Impact of the mode of hospitalisation on the postoperative complication rate after dissection tonsillectomy in children

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ARTICLE INFO

Keywords:
Tonsillectomy
Outpatient surgery

ABSTRACT

Objectives: To compare postoperative complication rates after dissection tonsillectomy in patients operated by outpatient surgery and patients operated by inpatient surgery.

Population and methods: A prospective, single-centre, observational study was conducted over a period of 1 year. Dissection tonsillectomy was performed in 103 patients (mean age: 4 years) between September 2011 and September 2012. The following parameters were studied: bleeding or inflammatory complication rate, readmissions, unscheduled visits, factors contraindicating outpatient surgery, reasons for failure of outpatient surgery and influence of Postoperative Nausea and Vomiting scores.

Results: Two patient groups were composed: 54 patients were managed by outpatient surgery (Group O) and 49 patients were managed by inpatient surgery (Group I). The two main factors contraindicating outpatient surgery were age less than 3 years (40%) and preoperative suspicion of sleep apnoea-hypopnoea syndrome (26%). Seven patients of Group O had to stay in hospital (outpatient failure rate of 13%). Postoperative complications were observed in 13% of patients of Group O versus 12.2% of patients of Group I with no statistically significant difference between the two groups. One patient in each group had to be readmitted; no statistically significant difference was observed between the two groups (P = 0.41). PONV scores were very high (2) in all cases.

Conclusion: Outpatient tonsillectomy in well-selected patients is not associated with a higher postoperative complication rate than inpatient tonsillectomy. With systematic appropriate prophylaxis, Postoperative Nausea and Vomiting scores had no influence on the postoperative course.

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1. Introduction

Dissection tonsillectomy is one of the operations most frequently performed in children in France, both in the public sector and the private sector with about 50,000 tonsillectomies, either alone or in combination with adenoidectomy, in 2008, i.e. 17% of all ENT procedures [1–3].

Inpatient surgery rates have been declining over recent years in favour of outpatient management, consisting of day-only admission and discharge of the patient on the day of surgery and outpatient dissection tonsillectomy has become increasingly popular in France in both the private and public sectors, although these figures had remained stable for several years (Source: PMSI MCO 2006–2007–2008). In contrast, outpatient dissection tonsillectomy was already the predominant mode of tonsillectomy in several other countries at the first half of 2008 (64% in Holland, 67% in Canada, 89% in the USA, 93% in Belgium) [2].

However, outpatient surgery represents a major economic advantage in the current context of budget constraints and needs to be encouraged. International studies show that outpatient surgery requires fewer resources than inpatient surgery in terms of direct hospital costs. Furthermore, in France, a national health insurance study showed that the direct costs remained lower for five procedures, even after including the costs incurred before and after hospitalisation [3].

At the end of 2011, the Haute Autorité de la santé (HAS) (French National Authority for Health) and the Agence nationale d’appui à la performance des établissements de santé et médico-sociaux (ANAP) (National Agency to support the performance of healthcare and medical and social welfare establishments) therefore initiated a three-year joint action programme designed to help France make up for lost time in the field of outpatient surgery in the form of guidelines entitled “Good organisational and professional outpatient surgery practice” (with economic evaluation) [1–3].

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http://dx.doi.org/10.1016/j.anorl.2013.11.008
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The conditions currently required to perform outpatient dissection tonsillectomy in children in France were defined during a consensus conference organised by several learned societies in 2005. These conditions were published in the form of clinical practice guidelines for tonsillectomy in children under the aegis of the Société française d’oto-rhino-laryngologie et de chirurgie de la face et du cou (SFORL) and the Société française d’anesthésie et de réanimation (SFAR) in 2009 [1–3].

Consequently, since 1st September 2011, the Amiens University Hospital (France) otorhinolaryngology department surgical and anaesthetic team has developed a length of hospital stay reduction policy by modifying its practices in order to develop outpatient surgery. As part of this policy, we have organised the outpatient management of dissection tonsillectomy and this prospective study reports the preliminary results of this approach.

2. Study population and method

This was a single-centre prospective observational study conducted in Amiens University Hospital between 1st September 2011 and 1st September 2012 after validation by the hospital’s ethics committee.

This study was designed to:

- compare the number and type of complications observed after outpatient or inpatient dissection tonsillectomy, as well as the number of readmissions and unscheduled visits;
- analyse factors constituting a contraindication to outpatient surgery, the reasons for failure of outpatient management and the influence of Apfel’s Postoperative Nausea and Vomiting (PONV) score on management.

The inclusion criterion in this study was bilateral dissection tonsillectomy by outpatient surgery or inpatient surgery in subjects under the age of 18 years. Exclusion criteria were age greater than 18 years, unilateral tonsillectomy and emergency tonsillectomy.

Indications for tonsillectomy (in accordance with the French guidelines for tonsillectomy in children [11]) were as follows: tonsillar hypertrophy responsible for sleep-disordered breathing, tonsillar hypertrophy with oropharyngeal obstruction, recurrent acute tonsillitis (3 episodes of infection per year for 3 years or 5 episodes per year for 2 years), chronic tonsillitis, recurrent peritonsillar abscess and suppurative complication of acute tonsillitis other than peritonsillar abscess (parapharyngeal abscess, retropharyngeal abscess).

The mode of surgical management of the patients was defined by the absence of contraindication to outpatient management (Fig. 1).

At the preoperative anaesthetic visit, the anaesthetist gave his/her approval (recorded in the medical charts) to performing dissection tonsillectomy in the outpatient care unit on the basis of the patient’s history and anaesthetic conditions.

The anaesthetic protocol and surgical technique were similar in the two groups of patients. The anaesthetic protocol comprised induction with sevoflurane, sufentanil and propofol followed by maintenance with an halogenated anaesthetic, such as sevoflurane.

An injection of 4 mg of dexamethasone and 15 mg kg$^{-1}$ of paracetamol was systematically administered at the beginning of the operation.

The operation was performed by an experienced intern or senior ENT surgeon and consisted of dissection tonsillectomy with haemostasis ensured by compression and, if necessary, elective unipolar electrical coagulation.

Immediately postoperatively, the patient was transferred to the recovery room, where he/she received a weight-adjusted dose of nalbuphine by injection in the presence of documented pain. A weight-adjusted dose of ondansetron was administered by intravenous injection in the case of nausea, in which case the patient was kept under surveillance for an average of 1 hour with cardiac and blood pressure monitoring, pulse oxymetry and regular self-rating of pain (visual analogue scale or numerical scale) or observer-rating of pain (faces pain scale). Discharge from the recovery room was dependent on a satisfactory level of consciousness, control of nausea and pain, normal vital parameters and absence of bleeding.

On return to the ward, analgesia was continued with weight-adjusted intravenous paracetamol, rapidly replaced by weight-adjusted paracetamol syrup until complete pain control.

If intraoral and oropharyngeal examination revealed severe oedema of the uvula and soft palate, treatment with oral methylprednisolone at a dose of 1 mg kg$^{-1}$ was instituted for 2 days.

Four to 8 hours after the operation, the anaesthetic and surgical team performed the following assessment in each patient: intraoral and oropharyngeal examination, verification of the child’s level of consciousness, verification of resumption of oral feeding, verification of pain control and verification of vital parameters (temperature, blood pressure). If the patient presented a good level of consciousness with stable vital parameters, satisfactory pain control, satisfactory oral feeding and when no signs of bleeding were observed on intraoral/oropharyngeal examination, children in the outpatient group were allowed to return home after at least 6 hours post-anaesthesia and in compliance with the discharge conditions related to day-only admission and children in the inpatient surgery group were allowed to return home the following morning.

Before discharge, the surgical and nursing team provided the parents and the child with clear, appropriate, oral and written information about the postoperative course (feeding, possible complications and management in the event of complications).

Parents of children managed by outpatient surgery were systematically contacted by telephone on the day after the operation and a postoperative D1 telephone report form was filled in by a registered nurse or the charge nurse in order to ensure good continuity of home management.

Two visits were scheduled at postoperative days D10 and D21–D30 for follow-up examinations to confirm satisfactory healing of the tonsillar region and to detect any complications.

Statistical analysis initially consisted of descriptive analysis:

- qualitative variables were expressed as frequency or a percentage to the nearest 1 percent;
- quantitative variables were expressed as the mean and standard deviation, median and range.

Comparative analysis of the variables was then performed:

- using Chi² test, Fisher’s exact test or direct comparison of proportions;
- a P value < 0.05 was considered to be statistically significant.

3. Results

One hundred and three patients underwent dissection tonsillectomy during the period from 09/09/2011 to 09/08/2012 and the study was closed on 7/09/2012 (i.e. about 1 month after the last tonsillectomy performed). The age of the patients ranged from 11 months to 17 years with a median age of 4.41 years [mean age: 5.49 years]. The age distribution was as follows: 19 patients younger than 3 years (18.40%), 69 patients between the ages of 3 and 6 years (67.00%) and 15 patients over the age of 6 years (14.60%). The sex ratio was 59 boys/44 girls.

Fifty-four patients (52.43% of cases) were eligible for outpatient surgery (Group O) and 49 patients (47.57%) were managed by inpatient surgery (Group I).

Surgical indications were as follows: 71 cases (51.80%) of tonsillar hypertrophy responsible for sleep-disordered breathing, 29 cases (21.20%) of tonsillar hypertrophy with oropharyngeal obstruction, 35 cases (25.60%) of recurrent acute tonsillitis, 1 case (0.70%) of chronic tonsillitis, and 1 case (0.70%) of recurrent peritonsillar abscess.

The distribution of surgical indications between the two groups is presented in Table 1. The proportions of each indication varied according to age, with a majority of obstructive syndromes with sleep disorders before the age of 3 years and a larger proportion of infectious tonsillitis after the age of 6 years.

Fifty-three factors contraindicating outpatient tonsillectomy were identified in patients of Group I (Fig. 1). Day-only admission was converted to conventional hospitalisation in 7 patients (12.95% of cases) of Group O.

No case of early postoperative bleeding (before H8) was observed in this series. The reasons for failure of outpatient management were as follows: 2 cases (3.7%) of feeding problems on D0 (refusal to eat), 1 case (1.85%) of intractable postoperative vomiting on D0, 2 cases (3.7%) of severe oedema of the uvula and soft palate that was monitored until D1, 1 case (1.85%) of postoperative pharyngeal pain that was relieved on D2 but that required a morphine pump and 1 case (1.85%) of impaired consciousness (drowsiness) on D0.

A total of 13 postoperative complications were observed up until D30 in the 2 groups (Table 2).

In this series of 103 patients, 2 patients were readmitted because of postoperative bleeding (1 in each group). There were 4 unscheduled visits to the otorhinolaryngology department or to a general practitioner in Group O versus 2 in Group I, related to minor complications (pain, oedema of the uvula). No significant difference was observed between the 2 groups in terms of readmission rates (P = 1) and unscheduled visits (P = 0.41).

Seven postoperative complications were observed in Group O: 1 case of late pharyngeal bleeding requiring surgical revision in the operating room on D7, 3 cases of fever > 38.5 °C, 2 cases of dysphagia and pharyngeal pain and 1 case of nasal voice. Six postoperative complications were observed in Group I: 1 case of pharyngeal bleeding that was simply monitored on D1, 1 case of fever > 38.5 °C, 2 cases of dysphagia and pharyngeal pain and 1 case of moderate oropharyngeal dyspnea on D0.

Finally, Apfel’s Postoperative Nausea and Vomiting scores were very high (greater than or equal to 2 for all patients) in this series.

4. Discussion

The modalities of and contraindications to outpatient dissection tonsillectomy in France are fairly similar to those reported in North America and Europe [4–6]. The prevalence and the types of complications observed after tonsillectomy have been extensively reported and clearly defined in the literature [7]. In contrast, few studies have prospectively compared the complications observed after outpatient tonsillectomy and inpatient tonsillectomy. The most recent large-scale French study on this subject was published by Hans et al., who reported their 7-year experience of outpatient tonsillectomy. This study reported similar complication rates to those observed after inpatient surgery [2].

The results of our study are consistent with the data of the literature, with even a slightly lower bleeding rate compared to that reported in the literature: 1.94% for 103 patients (1.85% for outpatient surgery and 2.04% for inpatient surgery) versus an average of 3.5% according to Orliaguet [7], which can be easily explained by a sampling bias. Our study also failed to demonstrate any statistically significant differences between the complication rate and rate of specific types of complication between these two modes of management. Outpatient tonsillectomy therefore does not appear to be associated with a higher risk than conventional inpatient tonsillectomy, confirming the data of the literature [6,8,5,9–11].

However, failure of the outpatient procedure was observed in 12.95% of the cases scheduled to undergo outpatient surgery. Analysis of these cases revealed that, although most failures could have been avoided by better organisation and anticipation (PONV, pain, drowsiness), others were related to surgical (oedema of the uvula and soft palate) and anaesthetic incidents. It should be stressed that these incidents were all minor and resolved either spontaneously or in response to medical treatment in 85.71% of cases on D0 or D1. It should also be noted that, in contrast with other studies, no cases of early bleeding (<8 hours) were observed among patients initially eligible for outpatient surgery and that a number of patients with minor oedema of the uvula and soft palate were admitted to hospital for observation, possibly reflecting excessive caution. The absence of early bleeding in this series, compared to other studies, could be related to the small sample size, as the primary bleeding rate reported in the literature is estimated to be between 0.4 and 1% [7].

The incidence of postoperative nausea and vomiting is known to be very high in paediatric surgery with a rate of about 30% for all forms of paediatric surgery and up to 80% for tonsillectomy [11–15]. Although all patients in the present series had a high PONV score (2), the use of short-acting anaesthetic agents, systematic prevention of nausea and vomiting by injection of dexamethasone [11–14] and

Table 2

<table>
<thead>
<tr>
<th>Complication</th>
<th>Outpatient (%)</th>
<th>Conventional (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>1.85% (1/54)</td>
<td>2.04% (1/49)</td>
<td>1.94% (2/103)</td>
</tr>
<tr>
<td>Dysphagia/pain</td>
<td>3.7% (2/54)</td>
<td>4.08% (2/49)</td>
<td>3.88% (4/103)</td>
</tr>
<tr>
<td>Fever/tonsillar suprination</td>
<td>5.5% (3/54)</td>
<td>2.04% (1/49)</td>
<td>3.88% (4/103)</td>
</tr>
<tr>
<td>Other</td>
<td>1.85% (1/54)</td>
<td>4.08% (2/49)</td>
<td>2.91% (3/103)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>12.95%</td>
<td>12.24%</td>
<td>12.61%</td>
</tr>
</tbody>
</table>

Table 1

<table>
<thead>
<tr>
<th>Surgical indication</th>
<th>Conventional (%)</th>
<th>Outpatient (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonsillar hypertrophy responsible for</td>
<td>60</td>
<td>45</td>
</tr>
<tr>
<td>Sleep-disordered breathing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonsillar hypertrophy with</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Oropharyngeal obstruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurrent acute tonsillitis</td>
<td>18</td>
<td>31</td>
</tr>
<tr>
<td>Chronic tonsilits</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Recurrent peri-tonsillar abscess</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
administration of setrons [15] in the presence of early nausea in the recovery room optimised management and allowed early patient discharge. Discharge was delayed in only one patient because of intractable vomiting on D0.

Outpatient surgery requires good coordination between anaesthetic and surgical teams in order to anticipate postoperative pain and vomiting and also requires good operating room organisation in order to allow patients scheduled for outpatient surgery to be operated at the beginning of operating lists [1,3,11].

It would appear to be difficult to eliminate a number of contraindications to outpatient surgery in our series: children with a sometimes complicated medical history require specific multidisciplinary management that is rarely available in non-teaching hospitals and private clinics.

However, other contraindications may need to be redefined or completed, particularly age less than 3 years and obstructive sleep apnoea/hypopnoea syndrome (OSAHS). Severe OSAHS was considered to be a contraindication to outpatient tonsillectomy, although the concept of severe OSAHS appears to be poorly defined, despite the use of detailed questionnaires existence [16–20] designed to quantify the severity of oropharyngeal obstruction. However, according to Orliaguet et al. [19], these questionnaires may be unreliable or even inappropriate. Polysomnography can be used to confirm the diagnosis of OSAHS and assess its severity, but it is expensive and difficult to perform systematically in children, and it is still subject to caution due to the absence of reliable normal values [17–20]. Many children at the beginning of our study were therefore excessively excluded from outpatient surgery because of severe OSAHS, which illustrates the need to develop easy-to-use, quick and reliable clinical assessment tools to quantify OSAHS in children.

In this study, age less than 3 years was the main limiting factor for outpatient tonsillectomy (30–48% of cases). However, this study showed that the postoperative complication rate and the type of complication were totally independent of the patient’s age.

The 3-year age limit was defined by paediatric otolaryngology and anaesthesia learned societies [21–23]. However, these guidelines differ from the guidelines proposed by the Société française d’anesthésie et de réanimation in 2010, which stipulates that children with an ASA score of I or II or stable ASA III and children born at term and older than 3 months are eligible for outpatient surgery. Depending on the team’s experience and the type of operation, some patients younger than 3 months could be included after agreement between the anaesthesiologist and the surgeon [3]. In 2005, SFAR and ADARPEF proposed the possibility of outpatient tonsillectomy in children over the age of three years [Strong agreement] [3].

In fact, very few studies evaluating the complications of tonsillectomy in children under the age of 3 years have been published in the literature. Helmus et al. [8] and Wiatrak et al. [21] reported a low complication rate in children under the age of 3 years undergoing adenoidectomy and tonsillectomy. Our study tends to confirm these results with a low absolute number of complications, but these results are not significant due to the small sample size.

The results of assessment of the level of consciousness and resumption of feeding in these children within the timeframe compatible with outpatient surgery were very encouraging, showing that the great majority of children (about 9 out of 10) presented a postoperative status allowing them to be discharged in the evening after the operation.

Children under the age of three years undergoing tonsillectomy appeared to experience fewer anaesthetic and surgical complications than the general population with lower morbidity and mortality [21–23].

We believe that the guideline excluding children under the age of 3 years from outpatient tonsillectomy needs to be revised and we propose that outpatient tonsillectomy be extended to include children over the age of 2 years. The North American study by Oomen et al. concerning paediatric tonsillectomy [4] reached similar conclusions. A large-scale study should therefore be conducted in order to confirm the lower risk of complications in young children. Such a study could lead to revision of the guidelines concerning children under the age of 3 years in this indication in order to extend outpatient tonsillectomy to children over the age of 2 years.

5. Conclusion

Patient populations operated in teaching hospitals may differ from those operated in other centres, as children presenting a complex medical history are generally referred to teaching hospitals for management. It is therefore only logical that the outpatient surgery rate in teaching hospitals is lower than that reported in other centres. Nevertheless, the outpatient tonsillectomy rate in our centre increased to 52.3% after the first year versus a mean of 12.9% in public hospitals over recent years.

This study further supports the safety of outpatient tonsillectomy in carefully selected patients. This type of outpatient management is relatively easy to set up and does not require any major logistic organisation. The experience acquired with outpatient surgery highlights the need to revise and optimise the contraindications defined in guidelines while ensuring the safety of this type of surgical procedure.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References
