

# Oral and maxillofacial day case surgery in general anaesthesia with nasoendotracheal intubation

C L Christiansen, P Ahlburg, R H Jensen, S Sindet-Pedersen, J Heslop

Departments of Anaesthesiology and Oral and Maxillofacial Surgery, Aarhus University Hospital, Aarhus, Denmark

In a prospective observation study we have evaluated whether some oromaxillofacial surgery using general anaesthesia with nasoendotracheal intubation can be performed as day case surgery. Patients received no premedication except for acetaminophen treatment from the evening before surgery. Anaesthesia was instituted with propofol, alfentanil, N<sub>2</sub>O/O<sub>2</sub> 2 : 1 and atracurium. All patients were nasoendotracheally intubated. Local analgesics were used to decrease the anaesthetic requirements and to provide postoperative pain relief. The patients received naproxene for postoperative pain treatment. Ninety-three patients with a mean age of 27 (4-83) were treated. The mean duration of surgery was 54 min (12-135). Except for postoperative sore throat (29%) and nose bleed (3%) no complications of intubation were seen. Eighty-seven (94%) patients were discharged after a mean of 5 h 40 min (2½-9½ h). Six patients were admitted due to nausea and vomiting (2), sudden anxiety of discharge (2), surgical complication (1) and more extensive surgery than expected (1). Ninety-four per cent of the patients were satisfied with the postoperative pain treatment and 92% would prefer day case surgery again. A wide range of oromaxillofacial surgical procedures can be performed safely under general anaesthesia with nasoendotracheal intubation as day case surgery.

Key words: Day case surgery, oromaxillofacial surgery, nasoendotracheal intubation, postoperative pain treatment, complications

Since the late sixties day case surgery has become more predominant, now accounting for approximately 50% of the surgical procedures done in the United States and 20-30% in the UK<sup>1,2</sup>. Initially a typical day case operation should not exceed 30 min, but the success of day case surgery has encouraged people to perform more prolonged operations; some centres now accept procedures lasting up to 3 hours as day cases<sup>2,3</sup>. The duration of surgery is, however, only one among a number of variables which must be considered before new procedures can be accepted for day case surgery. Other variables to be considered are expected blood loss, the physiological status of the patient, the risk of nausea and vomiting, expected level of pain postoperatively and the risk of airway compromise. Anaesthesia for oral and maxillofacial day case surgery involves several of these problems, of which the maintenance of free airways per-

**Table 1.** Baseline variables with range of the patients

Number of patients	93
Female/male ratio	49/25
Patients < 18 years	19
Mean age in years	27 (4-83)

and postoperatively is the most troublesome, especially as the patients have to be nasoendotracheally intubated for surgical reasons. Effective postoperative pain treatment and a low incidence of nausea and vomiting is also essential. In a prospective observation study we have investigated whether some oral and maxillofacial surgical procedures can be performed safely as day case surgery under general anaesthesia with nasoendotracheal intubation, with the above-mentioned variables in mind.

## Materials

During a 6-month period a total of 93 patients were treated. The baseline variables of the patients are shown in Table 1 and the surgical procedures in Table 2.

Accepted: May 1993

Correspondence and reprint requests to: C L Christiansen, Department of Anaesthesiology, Aarhus University Hospital, DK-8000 Aarhus C, Denmark

© 1993 Butterworth-Heinemann Ltd  
0966-0632/93/020097-04

**Table 2.** Surgical procedures

	No.
Arthroscopy of the temporomandibular joint	35
Mandibular implant procedures	22
Removal of impacted teeth/tooth transplantation	18
Uncomplicated facial fractures*	10
Other procedures	8

\*Fractures of zygomatic bone, mandibular arch or orbital floor. ( $N = 93$ ).

## Methods

All patients were preoperatively evaluated by one of the participating anaesthesiologists and found to be in ASA group I or II. The patients were informed verbally and written consents were obtained. One gram acetaminophen was taken the evening before surgery and in the morning on the day of surgery. No other premedication was used. Children had EMLA (Astra) on the back of the hands one hour before surgery. On the day of operation a flow sheet showing the time consumption of each step of the treatment was filled in. All patients were recalled for control within three days of surgery, at which time they delivered an evaluation scheme.

## Anaesthesia and postoperative care

All patients were monitored with ECG, non-invasive blood pressure, pulsoxymetry and most also with end-tidal  $\text{CO}_2$ . Anaesthesia was induced and maintained with propofol, alfentanil and  $\text{N}_2\text{O}/\text{O}_2$  2:1. Neuromuscular blockade was achieved with atracurium. All patients were nasoendotracheally intubated and had a moist posterior pharyngeal pack placed. Before extubation the neuromuscular block was reversed with atropine/neostigmine. Lidocaine 1% local analgesic with epinephrine  $5 \mu\text{g ml}^{-1}$  was used for infiltration into the surgical site and regional blocks before the start of the operation. At the end of the operation further regional and infiltrative injections of bupivacaine 0.5% were given for postoperative pain relief. Postoperative pain treatment was continued with acetaminophen and naproxen. From the operating theatre the patients were transferred to the postoperative care unit. When stable vital signs, minimal nausea, pain or bleeding were present and the patient was able to retain oral fluids, the patients were transferred to the surgical ward. Finally they were discharged when able to void, walk and dress without assistance and the accompanying person had arrived.

## Results

The anaesthetic monitoring and induction time, the duration of the operation including surgical preparation time, time before extubation, the observation time on the postoperative care unit and the time to discharge are shown in Table 3. Eighty-seven (94%) of the patients were discharged. Six patients were admitted due to nausea and vomiting (2), anxiety of discharge (2), surgical

**Table 3.** Flowsheet on the day of day case surgery

	Hours . minutes
Induction time of anaesthesia	0.18 (0.07–0.50)
Duration of surgery	0.54 (0.12–2.15)
Time before extubation	0.06 (0.01–0.20)
Observation on postoperative care unit	1.16 (0.15–3.28)
Total time spent before discharge	5.40 (2.30–9.30)

**Table 4.** Postoperative complaints among 75% of the patients.

Complaints	No. (%)
Muscle pain	16 (19)
Sleepiness	41 (49)
Headache	27 (32)
Nausea	17 (20)
Vomiting	8 (10)
Sore throat	24 (29)
Nose bleed	3 (3)
Wound bleed	2 (2)

Some patients had more than one complaint.

complication (1) and undergoing more extensive surgery than expected (1). The correlation between the duration of surgery and the duration of postoperative care gave a correlation coefficient  $R = 0.28$ , but the correlation was significant ( $P < 0.02$ ).

## Patient's own evaluation of their day case surgery

Eighty-four (90%) of the patients delivered their evaluation scheme. Evaluation of pain treatment at the hospital showed that 82 of the patients (98%) were satisfied. Eighty-one (96%) found the pain treatment at home satisfactory, although six had experienced strong pain, 20 moderate pain, 32 slight pain and 20 no pain. Six patients did not answer this question. Sixty-three patients (75%) had one or more of the postoperative complaints shown in Table 4. Other less frequent symptoms included hoarseness (2 patients), ear pain (3) and a numb tooth (2). Three patients (4%) contacted the local primary health centre; one due to strong pain, one because of fever and one because of a numb chin. Seventy-seven (92%) responded that they would prefer day case surgery another time if possible. Seven patients would not prefer day case surgery on another occasion because they had had fever (1), vomiting (1), pain (1), dizziness (2) and too long transportation time home (170 km) (1). One patient did not give any explanation.

## Discussion

The social and economic benefits of day case surgery are evident. Patients avoid an unnecessary hospital stay, have minimal disruption of daily routine and the hospital does not incur hotel costs<sup>2</sup>. The success of day case

surgery demands high standards of care, because it is essential that there is a minimum of postoperative sequelae, as the patient must be 'street fit' within a few hours.

In this observation study we have evaluated whether some oral and maxillofacial operations could be performed on a day case basis. For surgical reasons most patients having oral and maxillofacial surgery must be nasoendotracheally intubated with the possibility of complications such as epistaxis, trauma to the posterior pharyngeal wall, dislodgement of the adenoids, auditory tube obstruction, maxillary sinusitis and bacteraemia. To our knowledge only two papers have reported on complications or complaints in day cases undergoing oral and maxillofacial surgery using general anaesthesia with nasoendotracheal intubation. One paper, however, has dealt with orthognathic procedures performed over a nine-year period in 87 patients in an outpatient environment. All the patients had been nasoendotracheally intubated. Fourteen of the patients (16%) were admitted to hospital requiring observation of the airway, severe nausea or vomiting, significant blood loss or pain<sup>4</sup>. The surgical procedures performed in the study were, however, more advanced than in our study, which may explain the higher admission rate. The other paper compared the use of a reinforced laryngeal mask with nasoendotracheal intubation in dental surgery. The study reported no difference in visual analogue score of complaints among the 30 patients in each group, except for a higher score of muscle pain in the nasoendotracheally intubated group<sup>5</sup>. The use of suxamethonium for intubation of the patients in this group may explain this difference. Three patients all from the nasoendotracheally intubated group were admitted due to excessive bleeding.

Usually a tube with i.d. 7.0 mm is recommended for nasoendotracheal intubation of adults<sup>6</sup>. We have tried to reduce the complication rate due to nasoendotracheal intubation by using tubes with a smaller internal diameter and with a maximum size of i.d. 6.0 mm in adults. As all patients were on controlled ventilation, we did not observe any signs of hypoventilation. Where end-tidal CO<sub>2</sub> was monitored, this parameter was within normal range. The nose bleed in three patients after their discharge may be due to the nasoendotracheal intubation. The incidence of sore throat in 29% and hoarseness in 2% are low compared with symptoms in inpatients following orotracheal intubation<sup>7</sup>. None of these symptoms resulted in admission or a visit to the general practitioners. Based on our own findings in this study, it seems that patients who have been nasoendotracheally intubated can be handled safely as day case patients.

The use of propofol, alfentanil and atracurium for anaesthesia in day case surgery seems to be the best choice today<sup>8-11</sup>. Propofol and alfentanil are well tolerated, have a rapid elimination and are associated with a low frequency of postoperative nausea and vomiting. Indeed propofol seems to possess an anti-emetic action in low doses<sup>12</sup>. In our study the patients were extubated within a mean of 6 min (1-20) after the end of surgery and 20% had nausea and 10% did vomit. These are low

incidences<sup>13</sup>. The combination of fast recovery and low incidence of nausea and vomiting is extremely important in day case patients operated on in their oral cavity.

Several studies have shown that pain treatment with a nonsteroidal anti-inflammatory drug (NSAID) or acetaminophen started preoperatively reduces the postoperative need for opioids in various types of operations<sup>14-17</sup>. The combined action of acetaminophen and a NSAID on pain relief has not been studied. Oral administration of most NSAIDs inhibits platelet aggregation, whereas acetaminophen does not inhibit platelet aggregation to the same extent<sup>18</sup>. To avoid the inhibition of platelet aggregation and to reduce the postoperative use of opioids we started only the acetaminophen treatment preoperatively and then supplemented with naproxen postoperatively.

Clinical studies have shown that postoperative pain is reduced if regional anaesthesia or incisional local analgesia is used<sup>19,20</sup>. We used nerve blocks and/or infiltrational local analgesia with lidocaine before surgery because of the fast onset. At the end of surgery additional local analgesia was given using bupivacaine to ensure long lasting pain relief. This combined regime with acetaminophen, naproxen and local analgesia gave good pain relief and no opioid was used. Eighty-one of the patients (96%) evaluated their pain treatment as satisfactory although 31% graduated their pain intensity to be strong (7%) or moderate (24%). These last numbers indicate that the postoperative pain treatment still might be improved. An admittance rate of 6% is acceptable taking surgical procedures into consideration. The poor correlation between the duration of surgery and the duration of postoperative care indicates that the duration of surgery per se is not a limiting factor to day case surgery.

In conclusion, some oromaxillofacial surgical procedures can be performed safely as day cases under general anaesthesia with nasoendotracheal intubation, if a fast recovery, a low incidence of nausea and vomiting and effective pain treatment can be accomplished.

## References

- 1 Pasternak LR. Anesthetic considerations in otolaryngological and ophthalmological outpatient surgery. *Int Anesthesiology Clinics* 1990; **28**: 89-100
- 2 The economics of day case surgery. ICI Pharmaceuticals & Janssen Pharmaceutica. Complete Medical Communications Ltd., Cheshire, UK, 1991
- 3 Guidelines for day case surgery. Royal College of Surgeons, England, 1985
- 4 Knoff SB, van Sickles JE, Holmgren WC. Outpatient orthognathic surgery: Criteria and review of cases. *J Oral Maxillofac Surg* 1991; **49**: 117-20
- 5 Goodwin APL, Ogg T, Lamb WT, Adlam DM. The reinforced laryngeal mask in dental day surgery. *Amb Surg* 1993; **1**: 31-5
- 6 Lindholm CE, Grenvik A. Tracheal tube and cuff problems. *Int Anesthesiology Clin* 1982; **20**: 103-51
- 7 Peppard SB, Dickens JH. Laryngeal injury following short-term intubation. *Ann Otol Rhinol Laryngol* 1983; **92**: 327-30
- 8 Korttila K, Østman P, Faure E, Apfelbaum JL, Prunskis J, Ekdawi M, Roizen MF. Randomized comparison of recovery after propofol-nitrous oxide versus thiopentone-

- isoflurane-nitrous oxide anaesthesia in patients undergoing ambulatory surgery. *Act Anaesth Scand* 1990; **34**: 400-3
- 9 Sanderson JH, Blades JF. Multicenter study of propofol in day case surgery. *Anaesthesia* 1988; **43** (Suppl) : 70-3
- 10 White PF. The role of premedicants and new drugs in anaesthesia for day case surgery. *Acta Anaesthesiol Scand* 1991; **35** (Suppl): i34
- 11 Raeder JC, Hole A. Out-patient laparoscopy in general anaesthesia with alfentanil and atracurium. A comparison with fentanyl and pancuronium. *Acta Anaesthesiol Scand* 1986; **30**: 30-4
- 12 Borgeat A, Wilder-Smidt OHG, Saiah M, Kifat K. Subhypnotic doses of propofol possess direct antiemetic properties. *Anesth Analg* 1992; **74**: 539-41
- 13 Plazzo MGA, Strunin L. Anaesthesia and emesis. I Etiology. *Can Anaesth Soc J* 1984; **31**: 178-87
- 14 Parsloe M, Chater SN, Bembridge M, Simpson KH. Premedication with piroxicam in patients having dental surgery under general anaesthesia with halothane or isoflurane. *Br J Anaesth* 1988; **61**: 702-6
- 15 Pavy T, Medley C, Murphy DF. Effect of indomethacin on pain relief after thoracotomy. *Br J Anaesth* 1990; **65**: 624-7
- 16 McLoughlin C, McKinney MS, Fe JPH, Boules Z. Diclofenac for day-care arthroscopy surgery: Comparison with standard opioid therapy. *Br J Anaesth* 1990; **65**: 620-3
- 17 Jespersen TW, Christensen KS, Hjørsgaard-Andersen P, Sonne S, Juhl B. Postoperativ smertebehandling med morfin versus morfin og paracetamol. *Ugeskr Læger* 1989; **151**: 1615-18
- 18 Cronberg S, Wallmark E, Söderberg I. Effect on platelet aggregation of oral administration of 10 non-steroidal analgesics to human. *Scand J Haematol* 1984; **33**: 155-9
- 19 Tverskoy M, Cozakov C, Ayache M, Bradley EL, Kissin I. Postoperative pain after inguinal herniorrhaphy with different types of anaesthesia. *Anesth Anal* 1990; **70**: 29-35
- 20 Sinclair R, Cassuto J, Høgstrøm S, Lindén I, Faxén A, Hedner T, Ekman R. Topical anesthesia with lidocaine aerosol in the control of postoperative pain. *Anesthesiology* 1988; **68**: 895-901

## **International Conference and Exhibition on Same Day Surgery *The Future Today* Perth, Western Australia 27-30 October 1993**

This conference will be of interest to all healthcare professionals involved in the planning and application of same day surgery. A distinguished and international list of invited speakers will deliver a series of keynote lectures on a variety of topics.

### **Conference topics**

- New surgical techniques and their application to same day surgery
- Application and impact of new technology in the day setting
- New technology and patient outcomes
- Continuing education and new technology
- Patient screening and after care
- Cost benefits to the community
- Future trends in same day surgery

For further information please contact: Meetings Masters, PO Box 1400, West Perth, W.A. 6872, Australia. Tel: (09) 322 6730 Fax: (09) 481 0890.