Application of the Paediatric Throat Disorders Outcome Test (T-14) for tonsillectomy and adenotonsillectomy

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ABSTRACT

INTRODUCTION The T-14 questionnaire is a validated patient reported outcome measure (PROM) used to assess the value of paediatric tonsillectomy from the patient's perspective. Tonsillectomy is a procedure under threat. As such, this study aimed to provide further evidence supporting the role of tonsillectomy in the management of recurrent tonsillitis and obstructive sleep apnoea.

METHODS A prospective uncontrolled observational study was undertaken examining 54 paediatric patients undergoing tonsillectomy at our institution. Parents of children having surgery were invited to complete a T-14 questionnaire preoperatively as well as at three and six months postoperatively.

RESULTS The questionnaire was completed for 52 of the 54 patients preoperatively as well as at 3 and 6 months postoperatively (96% response rate). The mean difference between the preoperative and six-month T-14 score was 31.8 ($p < 0.0001$). T-14 scores at three months were also significantly improved compared with those taken preoperatively (mean difference: 29.9, $p < 0.0001$).

CONCLUSIONS This is the first study in the literature to assess T-14 questionnaires at three and six months following paediatric tonsillectomy, providing evidence of the early benefit on PROMs. Tonsillectomy is the most common surgical procedure performed in the UK, and it is regarded highly by patients and otolaryngologists alike. This study provides significant evidence that tonsillectomy improves PROMs, thereby demonstrating its ongoing clinical value as a funded National Health Service procedure.

KEYWORDS

Tonsillectomy – Adenotonsillectomy – T-14 – Outcome – Paediatric – Throat

Accepted 08 March 2013

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In 2009 the Department of Health commissioned McKinsey & Company (a global consulting firm) to examine the spending practices of the National Health Service (NHS) and advise the UK government on future spending reductions.¹ It was concluded that a number of procedures with 'limited clinical benefit' were being performed within the NHS on a regular basis. In the final report published in March 2009, tonsillectomy appeared to top the list of 'relatively ineffective interventions', suggesting that this procedure could be reduced by between 10% and 90%, resulting in a maximum saving of £45 million.

As a direct result of the suggestion that otolaryngologists were unnecessarily performing surgery with no clear benefit, ENT UK published a position paper defending the recommendations for tonsillectomy.² This revealed that tonsillectomy procedures had in fact reduced from 77,604 operations in 1994–1995 to 49,187 in 2008–2009, a 37% re-

duction. The suggested cause for this reduction in operating was that surgeons are now using the best available evidence to refine the indications for surgical procedures and that surgery is currently only available to those who will gain maximum benefit from it.

These guidelines have been further advanced in the paediatric population by distribution of the Paediatric Throat Disorders Outcome Test (T-14), assessing patient reported symptom scores for tonsillitis and/or obstructive sleep apnoea (OSA).³ It is recommended for use prior to and following surgery in order to assess patient reported outcome measures (PROMs). The T-14 questionnaire (Fig 1) was validated through a prospective study conducted by Hopkins *et al* measuring scores both preoperatively and six months postoperatively, revealing tonsillectomy to be an excellent procedure for the reduction of patient related symptom scores in the paediatric population.³

This study aimed to provide further evidence supporting the role of tonsillectomy in the management of recurrent tonsillitis and OSA via its impact on PROMs, and, more specifically, the validated T-14 questionnaire. It is also the first published study to assess T-14 scores at three months following surgery, providing additional evidence of the potential early clinical benefit following paediatric tonsillectomy.

Methods

A prospective uncontrolled observational study was undertaken examining 54 paediatric patients undergoing tonsillectomy at Portsmouth Hospitals NHS Trust (10 March – 10 December 2012). Children (under 16 years old) were considered eligible if they were undergoing tonsillectomy for either recurrent tonsillitis as defined by the Scottish Intercollegiate Guidelines Network (SIGN) criteria⁴ and/or OSA. Parents of children undergoing surgery were invited to complete a T-14 questionnaire preoperatively as well as at three and six months postoperatively. Preoperative scores were collected on the day of surgery, with parents contacted by the first author (KK) to complete questionnaires at three and six months following surgery.

Prior to data collection, a power calculation was conducted (using the results of the validation study by Hopkins *et al*)⁵ to decide on a suitable sized study population. This preliminary calculation revealed the Hopkins study to be powered at over 90%. Therefore a similar sized population was used in this study in an attempt to provide an acceptable number of patients whilst also trying to compensate for possible bias (selection, study and expectation bias). This has therefore resulted in the presentation of a highly powered study (>90%). Data were collated and analysed using Excel® (Microsoft, Redmond, WA, US). Statistical analysis was performed in SPSS® version 20 (SPSS, Chicago, IL, US) using the independent samples t-test (statistical significance achieved at *p*<0.05).

Results

A total of 54 patients (25 male, 29 female) aged 2–15 years (mean age: 6 years) were included in the study. Questionnaires were completed for all 54 patients preoperatively and 3 months, with 52 patients studied at 6 months. This gave an overall response rate of 96%. Tonsillectomy was performed in 25 patients and adenotonsillectomy in 29. The indications for tonsillectomy

Table 1 Total T-14 scores preoperatively, and at 3 and 6 months postoperatively

	Patients	Mean total score	Range	SD	95% CI
Preoperatively	54	33.3	12–61	13.2	29.7–36.9
3 months	54	3.4	0–37	5.7	1.8–5.0
6 months	52	1.5	0–18	3.5	0.6–2.5

SD = standard deviation; CI = confidence interval

Table 2 Differences between T-14 scores preoperatively and at 3 months postoperatively as well as at 3 months and 6 months postoperatively

	Patients	Difference between preoperative and 3-month total score	95% CI of difference	p-value (t-test)	Difference between 3-month and 6-month total score	95% CI of difference	p-value (t-test)
Preoperatively	54	29.9	26.1–33.8	<0.0001			
3 months	54				1.9	0.1–3.7	0.04
6 months	52						

CI = confidence interval

were: 21 patients with recurrent tonsillitis, 14 with OSA and 19 with both symptoms

Table 1 shows the preoperative, three and six-month T-14 scores. There was a mean difference of 31.8 between the preoperative and six-month T-14 scores ($p<0.0001$). Table 2 reveals the difference in T-14 scores prior to surgery and at three months ($p<0.0001$) and at three months and six months ($p=0.04$). Figure 2 highlights the significant reduction in the total T-14 scores from preoperative scores to those at three and six months following surgery. Figure 3 illustrates the reduction in the total T-14 scores between the following groups: indications for tonsillectomy (recurrent tonsillitis, OSA or both), surgery (tonsillectomy or adenotonsillectomy), age category (≤ 5 or >5 years old) and sex. Although there was a statistically significantly drop in the total preoperative score compared with those at three and

six months ($p<0.001$), there was no significant difference between any of the groups identified in Figure 3 ($p>0.05$).

Discussion

Sore throat is an extremely common condition, accounting for approximately 35 million days lost from school and work per year in the UK.⁵ The numbers of tonsillectomies carried out has reduced drastically in the previous 50 years, from approximately 200,000 in the 1950s to 49,187 in 2008–2009.² However, despite the limiting of tonsillectomy surgery in recent years and restrictions on qualifying criteria for surgery (ie SIGN guidelines),⁴ tonsillectomy is still under threat as a funded NHS procedure. Therefore, more than ever, otolaryngologists require evidence that this procedure provides real benefit to patients, enabling ongoing continued funding to be available.

PROMs assess quality from the patient’s perspective. They provide a measurable score indicating a patient’s health status or health related quality of life and can be used to assess the value of a surgical procedure. There are a number of currently available PROMs in the field of otolaryngology on the ENT UK website (<http://www.entuk.org/>), with the T-14 questionnaire being freely available.

In the context of this study, there was a highly statistically significant reduction in the preoperative T-14 score compared with that at three and six months postoperatively ($p<0.0001$). The difference between the T-14 score at three months compared with at six months was also statistically significant ($p=0.04$), revealing ongoing clinical improvement following surgery.

These results reveal that tonsillectomy has had a significant impact on the health related quality of life of these paediatric patients and that this difference is evident from the early postoperative period (three months). Following this, there is another significant improvement in scores between three and six months, with the final mean T-14 score com-

Figure 3 Total T-14 scores preoperatively, and at 3 and 6 months postoperatively linked to indications for tonsillectomy (A), surgical procedure undertaken (B), age category (C) and sex (D)

ing to only 1.5, slightly higher than the score of completely asymptomatic children (0.78).⁵

There are a number of studies investigating the effects of tonsillectomy on subsequent tonsillitis symptoms, most commonly examining the numbers of sore throat episodes following surgery.⁶ In 2009 a Cochrane review summarised this objective clinical evidence for tonsillectomy, concluding that adenotonsillectomy/tonsillectomy is effective in reducing the number of episodes of sore throat in children, with gain being more marked in those most severely affected.⁷ Despite this, in the literature, there are currently very few PROM studies assessing the impact of tonsillectomy, with only one study assessing the validated T-14 questionnaire on symptom scores, prior to and following tonsillectomy.⁵ This study by Hopkins *et al* outlines for the first time

the T-14 tool as well as validation evidence for its use as a PROM in otolaryngology.⁵ They revealed a preoperative mean score of 24.0 (33.3 in this study), dropping to 7.01 (1.5 in this study) six months following surgery.⁵

The results presented in our study are similar to those of Hopkins *et al*⁵ in that the drop is highly statistically significant. However, our results revealed an initially higher patient symptom score combined with a lower overall score following surgery. This difference may be due in part to better patient selection (ie only selecting those with significant disease likely to improve with surgery). Another important difference between our study and that of Hopkins *et al*⁵ is in our measurement of the T-14 score at both three and six months following surgery, thereby revealing the clear benefits of tonsillectomy to be evident almost immediately

as well as showing continued benefit up to the six-month point. We felt that the significant improvement in symptoms as early as three months (and continuing up to six months) was an important observation.

PROMs are likely to become more widespread in their use, especially for procedures deemed to be of limited clinical value. As a result, audit of such PROMs will be an important ongoing process. By revealing significant improvements following tonsillectomy at three months, junior doctors would be encouraged to audit such procedures within the space of their usual four-month attachments, together with increasing the likelihood of collecting the data following surgery (parents are more willing to cooperate, less likely to move out of the area etc). This will therefore be of direct benefit to all who may wish to study paediatric tonsillectomy outcome measures in the future.

This study also includes an age (≤ 5 or > 5 years), sex and surgical procedure (tonsillectomy or adenotonsillectomy) subanalysis, revealing there to be no significant difference in the benefits of tonsillectomy across these differing demographics. This again provides evidence that tonsillectomy is a highly useful procedure in the management of paediatric patients, fulfilling current guidelines for surgical intervention irrespective of age, surgical procedure (tonsillectomy or adenoidectomy), sex and referral indication.

Study limitations

The T-14 questionnaire assesses quality of life and symptom reported patient scores from the perspective of the patient's legal guardian. Bias is likely to be a limiting factor due to the subjective and indirect way in which the scores are obtained. Although slightly biased, the results are still valid as

a means of assessing the value of a surgical procedure from the patient's rather than surgeon's viewpoint, providing ongoing evidence of the positive impact of this procedure.

Conclusions

PROMs are essential for monitoring the success of surgery from the patient's perspective. This is even more important given the introduction of the Health and Social Care Act 2012, placing patients at the heart of the NHS and highlighting clinical outcomes as a key driver of future quality assurance. Tonsillectomy is the most common surgical procedure performed in the UK, highly regarded by patients and otolaryngologists alike. This study provides significant evidence that tonsillectomy improves PROMs, thereby demonstrating its ongoing clinical value as a funded NHS procedure.

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