

## Factors affecting quality-of-life impact of adult tonsillectomy

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### Abstract

**Objective:** To assess the quality of life of adult patients with recurrent tonsillitis after tonsillectomy, and to determine predictive factors for patient satisfaction.

**Methods:** In a prospective cohort study, a Glasgow benefit inventory questionnaire was posted to 70 adult patients six months after tonsillectomy for recurrent tonsillitis. Data were obtained on patient characteristics, risk factors, tonsillitis history, and clinical and operative findings. The patients were also assessed using self-completed diary data collection regarding acute symptoms (i.e. fever, throat pain, cough and rhinitis), tonsillitis episodes and visits to a doctor, either three to six months before tonsillectomy or six months after tonsillectomy. Predictive factors were sought for inclusion in the worst 30<sup>th</sup> percentile of patients (i.e. Glasgow benefit inventory score under 18), regarding post-operative change in quality of life.

**Results:** Sixty-two patients (40 females, 22 males; age range 15–46 years) returned the questionnaire (response rate 89 per cent). The mean total Glasgow benefit inventory score after tonsillectomy was +26 (standard deviation 14). The mean scores for Glasgow benefit inventory subscales were: general health +25 (standard deviation 18), social functioning +5 (standard deviation 14) and physical functioning +55 (standard deviation 23). The only factors associated with low patient satisfaction were a small number of tonsillitis episodes (diary-based data) and days with fever before tonsillectomy.

**Conclusions:** Adult patients with recurrent tonsillitis seemed to be generally pleased with their tonsillectomy. The more symptoms they had prior to surgery, the greater was their improvement in quality of life. No other patient- or disease-related factors were associated with patient satisfaction.

**Key words:** Tonsillitis; Tonsillectomy; Quality Of Life; Adult

### Introduction

Tonsillectomy is often performed for recurrent tonsillitis in young adults,<sup>1</sup> but opinions vary on whether this procedure should be used for this purpose. Early research suggests that, in the short term, tonsillectomy results in a reduced number of streptococcal and other tonsillitis episodes and fewer days with a sore throat.<sup>2</sup> Apart from symptoms, recurrent tonsillitis episodes may impair a patient's life by causing missed working days, extra medical appointments and recurrent antibiotic treatment. A significant improvement in quality of life has been reported in adult patients with chronic or recurrent tonsillitis, following tonsillectomy.<sup>3–6</sup> Improvement has been seen in patients' general health as well as in their physical and social functioning. However, little is known about whether such improvement in quality of life is similar for all patients or whether there are patient- or disease-related factors which

affect patient satisfaction after tonsillectomy. Such information would help physicians to identify the right candidates for surgery.

The objective of this study was to determine the influence of tonsillectomy on the quality of life of adult patients suffering recurrent tonsillitis, and to determine any predictive factors for patient satisfaction.

### Patients and methods

#### Patients

A prospective cohort study of adult patients with recurrent tonsillitis was conducted. Patients were recruited in a tertiary care ENT referral centre (Oulu University Hospital). Seventy consecutive adult patients with recurrent episodes of streptococcal tonsillitis, who were referred between October 2001 and May 2005 and who fulfilled the entry criteria, were enrolled.

The study inclusion criteria comprised three or more episodes of tonsillitis in six months or four episodes in 12 months. The patient's symptoms and signs during these episodes had to be typical of streptococcal tonsillitis, and the episodes had to be severe enough for the patient to seek medical attention. At least one such episode had to be group A streptococcal infection proved by a positive rapid antigen test or culture.

The exclusion criteria were: ongoing antibiotic treatment for another reason; any possibility that recurrence was due to non-compliance with treatment; history of peritonsillar abscess; major airway or heart disorder or bleeding diathesis making same-day surgery unfeasible; age under 15 years; and residence outside the city of Oulu or the neighbouring eight communities.

All the patients provided written, informed consent. The study protocol was approved by the Oulu University Hospital ethics committee.

### *Follow up*

Background data on patient characteristics, risk factors and tonsillitis history were obtained and the patients were examined at first appointment. After being assigned to a waiting list, all patients underwent tonsillectomy under general anaesthesia as day surgery. Four experienced ENT surgeons performed total extracapsular tonsillectomy using blunt or diathermy dissection. Details of the tonsillectomy procedures were recorded.

Six months after their operation, the changes in patients' quality of life were assessed. A published Glasgow benefit inventory questionnaire was used for this purpose. This questionnaire measures patient benefit and was developed especially for otolaryngological interventions.<sup>7</sup> The Glasgow benefit inventory questionnaire includes 18 questions about changes in quality of life after an intervention. In scoring the Glasgow benefit inventory, the responses to all 18 questions are averaged so that all questions have equal weight. The average score is then transposed onto a continual benefit scale ranging from -100 to +100. A score of -100 indicates maximal negative benefit, a score of 0 indicates no benefit at all, and a score of +100 indicates maximal positive benefit to the patient's quality of life. Combined total Glasgow benefit inventory scores for quality of life changes after tonsillectomy can then be calculated. To achieve more accurate information about quality of life, the Glasgow benefit inventory subscale scores for general benefit, social support and physical benefit can also be calculated.<sup>7</sup> The Glasgow benefit inventory instrument was validated in Finnish by forward translation, reconciliation, back translation and pilot testing.<sup>8</sup>

In order to obtain more accurate data on patient symptoms, diary data were also collected. We aimed to compile diary data on infections both before and after tonsillectomy, to inform quality-of-life analyses. In order to achieve comparable response rates from patients with pre- and with post-operative diaries, patients were instructed

to complete either one or the other. Of the 70 patients, 36 randomly selected patients were advised to record their acute symptoms (i.e. fever, throat pain, cough and rhinitis), episodes of tonsillitis and visits to the doctor for six months after their tonsillectomy date. The other 34 patients were advised to collect the same data before their tonsillectomy date (during their time on the waiting list). At the follow-up visit, the diaries were collected and checked for completeness.

### *Statistical methods*

Descriptive data are given as means with standard deviation (SD) or as medians with ranges. The chi-square test was used to compare categorical variables and the Mann-Whitney U test to compare continuous variables. The group of patients who were least pleased six months after their tonsillectomy was determined on the basis of the total Glasgow benefit inventory quality-of-life score. A cut-off point of 18 was used for this purpose, as a score of less than 18 represented the worst 30<sup>th</sup> percentile of patients regarding post-operative quality of life. Survival curves, related to post-operative change in quality of life, were constructed according to the Kaplan-Meier method, starting from the date of first follow up.<sup>9</sup> Differences between the groups were tested with the log rank test.

### **Results**

Of the 70 patients, 62 returned a completed Glasgow benefit inventory quality-of-life questionnaire (giving a response rate of 89 per cent). Of these patients, 40 (65 per cent) were female and 22 male (35 per cent), and the mean age was 26 years (range 15-46 years). There were no significant differences in patient characteristics, infections or operative characteristics, comparing respondents and non-respondents (data not shown). Of the respondents, 34 kept a post-tonsillectomy diary and 28 a pre-tonsillectomy diary. The mean length of diary-based follow up was 171 days (SD 11) post-tonsillectomy and 160 days (SD 69) pre-tonsillectomy.

### *Quality of life after tonsillectomy*

The mean total Glasgow benefit inventory score after tonsillectomy was +26 (SD 14). The mean scores for Glasgow benefit inventory subscales were: general health +25 (SD 18); social functioning +5 (SD 14); and physical functioning +55 (SD 23). Nineteen (30 per cent) patients were classified as least pleased according to their post-operative Glasgow benefit inventory questionnaire response.

### *Factors affecting quality of life after tonsillectomy*

Age, gender, tobacco use, history of allergy and various risk factors for tonsillitis were all similar, comparing the least pleased group and the others (Table I). Similarly, the number of previous episodes of tonsillitis reported at enrolment did not differ between the two groups.

TABLE I

DEMOGRAPHIC AND BASELINE CHARACTERISTICS OF 62 ADULTS UNDERGOING TONSILLECTOMY FOR RECURRENT TONSILLITIS, BY POST-OPERATIVE QUALITY OF LIFE

Characteristic	Post-op QOL		<i>p</i> **
	Least pleased* <sup>†</sup>	Others <sup>‡</sup>	
Age (mean (SD); years)	27 (9)	26 (7)	0.77
Female gender	12 (63)	28 (65)	0.88
Tobacco use	5 (26)	17 (40)	0.32
Allergy history	3 (16)	12 (28)	0.60
Frequent throat pain	4 (21)	13 (30)	0.55
<i>Tonsillitis risk factors</i>			
>4 people in family	5 (26)	14 (33)	0.62
Similar infections in family	5 (26)	11 (26)	1.00
Recurrent respiratory infection	4 (21)	17 (40)	0.16
<i>Prev acute tonsillitis episodes</i> (mean (SD); <i>n</i> )			
Past 6 months	3.2 (1.7)	3.4 (1.3)	0.44
Past 12 months	4.7 (2.6)	5.0 (1.7)	0.13

Data represent patient number (percentage) unless otherwise stated. \*Glasgow benefit inventory<sup>7</sup> score of <18, six months post-tonsillectomy, representing the worst 30<sup>th</sup> percentile. <sup>†</sup>*n* = 19; <sup>‡</sup>*n* = 43. \*\*By chi-square for categorical variables and Mann-Whitney U test for continuous variables. Post-op QOL = post-operative quality of life; SD = standard deviation; prev = previous

In contrast, the number of all tonsillitis episodes and of days with fever recorded by patients during the pre-tonsillectomy period was significantly lower in the least pleased patients compared with the others (Table II). This difference between the two groups was also evident in the time to the first tonsillitis episode (Figure 1a). Similarly, the number of medical consultations for tonsillitis and number of days with sore throat and cough all tended to be lower in the least pleased group. After tonsillectomy, the number of tonsillitis episodes and of days with sore throat and fever recorded in patients' diaries declined similarly in both groups (Table II), and the time to the first post-operative tonsillitis episode was similar in the two groups (Figure 1b).

There were no significant differences between the two groups regarding: the quality of the tonsils at pre-operative evaluation; type of operation (blunt or electrodissection); time in the operating theatre; amount of blood loss; occurrence of complications (e.g. post-operative bleeding); or operative findings (Table III).

## Discussion

### Principal findings

We found that tonsillectomy improves the quality of life of adult patients suffering from recurrent tonsillitis. There was a significant improvement in quality of life according to all the Glasgow benefit inventory subscales, indicating that patients gained benefits in addition to general health (i.e. benefiting in social and physical terms also). The most important factor predicting patient satisfaction as well as improvement in quality of life was morbidity before tonsillectomy. Patients who suffered only spasmodic

TABLE II

DIARY DATA\* ON PRE- AND POST-TONSILLECTOMY MORBIDITY IN 62 ADULTS UNDERGOING TONSILLECTOMY FOR RECURRENT TONSILLITIS, BY POST-OPERATIVE QUALITY OF LIFE

Morbidity parameter	Post-op QOL		<i>p</i> <sup>§</sup>
	Least pleased <sup>†‡</sup>	Others**	
<i>Pre-tonsillectomy</i>			
All tonsillitis episodes	1.4 (1.8)	2.5 (1.9)	0.04
Medical consults for tonsillitis	0.5 (1.1)	1.0 (1.0)	0.09
Days with sore throat	9.1 (15.4)	14.1 (12.1)	0.07
Days with fever	1.0 (3.2)	3.3 (3.0)	0.01
Days with rhinitis	9.1 (12.9)	8.1 (13.0)	0.88
Days with cough	0.3 (0.9)	3.8 (6.5)	0.08
<i>Post-tonsillectomy</i>			
All tonsillitis episodes	0.8 (1.3)	0.6 (0.8)	0.71
Medical consults for tonsillitis	0.1 (0.3)	0.2 (0.4)	0.66
Days with sore throat	4.2 (6.4)	3.2 (5.1)	0.69
Days with fever	0.6 (1.7)	0.7 (1.6)	0.39
Days with rhinitis	7.8 (10.6)	6.3 (5.6)	0.57
Days with cough	3.1 (4.2)	2.6 (3.1)	0.95

Data represent mean number (standard deviation (SD)). \*Mean length of diary-based follow up was 160 days (SD 69) pre-tonsillectomy and 171 days (SD 11) post-tonsillectomy. <sup>†</sup>Glasgow benefit inventory<sup>7</sup> score of <18, six months post-tonsillectomy, representing the worst 30<sup>th</sup> percentile. <sup>‡</sup>*n* = 19; \*\**n* = 43. <sup>§</sup>Mann-Whitney U test. Post-op QOL = post-operative quality of life

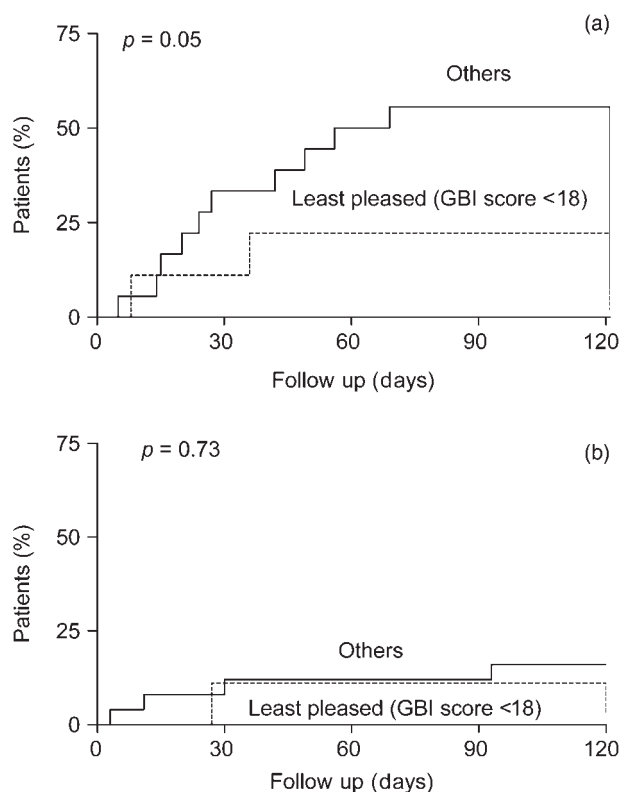


FIG. 1

Times to first tonsillitis episode (a) before and (b) after tonsillectomy, in 62 adults with recurrent tonsillitis, according to post-operative quality of life (assessed by Glasgow benefit inventory score six months after tonsillectomy, separating the least pleased group (score <18) from the others (score >18). Differences tested by log rank test.

TABLE III

CLINICAL AND OPERATIVE CHARACTERISTICS OF 62 ADULTS UNDERGOING TONSILLECTOMY FOR RECURRENT TONSILLITIS, BY POST-OPERATIVE QUALITY OF LIFE

Characteristic	Post-op QOL		<i>p</i> **
	Least pleased*†	Others‡	
Time in OT§ (mean (SD); min)	51 (17)	52 (17)	0.91
Blood loss (mean (IQR); ml)	5 (5–5)	5 (5–20)	0.46
Post-operative complication#	2 (12)	1 (2)	0.13
<i>Pre-operative tonsil quality</i>			0.17
Merely large	4 (21)	3 (7)	
Chronically infected	1 (5)	7 (16)	
Scarred	14 (74)	33 (77)	
<i>Operative technique</i>			0.77
Blunt dissection	6 (32)	12 (28)	
Diathermy dissection	13 (68)	31 (72)	
<i>Operative findings</i>			0.63
Scarred tonsils	16 (84)	34 (79)	
Extracapsular microabscesses	2 (11)	8 (19)	
Granulating, infected tonsils	1 (5)	1 (2)	

Data represent patient number (percentage) unless otherwise stated. \*Glasgow benefit inventory<sup>7</sup> score of <18, six months post-tonsillectomy, representing the worst 30<sup>th</sup> percentile. †*n* = 19; ‡*n* = 43. \*\*By chi-square for categorical variables and Mann–Whitney U test for continuous variables. §Data missing for one patient and excluded for two who underwent other, additional procedures. #Two cases of mild secondary bleeding (no transfusion needed) treated with electrocautery, plus one case of ward treatment for severe post-operative throat pain. Post-op QOL = post-operative quality of life; OT = operating theatre; SD = standard deviation; IQR = interquartile range

tonsillitis episodes and infrequent throat pain and fever during the three to six months before tonsillectomy, according to their diaries, were less satisfied six months after the operation, compared with patients who had suffered more frequent attacks and symptoms. In contrast, post-tonsillectomy improvement in quality of life was not influenced by: patient morbidity levels during the six months after tonsillectomy (based on diaries); patient demographics or any other background data; or the size or quality of the tonsils assessed pre- or peri-operatively.

#### Comparison with other studies

Our finding of improved post-tonsillectomy quality of life in adult patients with recurrent tonsillitis confirms the findings of several earlier studies. Bhattacharyya *et al.* and Schwentner *et al.* demonstrated significant improvement in the total Glasgow benefit inventory score and in all subscale scores after tonsillectomy in adult patients.<sup>3,6</sup> Similar results were detected in another two studies, with the exception of an insignificant social functioning subscale benefit.<sup>5,10</sup> Besides altered quality-of-life scores (using tools such as the Glasgow benefit inventory), several retrospective studies have demonstrated significant reductions in the use of antibiotics, visits to the doctor and number of missed working

days.<sup>4,11,12</sup> Little is known about the factors affecting patient satisfaction after tonsillectomy. However, younger adult patients have been found to perceive greater surgical benefit than older patients,<sup>5</sup> and this benefit seems to be independent of the surgical technique used.<sup>6</sup>

#### Study strengths and weaknesses

Our prospective study design allowed us to collect more accurate diary data on symptoms both before and after tonsillectomy. On analysis, this facility was seen to be important as, unlike the diary-based information, the reported number of prior tonsillitis episodes was not associated with an improvement in quality of life post-tonsillectomy.

As the response rate to the mailed quality-of-life questionnaires was reasonably high (89 per cent) and the non-respondents did not significantly differ from the respondents regarding their baseline characteristics and severity of symptoms before or after tonsillectomy, a noteworthy selection bias is not probable.

Alterations in patients' quality of life were surveyed six months after tonsillectomy, which may involve some recall bias. However, retrospective assessment of quality of life after an intervention appears to provide information that is more sensitive to change and more highly correlated with patient satisfaction, compared with serial change data.<sup>13</sup>

- **A significant improvement in quality of life has been reported for adult patients undergoing tonsillectomy for chronic or recurrent tonsillitis**
- **Little is known about whether the improvement in quality of life is similar in all patients, or whether there are patient- or disease-related factors which affect patient satisfaction after tonsillectomy**
- **In this study, patients with more pre-operative symptoms had a larger improvement in post-operative quality of life. No other patient- or disease-related factors were associated with post-operative patient satisfaction**
- **Diary-based collection of morbidity data proved superior to patient recall when determining which patients were likely to benefit from tonsillectomy**

The change in quality of life was measured using the Glasgow benefit inventory score, which has been demonstrated to be quite sensitive to the impact of otolaryngological interventions.<sup>7</sup>

The sample size was relatively small, but still enabled us to find significant predictors for post-operative change in quality of life.

As we recruited only patients who suffered from recurrent tonsillitis episodes, our results are not generalisable to patients whose tonsillar disease encompassed merely halitosis, bad taste in the mouth and tonsillar debris.

### Implications

According to the present results, carefully selected adult patients who suffered from recurrent tonsillitis were quite pleased with their tonsillectomy. Infective symptoms prior to surgery were the only predictive factor for patient satisfaction after tonsillectomy; this fact emphasises the importance of obtaining as accurate information as possible about the patient's past throat infections and symptoms. As patients' anamnestic pre-operative information was not accurate enough to predict post-operative improvement in quality of life, the exact dates of prior tonsillitis episodes, number of antibiotic courses and results of rapid antigen tests and throat cultures could be utilised when tonsillectomy was considered. Thus, patients without clear surgical indications for tonsillectomy could be advised to keep a diary of their acute tonsillitis symptoms for a few months, in order to help assess whether tonsillectomy is a suitable treatment. According to the present results, fever and throat pain were the most useful recorded symptoms. Naturally, physicians and patients must decide together whether the clinical benefits of tonsillectomy outweigh the risks involved.

### Conclusions

Our adult patients with recurrent tonsillitis seemed to be generally pleased with their tonsillectomy six months after the operation. The more symptoms they had prior to surgery, the larger was their improvement in quality of life. No other patient- or disease-related factors were associated with patient satisfaction. Diary-based collection of morbidity data proved to be superior to the patient's memory; thus, patients without clear indications for tonsillectomy could be advised to keep an exact diary of their infective symptoms for several months, in order to assess whether they are likely to benefit from tonsillectomy.

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