The Journal of Laryngology & Otology (2013), ***127***, *332–338*.
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doi:10.1017/S0022215113000273

REVIEW ARTICLE

Does tonsillectomy improve quality of life in adults? A systematic literature review

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Abstract

Aim: To determine whether tonsillectomy improves quality of life in adults suffering from chronic or recurrent tonsillitis.

Method: A systematic literature search of the Medline and Pubmed databases was conducted in order to identify all relevant studies measuring quality of life directly.

Results and Conclusion: Eight studies were identified. The Glasgow Benefit Inventory and the Short Form questionnaire were the main tools used to assess quality of life changes. Tonsillectomy is likely to improve the overall quality of life as it particularly improves patients' physical and general health. The social benefits of tonsillectomy appear to be non-significant. The effects are likely to be long-lasting and have a greater impact on younger patients. The presence of coexisting chronic conditions and the severity of infective symptoms due to tonsillitis are also influencing factors.

Key words: Tonsillectomy; Quality of Life; Tonsillitis

Introduction

Tonsillectomy (i.e. removal of the tonsils) is one of the most common operations performed worldwide.[1] Although chronic or recurrent tonsillitis is not a life-threatening condition, it can significantly affect the patient's quality of life (QoL): chronic sore throat can cause many days of missed work, halitosis can cause social embarrassment, and treatment can be a significant economic burden.

Quality of life is a measure of wellness.[2] Wellness depends not only on good health but also on social and physical factors. It should not be confused with 'patient satisfaction', which is closely related to how satisfied the patient is with the level of service received.

Reliable measurement, quantification and interpretation of QoL after tonsillectomy is of the utmost importance as it can indicate the effectiveness of the procedure.[3] Moreover, patients' appraisal of the effectiveness of their tonsillectomy should not be ignored. Such appraisal can help determine whether tonsillectomy is worth having, especially since significant post-operative pain is involved. Thus, it is important to have robust evidence in order to confidently state to patients whether or not a tonsillectomy will improve their QoL.

However, although the effects of tonsillectomy have been studied extensively in children, in adults and adolescents this is not the case. Existing studies attempting to measure post-tonsillectomy QoL changes in adults are few, small and mostly retrospective. There are even fewer studies of adolescents. This means that adult tonsillectomy due to chronic or recurrent tonsillitis is still a controversial procedure, without fully established benefits or (long-term) cost-effectiveness.

The benefits of tonsillectomy for certain conditions (e.g. malignancies) are undisputed. Hence, this review is limited to tonsillectomies performed for chronic or recurrent tonsillitis, with or without coexisting conditions.

This systematic literature review analysed the evidence from studies which directly measured QoL changes. It aimed to determine whether tonsillectomy improves QoL in adults suffering from chronic or recurrent tonsillitis.

Methods

An initial database search was conducted to exclude the possibility of existing or planned reviews on our study topic.

We then conducted a systematic search of the Medline and PubMed databases up until the third week of November 2011. We utilised a search strategy using combinations of text words and Medical Subject

Accepted for publication 25 June 2012 First published online 1 March 2013

https://doi.org/10.1017/S0022215113000273 Published online by Cambridge University Press

Heading terms relating to 'tonsillectomy', 'quality of life' and 'adult' (defined for the purposes of this review as older than 15 years) (see Table I). We limited accepted studies to those published in the English language. Further relevant papers were then identified in an iterative fashion by searching through the bibliographies of the identified studies. Articles which cited the included studies were also identified and assessed. The search string was reviewed and refined several times in this way. No attempt was made to hand-search journals or theses or to find unpublished literature. Figure 1 shows the process of study selection, as well as the inclusion and exclusion criteria.

Retrospective studies were deemed appropriate for inclusion. We believed it was necessary to obtain patients' subjective, retrospective views of their QoL post-tonsillectomy in order to determine the long-term effectiveness of the procedure. Furthermore, one of the most widely used, validated and ENT-specific surveys, the Glasgow Benefit Inventory, assesses QoL changes retrospectively.[3]

Studies that did not assess QoL directly (e.g. those assessing patient satisfaction only) were excluded.

Results

General

Eight studies were identified, the earliest published in 2002 and the latest in 2010 (Table II).[4,5] We identified no randomised, controlled trials published on our review topic.[11]

Table III shows an evaluation of the surveys used.

All eight studies reported a general improvement in QoL after tonsillectomy in adults (Table II).[4–11] Several studies had a relatively low response rate, below 50 per cent.[4,6–8] This could possibly have contributed to a selection bias, since patients with an improvement in their QoL may be more likely to respond.

TABLE I
SEARCH STRING

1 exp Tonsillectomy/ (7006)
2 tonsillectom*.mp. (8341)
3 *tonsillectomy/ (4840)
4 1 or 2 or 3 (8341)
5 exp "Quality of Life"/ (97106)
6 "quality of life".mp. (147498)
7 "QoL".mp. (13644)
8 5 or 6 or 7 (148114)
9 4 and 8 (135)
10 exp Adult/ (5034215)
11 adult.mp. (3918657)
12 exp Adolescent/ (1468679)
13 adolescent.mp. (1476703)
14 youth.mp. (26071)
15 exp Young Adult/ (192289)
16 young adult.mp. (207094)
17 10 or 11 or 12 or 13 or 14 or 15 or 16 (5739066)
18 9 and 17 (65)
19 limit 18 to English language (60)

Studies using the Glasgow Benefit Inventory

Bhattacharya *et al.* demonstrated a significant improvement in QoL (total score, +27.54; $p < 0.001$).[4] This improvement was mostly accounted for by the general health component of the Glasgow Benefit Inventory (+35.74; $p < 0.001$). However, the patients' QoL change was measured only once. A 'snapshot' of overall change in QoL does not reflect internal fluctuations.[13] Thus, a trend could not be established.

In contrast to Bhattacharya *et al.*, Baumann *et al.* reported no significant change in the social functioning subscale of the Glasgow Benefit Inventory ($p = 1$).[6] This study had a higher response rate (42 per cent) and a bigger sample size ($n = 109$) than Bhattacharya *et al.*, so its results are likely to be more reliable. However, this study was conducted in Germany, with surveys in German, so cultural and translation issues may have influenced the results.

Schwentner and colleagues' Glasgow Benefit Inventory results all showed an improvement in QoL. However, in the 'hot tonsillectomy' subgroup the p values for these changes (i.e. 0.214, 0.085, 0.848, 0.941; see Table II) were all above the accepted 0.05 threshold; thus, these results cannot be regarded as statistically significant (p values for the 'cold tonsillectomy' subgroup were not reported). It is also worth noting that the range of patient ages in this study was reported to be 60 years. Even though this might enable wide-ranging conclusions, it is unlikely that young adults in their 20s would have the same perceptions as patients in their 70s. Therefore, the clinical significance of some of this study's findings can be questioned.

Richards *et al.* narrowed their patient age range to young adults (i.e. 15–25 years).[8] This potentially allowed these authors to make specific observations on that particular age group. Agreeing with Baumann *et al.*, and in contrast with Bhattacharya *et al.*, Richard and colleagues' social functioning subscale results indicated a non-significant change, and thus the possibility of no social benefit from tonsillectomy. Even though this study was smaller in size, with only 40 patients, the resultant loss of statistical power may have been compensated for by its narrower age range. All other subscale scores, and the total score, indicated a significant QoL improvement. In particular, Pearson's coefficient for both the total score and the general health subscale score was 0.96, indicating a nearly linear correlation.

In contrast with some aspects of the above studies, Koskenkorva and colleagues' study had certain strengths, including a response rate of 89 per cent and a relatively narrow age range (15–46 years).[9] In addition, the study design also included some prospective emphasis, with diary data collected pre-operatively as well as post-operatively. Although this study reported the largest increase in QoL post-tonsillectomy (+35.2), confidence intervals (CIs) were not reported.

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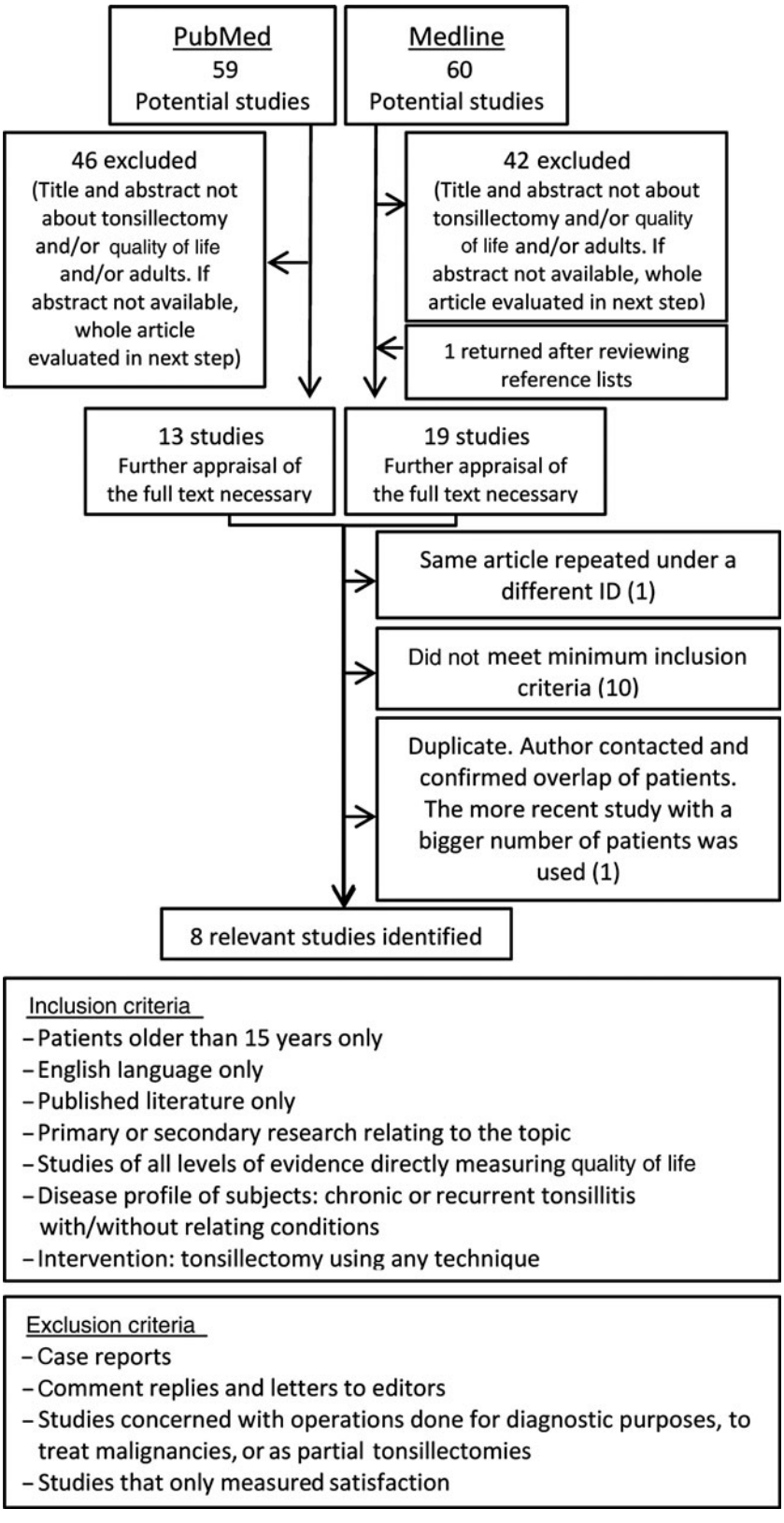

FIG. 1
Study selection criteria.

Similarly, Senska *et al.* had an 85 per cent response rate, which should, in theory, improve the validity of their results.[5] In addition, this study's statistical power was more substantial as it was one of the largest studies, with 97 participants. Similarly to most other studies, there was no substantial improvement in social functioning subscale scores. Senska and colleagues' report was the third study in our review to

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TABLE II
REVIEW RESULTS

Study	Country & year of publication	Type	Survey	Resp (%)	Size (*n*)	Glasgow Benefit Inventory											Short Form								
						Total			General health			Physical function			Social function			6 months				1 year				
						Score Δ	±95% CI	*p*	Score Δ	±95% CI	*p*	Score Δ	±95% CI	*p*	Score Δ	±95% CI	*p*	Physical CS		Mental CS		Physical CS		Mental CS	
																		Score Δ	*p*	Score Δ	*p*	Score Δ (±95% CI)	*p*	Score Δ (±95% CI)	*p*
Bhattacharya *et al.*[4]	USA, '02	Cohort	GBI	30	83	27.54	4.63	<0.001	35.74	5.33	<0.001	6.83	4.83	0.003	15.46	5.55	<0.00								
Baumann *et al.*[6]	Germany, '06	Cohort	GBI	42	109	16.9	2.9	<0.001	12.9	3.9	<0.001	46.6	8.6	<0.001	0	2.8	1								
Schwentner *et al.*[7]	Austria, '07	Cohort	GBI	38	HT 40	11.62	4.7	0.214	8.7	5.6	0.085	30.42	13.3	0.848	2.99	5.6	0.941								
					CT 187	15.78	2.6	–	14.8	2.7	–	31.8	5.9	–	2.75	2.7	–								
Richards *et al.*[8]	Australia, '07	Cohort	GBI	39	47	35.2	3.4	<0.001	37.8	3.9	<0.001	54.4	5.9	<0.001	5.05	2.83	>0.05								
Koskenkorva *et al.*[9]	Finland, '09	Cohort	GBI	89	62	26	–	–	25	–	–	55	–	–	5	–	–								
Senska *et al.*[5]	Germany, '10	Cohort	GBI	85	97	19	–	–	18	–	–	39	–	–	0.17	–	–								
Ericsson *et al.*[10]	Sweden, '07	Cohort	SF-36	97	43																	10.1 (8.7)	<0.001*	2.9 (14.7)	NS*
Wilsell *et al.*[11]	USA, '08	Cohort	SF-12	56	40													7.6		3.2		7.7	<0.0001†	1.3	<0.0001†

For Glasgow Benefit Inventory (GBI), scale of –100 to +100, positive values indicate quality of life (QoL) improvement; for Short Form questionnaires (SF; i.e. SF-12 and longer version SF-36), positive values indicate QoL improvement. *Compared with baseline; †compared with 6-month individual component summary (CS) score. Resp = response rate; CI = confidence interval; Δ = change from baseline; HT = 'hot tonsillectomy' subgroup (method of tonsillectomy not analysed); CT = 'cold tonsillectomy' subgroup (method of tonsillectomy not analysed); – = data not supplied; NS = not significant

TABLE III
SURVEY EVALUATION

Glasgow Benefit Inventory
✓ Validated
✓ ENT-specific
✓ In addition to global QoL outcomes, assesses general health, physical functioning and social functioning outcomes
✓ Sensitive to QoL changes
✓ Gives overall, retrospective evaluation of patient's subjective perception of QoL change, regardless of contributory factors (thus, makes above, valid limitations irrelevant)[12]
✗ Retrospective assessment of QoL changes
✗ Risk of recall bias: studies using GBI often ask patients to compare their pre-tonsillectomy QoL, ≥1 year post-tonsillectomy
✗ No consideration of placebo effect of tonsillectomy (inflating perceived QoL improvement)[6]
Short Form 36 & 12 questionnaires
✓ Prospective QoL measures[11] enabling valid comparison with baseline and thus better understanding of QoL factors
✗ Generic, not ENT-specific

✓ = strength; ✗ = weakness; QoL = quality of life; GBI = Glasgow Benefit Inventory

show very little change in social QoL post-tonsillectomy. It should be noted that this study was aimed at a German-speaking population within Germany. All other subscales scores, and the total score, indicated a substantial improvement in QoL; in particular, scores were +39 for physical functioning, compared with +19 for total score. Moreover, the authors' graphical representation of results showed that the 95 per cent CIs for the total score and the general health subscale score included 0, indicating that the statistical significance was uncertain. In contrast, original graphical representation of the 95 per cent CI for the physical functioning subscale score indicated a robust positive improvement.

Studies using the Short Form questionnaire

Ericsson and colleagues' study used the Short Form-36 questionnaire, and reported a significant improvement (10.1 units, $p < 0.001$) in the physical component summary score one year post-operatively.[10] In contrast, the mental component summary score showed no statistically significant change. This study had an astonishing response rate of 97 per cent and a narrow age range (16–25 years). Thus, there was greater potential for more accurate conclusions. However, the sample size was small ($n = 43$), even if it was prospectively observed.

Witsell *et al.* used the Short Form-12 questionnaire both at six months and one year post-tonsillectomy.[11] This study design enabled possible trends to be charted. The physical component summary score showed a similar improvement to that reported by Ericsson *et al.*, and remained stable between 6 and 12 months (being 7.6 and 7.7, respectively). The mental component score showed a decrease in positive QoL change, compared with baseline (being +3.2 at 6 months but +1.3 at 1 year). Unlike all the other studies, this study involved multiple centres and therefore could be expected to have eliminated any influencing factors specific to individual institutions.

Discussion

Possible limitations

Our literature search included English language papers only and was confined to published studies; thus, a publication bias could have arisen. We identified no randomised, controlled studies of our research topic.[11] However, the retrospective views of patients are crucial in determining treatment effectiveness and should always be taken into consideration; for this reason, retrospective studies were deemed appropriate for inclusion. No statistical meta-analysis was attempted in this review because the small number of studies and missing CIs did not permit it.

Lessons learned

Performing tonsillectomy as a treatment for chronic or recurrent adult tonsillitis has been described as controversial.[1] This is primarily because, from a medical point of view, the evidence supporting the benefits of the procedure is thin. However, most of the available studies, despite some limitations, show that patients rate their overall QoL as better after tonsillectomy. The studies that did not fully agree with this conclusion tended to have small sample sizes and low response rates.

In addition, different types of surveys demonstrated consistent improvement in QoL. This helps to remove the uncertainty introduced by each method's limitations.

More importantly, as shown by the relevant studies, these QoL improvements are long-standing and relatively stable over time.[10,11] Some of the included studies demonstrated that the identified improvement in QoL was associated with a decrease in antibiotics usage, physician visits and missed work days.[4,5] These effects contribute to the cost-effectiveness of the procedure.[4]

Another interesting finding was the significantly larger QoL change in the younger patients (i.e. less than 30 years old) compared with older patients.[6,8] This age-related difference could possibly be due to the value placed by younger patients on their physical well-being.

Furthermore, it is important for clinicians to recognise that individual circumstances and morbidity before tonsillectomy can affect patients' QoL perceptions. Schwentner *et al.* reported that the Glasgow Benefit Inventory score improvement for patients with concurrent chronic disease (i.e. total score, +6.7; 95 per cent CI, 0.7–12.7; $p = 0.004$) was significantly lower than that of patients without chronic disease (i.e. total score, +16.6; 95 per cent CI, 14.3–18.9; $p = 0.004$). Koskenkorva *et al.* compared their 'least pleased group' (i.e. the lower 30 per cent of patients) to their 'more pleased group'. They found

https://doi.org/10.1017/S0022215113000273 Published online by Cambridge University Press

that days with fever and number of tonsillitis episodes prior to surgery were the only predictive factors of the former cohort's differences in QoL. This suggests that the infective aspects of chronic or recurrent tonsillitis are important predictors of tonsillectomy's effectiveness, from the patient's point of view.

In the reported studies, improvements in physical functioning subscale scores and general health subscale scores had an almost linear relationship with overall QoL improvements.[8] This is perhaps not surprising for a procedure aimed primarily at improving health. However, the social benefits of tonsillectomy appeared to be ambiguous.[6,8,10] This could reflect the fact that the morbidity of chronic or recurrent tonsillitis might not have a significant impact on patients' social lives.

Translation into clinical practice

A pragmatic dilemma for patients is whether the benefits of tonsillectomy outweigh the risks. Crucially, clinicians should now be able to advise patients that their overall QoL is likely to improve and the effects could be long-lasting. In particular, patients' general and physical health is likely to improve significantly; however, the effect on their social QoL is still uncertain. Patients with coexisting chronic conditions are likely to benefit less. More importantly, those patients with more severe infective symptoms due to tonsillitis will probably perceive a greater improvement in their QoL. Overall, tonsillectomy is likely to be cost-effective for adult patients, their employers and the health service treating them.

Currently, out of the aforementioned factors affecting QoL outcomes, one – severity of infective symptoms – is incorporated into national practice as an indication for tonsillectomy.[14] The Scottish Intercollegiate Guidelines Network suggests the following as indications for tonsillectomy: sore throat due to tonsillitis; seven or more significant and adequately treated sore throat episodes in the preceding year, or five or more episodes in each of the preceding two years, or three or more episodes in each of the preceding three years; and adverse effect of sore throat episodes on normal daily functioning.[14]

Improvement in QoL is an important long-term factor, but it should not be the only factor directing the decision of whether to offer tonsillectomy (as a treatment for chronic or recurrent tonsillitis). Tonsillectomy, like any surgery, carries an inherent risk; therefore, consideration of the patient's safety should always be the first priority. Figure 2 presents the relative importance of factors affecting tonsillectomy decision-making over time.

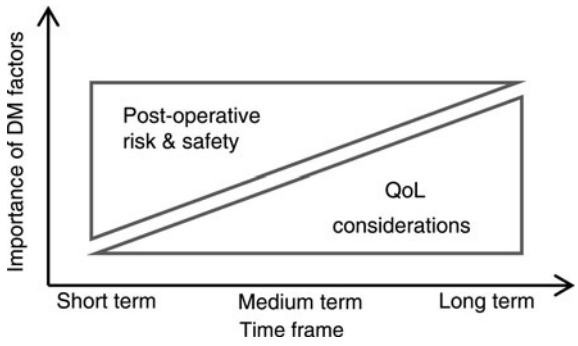

FIG. 2

Relative importance of factors affecting tonsillectomy decision-making over time. DM factors = factors influencing decision-making

Conclusion

Effective provision of health care is increasingly affected by the need for prudent allocation of scarce resources. Therefore, decisions on whether to perform tonsillectomy as treatment for chronic sore throat should be made based on the chances of surgical success. The long-term success of tonsillectomy largely depends on patients' QoL improvement.

Tonsillectomy has been described as a controversial procedure because its long-term benefits have not been established in adults suffering from chronic or recurrent tonsillitis; most of the current evidence has been extrapolated from children's data. However, several relatively small studies have tried to identify and measure the long-term benefits of tonsillectomy in terms of QoL changes in adult patients.

This review collates and critically appraises all the available studies that directly measure QoL, and attempts to present a complete assessment of evidence on QoL changes.

The identified literature provides consistent evidence that tonsillectomy is likely to produce a long-lasting, continuous improvement in adult patients' general QoL (even if the specific social benefits are ambiguous). The review also analyses factors contributing to this improvement: patients with coexisting chronic conditions are likely to benefit less, while younger patients and those with more severe infective symptoms due to tonsillitis are likely to benefit more.

- **Adult tonsillectomy is controversial as its long-term benefits (re chronic tonsillitis) are not established**
- **This review appraises evidence on quality of life (QoL) after adult tonsillectomy**
- **There is evidence of prolonged, cost-effective QoL improvement**
- **Patients with coexisting chronic conditions benefit less**
- **Younger patients and those with more severe infective symptoms benefit more**

These factors could be incorporated into routine hospital practice; they should also be communicated to patients to help them form their own opinions on the costs and benefits of tonsillectomy.

https://doi.org/10.1017/S0022215113000273 Published online by Cambridge University Press

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Mr N Andreou takes responsibility for the integrity of the content of the paper
Competing interests: None declared

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