

Good long-term results after tonsillectomy in ear, nose and throat practices

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ABSTRACT

INTRODUCTION: The objective was to evaluate the long-term results of outpatient tonsillectomy in Danish ear, nose & throat (ENT) practices in terms of satisfaction, quality of life (QoL) and relief of symptoms.

MATERIAL AND METHODS: A telephone interview was carried out at least three years after tonsillectomy. Alternatively, a questionnaire was filled in by the patients. The answers were compared to a pre-operative questionnaire.

RESULTS: The response rate was 63% (386/614). No differences were found between the responders and the non-responders except that the proportion of smokers was higher in the non-responder group. QoL improved significantly and 93% were satisfied with having chosen tonsillectomy. 95% experienced complete or partial relief from their former throat-related symptoms. Eight to 11% had developed new symptoms from the throat including sleep-disordered breathing.

CONCLUSION: With regard to QoL, satisfaction and relief of symptoms, the long-term results of outpatient tonsillectomy in Danish ENT practices are comparable to those obtained among hospitalized patients and they are in conformity with international standards. However, as approximately 10% develop new symptoms, it is important that physicians are aware of the indication as well as of any information received during shared decision-making with the patients/parents to adjust expectations.

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The literature concerned with long-term results of tonsillectomy is relatively sparse and mostly based on hospitalized patients staying overnight after the procedure [1-12]. The reported study populations have been rather small, typically counting less than 150 eligible patients [2, 4-6, 10]. The follow-ups have varied in duration but rarely exceed 12 months [3-5, 7, 11]. According to these studies, tonsillectomy significantly increases quality of life (QoL), reduces the number of episodes with throat infections and improves sleep-disordered breathing [1-12]. In addition, the use of analgesics and antibiotics decreases after tonsillectomy along with the economic burden even when the surgical costs are recognised [4-6].

Elective tonsillectomies account for 16% of all am-

bulatory surgery in children younger than 15 years in the US [1]. Given the conditions associated with outpatient procedures, it appears necessary to demonstrate good and valid long-term results of a potentially life-threatening procedure to justify the large-scale use of this surgical intervention.

From 2003 to 2005, we enrolled a study population of 614 patients in a National Indicator Project (NIP) on outpatient tonsillectomy in Denmark. The tonsillectomies were performed in ear, nose & throat (ENT) practices as strictly outpatient procedures, i.e., procedures that did not involve the local hospital or a patient hotel. It was concluded that the NIP principles are useful tools for measuring the medical technical quality [13, 14]. Pain and bleeding were the main determinants of unscheduled contacts after tonsillectomy. Diagnosis, age and length of the postoperative observation were identified as significant prognostic factors. Patient-reported outcomes three weeks after surgery revealed that 30% were unsatisfied with the information provided about postoperative complications. The extent of postoperative pain as well as the number of days absent from work/school owing to illness was underestimated [15].

The aim of the present study was to evaluate the long-term results of outpatient tonsillectomy in terms of relief of symptoms, QoL and satisfaction with the outcome.

MATERIAL AND METHODS

At enrolment during 2003-2005, patients/parents and surgeons filled in separate, validated questionnaires about the symptoms and a QoL score prior to the tonsillectomy. The QoL score was selected on a visual analogue scale from 1 (miserable) to 10 (excellent). At least three years after the tonsillectomy, a telephone interview was carried out by a blinded person according to a specified and standardized questionnaire. The questionnaire is available from the authors. Besides actual complaints from the throat, the interview was focused on questions on satisfaction with the procedure and on obtaining an actual QoL score (1-10). In cases in which the interviewer was unable to contact the patients/parents, the questionnaire was sent by ordinary post. If the surgeons considered it necessary, both adenoidectomy and tonsillectomy were performed. Cases of tonsillectomy

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 TABLE 1

Various characteristics are compared between the responders (n = 386) and the non-responders (228). The p values achieved by the χ^2 test are listed in the right column.

Characteristic	Re- sponders	Non- responders	P value
Median age and range	8 years (1-49 years)	9 years (2-44 years)	0.4920
Gender: male/female	43%/57%	49%/51%	0.1060
Diagnosis:			0.3205
Hypertrophic tonsils	41%	44%	
Recurrent tonsillitis	16%	18%	
Chronic tonsillitis	13%	7%	
Combinations	30%	32%	
Smokers	6.4%	13%	0.0102
Unscheduled contacts	23%	25%	0.5714
Hospitalization	5.7%	4.4%	0.5076
Median Quality of Life score at surgery	7	7	0.7523

and tonsillectomies in cooperation with the local hospital were excluded from the study. Permission was obtained from the Danish Data Protection Agency.

Trial registration: none.

Statistics

The incidences of the various symptoms before and after tonsillectomy were compared as were also the QoL scores using the χ^2 test and Wilcoxon rank sum test. In case of normally distributed data, Student's t-test for paired data was applied.

RESULTS

Of the originally 614 included patients, 386 completed the study, i.e. the response rate was 63%.

No statistical differences were found between the responders and non-responders in terms of age, gender, diagnoses, unscheduled contacts and hospitalizations or quality of life (QoL) scores (**Table 1**). Significantly more patients were smokers among the non-responders than among the responders.

The patients' QoL prior to the tonsillectomy was scored by the patients/parents as well as the surgeons (**Figure 1**). In general, the surgeons noted higher QoL scores for the patients than the patients themselves (signed rank: 6,976, $p < 0.0001$). Thus, concordance between the scores was found in 40% of cases.

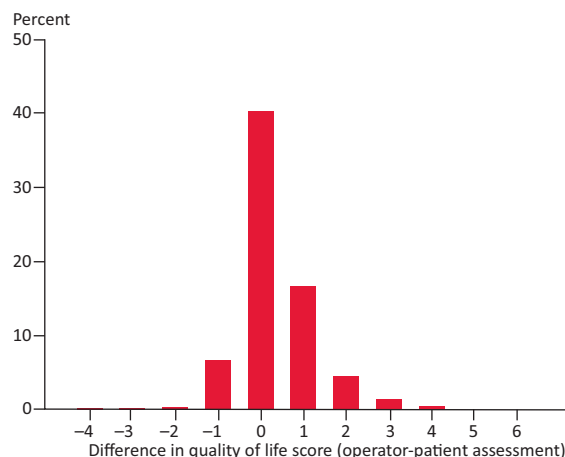
With regard to the long-term QoL scores, 89% of the patients indicated score eight, nine or ten. The differences between the pre- and post-operative scores are presented in **Figure 2**. Thus, 8.4% experienced a negative change (-1 to -6), 12% had unchanged scores, and 73% had better scores (+1 to +9) after surgery. The median QoL score among the 386 patients before surgery was seven compared with ten after surgery (signed rank: 23,560, $p < 0.0001$).

Overall, 93% of the patients were satisfied with the tonsillectomy (answered "yes" to the question: "Would you recommend the operation to others with similar symptoms"). 79% of the patients indicated to be completely free of their former symptoms and 16% had partly recovered from their symptoms, whereas 2.3% stated that their situation had not improved in any way.

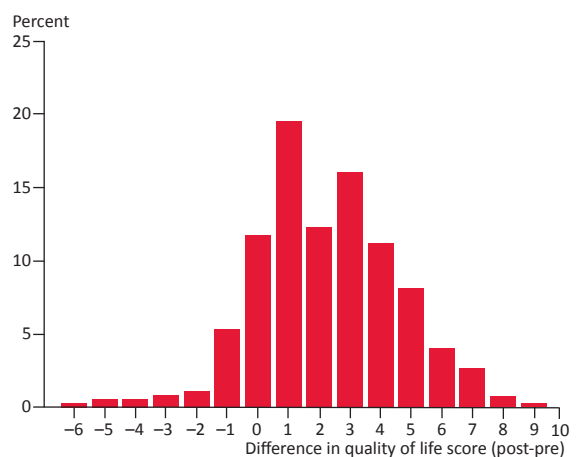
The overall incidence of acute throat infections among the responders had decreased significantly after

 FIGURE 1

The differences in the quality of life scores between the patients/parents and the surgeon prior to tonsillectomy (n = 614).


 FIGURE 2

Differences in quality of life scores indicated by the patients before-after tonsillectomy (n = 386)



tonsillectomy (χ^2 : 13.1385, $p = 0.0003$). 22% still had at least one episode per year and 5% of those without acute infections in the history prior to surgery had developed such complaints in the long term. The incidence of acute rhinitis was unchanged after tonsillectomy (χ^2 : 1.0737, $p = 0.3001$).

Besides recurrent acute tonsillitis, hypertrophic tonsils giving rise to sleep disordered breathing like snoring and apnoea (> 10 seconds) was also an indication for tonsillectomy. In general, these symptoms were significantly reduced postoperatively ($11.0537 < \chi^2 < 19.5845$, $p < 0.0009$), (Table 2). However, 29% complained about snoring and/or apnoea (6%) when responding to the postoperative questionnaire. 7% indicated that snoring had developed or worsened after surgery. Comparison with the preoperative questionnaires demonstrated that 4% developed snoring and 2% apnoea during the follow-up.

The long-term prevalence of various throat-related symptoms appears from Table 2. Seven to 25% of the responders complained about at least one of the listed symptoms. Between one and 46% of these patients claimed that the symptoms had developed or worsened after surgery corresponding to 1-8% of the entire group of responders. Comparison with the preoperative questionnaires unveiled that in 8-11% of the cases, these symptoms had not been present before the tonsillectomy. Many of the symptoms were consistent with chronic pharyngitis/laryngitis. In this context, the patients at risk were significantly older (adults) than those without these symptoms ($p < 0.050$). Furthermore, patients operated due to chronic tonsillitis tended to complain more frequently about chronic pharyngitis/laryngitis than patients with other diagnoses. This trend, however, was not statistically significant ($p > 0.0811$). As regards smoking, the relatively low number of smokers among the responders did not allow for statistical analysis of this subgroup.

DISCUSSION

The present study has demonstrated a general satisfaction (93%) with elective outpatient tonsillectomy in Danish ENT practices. The surgery significantly improved patients' QoL, also in the long term. Thus, 95% had recovered completely or partly from their symptoms. The incidence of acute throat infections declined significantly as did the prevalence of sleep-disordered breathing. On the other hand, various throat-related symptoms had developed in approximately 10% of the patients.

Being a long-term study carried out more than three years after tonsillectomy, the obtained response rate of 63% is acceptable. For comparison, previous studies of tonsillectomy with follow-ups between 16 and 76 months reported response rates of 26-85% [1, 4-6,



TABLE 2

The status at least three years after tonsillectomy. Percentage of patients presenting symptoms of pharyngitis/laryngitis, swallowing problems, snoring and apnoea are listed out of a total of 386 patients (left column). The percentage of the patients in whom the symptoms developed or worsened after surgery is shown in the right column.

Symptom	Percentage of 386 patients	Developed/worsened after tonsillectomy. Percentage of 386 patients
Sleep quality		
Snoring	29	2.0
Apnoea	6	0.5
Pharyngitis		
Dryness of the mouth/throat	14	6.5
Sense of foreign body	13	3.4
Urge to clear the throat	19	8.0
Laryngitis		
Voice fatigue	9	2.6
Hoarseness	11	2.6
Voice change	25	7.3
Swallowing		
Aspiration	5	1.8
Not normal food	14	0.8
Obstruction	7	2.3

11]. The highest rates were achieved in the short term. Statistical comparison between non-responders and responders in our study revealed no significant differences except for a higher proportion of smokers among the non-responders than among the responders. This may be explained by a tendency towards relatively more men in the non-respondent group combined with the fact that more men than women were smokers.

The 93% satisfaction with the tonsillectomy in the present study is comparable to the 88-91% reported elsewhere [9, 16, 17]. Very few have focused on outpatient tonsillectomy without involvement of hospital facilities. Thus, with the aim of testing the attitude towards outpatient tonsillectomy prior to adopting this procedure in their unit, Kubba and Messersmith found such a change to be impractical based on the fact that the majority of parents of tonsillectomized children were opposed to it [17]. Our study clearly demonstrates that outpatient tonsillectomy is feasible and that it yields outcomes which are in line with those obtained by hospitalisation. Meanwhile, it is essential to emphasize that strict selection criteria have to be respected to identify patients suitable for day-care surgery [14, 15].

Several studies have addressed QoL by various measures in patients being tonsillectomized [2-6]. Regardless of age and indication, QoL is generally reported to improve after tonsillectomy. Good correlations between QoL scored by children and parents have been found [2], whereas none have focused on compar-

Hypertrophy of the tonsils causing mechanical and obstructive symptoms (source: temporarily appointed consultant Tejs Ehlers Klug, ENT Department, Aarhus University Hospital).



ing the scores provided by the surgeon and the patient/parent. We observed a clear tendency towards an overestimation of the patient's QoL by the surgeons, a finding that may influence the process of shared decision-making and which calls for further investigation. The long-term assessment of QoL demonstrated an improvement in 73% of the patients. This appears to be lower than some of the results obtained in other studies [2-6]. The reason for this discrepancy may be differences in the length of follow-up, the age of the patients and the method applied for measurement of QoL. Especially the length of the follow-up is known to influence the outcome measures after tonsillectomy. Thus, the positive effects have been found to decline with time in most studies [1, 3, 7, 8].

In accordance with the literature, 79% of our patients claimed to be completely without their former symptoms from the throat after the tonsillectomy, and 16% had improved [1, 3, 7-12]. It is a general finding that some patients have persistent or worsened symptoms, while others develop new symptoms [1, 9, 12]. We had the possibility to test the agreement between the patient's long-term and their pre-operative answers with regard to whether a symptom was new or not. Thus, in 8-11% symptoms had developed after surgery. For instance, 4% of the patients developed snoring and 2% apnoea, and 5% of those formerly without acute throat infections had long-term complaints about this. Symptoms of chronic pharyngitis/laryngitis were more prevalent among adults and in case of chronic tonsillitis.

There may be several reasons for the persistence, worsening, recurrence or development of symptoms after tonsillectomy. It has been proposed that removal of the tonsils might harm the immune system and cause a condition of chronic pharyngitis/laryngitis. On the other hand, it has been postulated that tonsillectomy would be beneficial in case of chronic or recurrent tonsillitis due to inadequate immune function of the palatine tonsils. However, tonsillectomy has presently not been

proven to have any significant effect on the immune system [1]. It might be that diffuse symptoms of chronic inflammation are present pre-operatively in the upper airway, but that they are dominated by symptoms from the tonsils. Removal of the tonsils may not influence the remaining inflamed structures, leaving the patients with symptoms from these, i.e. chronic pharyngitis/laryngitis. In addition, conducting a follow-up three years after tonsillectomy may have inflicted certain changes among the patients. For instance, development of overweight could have caused snoring and apnoea, and smoking habits as well as age-related voice changes and upper airway allergy may induce symptoms of pharyngitis/laryngitis. It is therefore of utmost importance to adapt the patient's expectations to the possible outcome before deciding on tonsillectomy. The indication for surgery should follow strict criteria. It is well known that there is a spontaneous reduction in episodes of acute throat infections with age/time; thus, tonsillectomy has only a mild or no effect on patients suffering from few episodes of acute throat infections per year [1, 7, 8, 11]. Accordingly, there is a tendency towards watchful waiting in case of mild to moderate symptoms of throat infection, and tonsillectomy recommendations presently stipulate more than seven episodes during the past year; five episodes per year during the past two years; or three episodes per year the past three years [1]. Sleep-disordered breathing has become the most frequent indication for tonsillectomy, but this condition also calls for awareness. Other co-morbidity than hypertrophic tonsils influences the presence of snoring and apnoea, and attention should be paid to this since such cases may need hospitalisation and not day-care surgery, including further diagnostics [1, 3, 12].

CONCLUSIONS

Long-term results of elective outpatient tonsillectomy in Danish ENT practices are convincing and comparable to international standards in terms of QoL and relief of symptoms. Thus, outpatient tonsillectomy appears to be a safe procedure. Strict criteria and shared decision making including thorough information to the patient/parents are essential and necessary elements of the procedure.

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