp or cyst excision and biopsies of small lesions of the larynx can be safely carried out on an ambulatory basis if the patients are properly selected. In fact many of these procedures are performed under general anaesthesia, not because of the nature of the lesion, but because of its inaccessibility with other techniques or because of the discomfort of the patient.

We believe that in this type of surgery it is important to select candidates with a good physical status to avoid substantial risks. In this regard 95% of our patients were ASA I or II. The postoperative course in the majority of them was uneventful, except in two patients who developed laryngospasm immediately after extubation of the trachea that reversed after a few minutes. Routine prescription of corticoids before MLS to avoid this complication is not necessary, but is recommended when the operation is expected to last more than 30 min[8]. The only ASA III patient presented the most severe complications, suggesting that a large number of cases need to be studied before considering patients in this physical status as appropriate candidates.

No significant complications were observed after discharge from the recovery room in any patient, including the one who was admitted to the hospital. Although the mean stay in the postoperative care unit was 85 min, two patients stayed for up to 4 h. This suggests that the minimum postoperative observation time should be at least 4 h.

The low number of patients included in spite of the period of the study (8 months) was due to the routine performance of the procedure under topical anaesthesia with a flexible fibroscope[7]. When this technique was not successful the patient was scheduled for MLS. Other reports should confirm the suitability of performing MLS on a day case basis.

Our saving represents 37% per case over the inpatient cost and assures optimal use of inpatient beds and an earlier return to work for the patients.

In conclusion, microlaryngeal surgery under general anaesthesia to remove or perform biopsies on small lesions of the larynx and hypopharynx can be carried out safely on an outpatient basis, provided the patient has no significant systemic disease or an unfavourable social situation.

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