A five-year follow-up observational study of the T-14 paediatric throat disorders outcome measure in tonsillectomy and adenotonsillectomy

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ABSTRACT

INTRODUCTION The T-14 questionnaire is a validated outcome measurement tool to assess the value of paediatric tonsillectomy from a parent's perspective. There is a paucity of data regarding the long-term postoperative effects of tonsillectomy on quality of life in the paediatric population. Our previous study assessed T-14 scores up to year 2 postoperatively, with this study extending follow-up to 5 years.

MATERIALS AND METHODS We undertook a prospective uncontrolled observational study examining 54 paediatric patients undergoing tonsillectomy at Portsmouth Hospitals NHS Trust. Parents of children undergoing surgery were invited to complete a T-14 questionnaire preoperatively, as well as at 3 months, 6 months, 1 year, 2 years and now 5 years postoperatively.

RESULTS In total, 44 of 54 patients completed questionnaires preoperatively and at all postoperative time points, with 46 being completed at 5 years. There was a highly significant ($P < 0.001$) difference between the preoperative scores and all other measured T-14 scores postoperatively. The mean score preoperatively was 33.3 compared with 1.0 at 5 years.

CONCLUSIONS This is the first study to assess long-term quality of life following paediatric tonsillectomy using the T-14 questionnaire. The benefits of tonsillectomy on long-term quality of life further confirms its value within the paediatric population.

KEYWORDS

Tonsillectomy – Quality of life – Outcome measures

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Introduction

Amidst growing financial pressures in 2009, the Department of Health (DoH) commissioned McKinsey & Company to analyse spending practices within the NHS.¹ In their controversial report, the company deemed some procedures to be 'relatively ineffective', suggesting that decommissioning them would create savings of £300–700 million in England alone.² Tonsillectomy topped the list of 'procedures of limited clinical value' (PLCV, a term coined later by NHS managers) and the report proposed a reduction in these procedures of between 10% and 90%.^{2,5} ENT UK responded by releasing a position paper to highlight the benefits of tonsillectomy in selected patients and in 2016 revised the clinical indications for this procedure.^{4,5} However, more robust long-term postoperative evidence is required to prevent further restrictions on NHS funding for tonsillectomy.

The T-14 questionnaire is a validated outcome measure tool used to gauge the value of paediatric tonsillectomy, based on the answers provided by the patient's parent/guardian.^{6,7} In 2015, we published the findings of the paediatric throat

disorders outcome measure (T-14) questionnaire for tonsillectomy patients at 1 and 2 years postoperatively.⁸ This followed our original study in 2013, which compared T-14 scores at 3 and 6 months following tonsillectomy.⁹ Both studies demonstrated the overwhelming benefits of tonsillectomy to patients' quality of life. This current study provides further long-term evidence to support the role of paediatric tonsillectomy in the management of recurrent tonsillitis and/or obstructive sleep apnoea. It is also the first published study to assess T-14 scores at 5 years following surgery.

Materials and methods

Study design

We undertook a prospective uncontrolled observational study examining 54 consecutive paediatric patients undergoing tonsillectomy or adenotonsillectomy at Portsmouth Hospitals NHS Trust from 10 March to 10 December 2012. This was undertaken as an audit of clinical practice, approved and registered with the clinical audit and research department at the Queen Alexandra Hospital, Portsmouth NHS Foundation Trust. Patients under 16 years

Table 1 Total T-14 scores preoperatively and up to 5 years postoperatively.

	Participants <i>n</i> (% follow-up)	Mean total score	Range	Standard deviation	95% confidence interval
Preoperative	54 (100%)	33.3	12–61	13.2	29.7–36.9
Postoperative:					
3 months	54 (100%)	3.4	0–37	5.7	1.8–5.0
6 months	52 (96%)	1.5	0–18	3.5	0.6–2.5
1 year	50 (93%)	2.1	0–21	4.1	1.0–3.2
2 years	44 (81%)	1.5	0–18	3.4	0.5–2.4
5 years	46 (85%)	1.0	0–13	2.4	0.25–1.7

of age were considered eligible if they were undergoing tonsillectomy for either recurrent tonsillitis, as defined by the Scottish Intercollegiate Guidelines Network (SIGN) criteria,¹⁰ and/or obstructive sleep apnoea. Parents of children undergoing surgery were invited to complete the T-14 questionnaire preoperatively, at 3 and 6 months and 1, 2 and 5 years postoperatively. Preoperative scores were collected on the day of surgery, with parents contacted via telephone by the first author (KK) to complete questionnaires for all subsequent postoperative time points.

Statistical analysis

As stated in the previous 2-year follow-up study,⁸ we conducted a power calculation, using the results of the original T-14 validation study by Hopkins *et al.*⁷ The number of patients that we recruited resulted in a highly powered study (greater than 90%). Data were collected and analysed using Excel®. Statistical analysis was performed in SPSS® version 20, using the independent samples t-test. Statistical significance was achieved at a *P*-value of less than 0.05.

Figure 1 Total T-14 scores preoperatively and up to 5 years postoperatively. Statistical analysis was performed using t-tests, 0.05 (*) and 0.001 (***).

Figure 2 Total T-14 scores preoperatively and up to 5 years postoperatively, subdivided for indications for tonsillectomy (top left), surgical procedure undertaken (top right), age category at time of surgery (bottom left) and sex (bottom right). Statistical analysis was performed using t-tests, with no statistical differences identified between the four subgroups in the postoperative scores.

Results

In total, 54 patients (25 male, 29 female) undergoing surgery between the ages of 2 and 15 years (mean age 6 years) were included. 46 patients completed the postoperative questionnaires at 5-years, resulting in a response rate of 85%. Tonsillectomy was performed in 25 patients and adenotonsillectomy in 29. The indications for surgery included 21 patients with recurrent tonsillitis, 14 with obstructive sleep apnoea and 19 suffering from both conditions.

Table 1 shows the T-14 scores preoperatively and up to 5 years postoperatively. There was a highly significant reduction in T-14 scores at all postoperative time points ($P < 0.001$). The lowest mean score was obtained at 5 years. Figure 1 demonstrates the significant reduction in

preoperative T-14 scores compared with 3 and 6 months, as well as 1, 2 and 5 years postoperatively. Figure 2 shows the reduction in T-14 scores between the following groups: indications for tonsillectomy (recurrent tonsillitis, obstructive sleep apnoea or both), surgical procedure (tonsillectomy or adenotonsillectomy), age category at the time of surgery (≤ 5 or > 5 years) and sex. There was no significant difference in the postoperative scores between any of the four subgroups identified in Figure 2 ($P > 0.05$).

Discussion

We have shown previously that T-14 scores reduce significantly in paediatric patients at 3 and 6 months, as well as at 1 and 2 years following tonsillectomy.^{8,9} The present

study, the first of its kind within the literature, further emphasises the significant benefit of tonsillectomy on quality of life after 5 years. There are few studies assessing quality of life following adenotonsillectomy. One of the largest and most well-known is the Childhood Adenotonsillectomy Trial (CHAT), a multicentre randomised control trial of 464 children with obstructive sleep apnoea aged 5–9 years.¹¹ This trial showed that at 7 months of follow-up, children randomised to adenotonsillectomy had a significantly better quality of life, as measured by the Paediatric Quality of Life Inventory, compared with the children randomised to watchful waiting ($P < 0.001$). They also displayed improved behaviour and polysomnographic findings; however, the study failed to show significantly improved attention or executive function as measured by neuropsychological testing. Further studies of obstructive sleep apnoea and infective tonsillitis in children have also highlighted significantly improved quality of life scores following tonsillectomy, although the follow-up period for these studies was limited to a maximum of 12 months, and they mainly focused on children with obstructive sleep apnoea as opposed to recurrent tonsillitis.^{2,3,14,15}

This study is unique within the literature in its ability to study children with obstructive sleep apnoea and infective tonsillitis. Furthermore, it provides long-term follow up at 5 years following surgery, the first study within the literature to do so. With the number of tonsillectomy procedures undertaken having dropped by 44% between 1991 and 2011, and the number of admissions for infective episodes and complications rising,¹⁶ it is of paramount importance that the positive long-term value of this procedure is highlighted.

Study limitations

The T-14 questionnaire assesses quality of life from the perspective of the patient's legal guardian. This is prone to bias, owing to the inherently subjective way in which these scores are obtained. This study did not include a control group, so comparison with conservative management is not possible.

Conclusions

Tonsillectomy is the most common surgical procedure performed in the UK and it is highly regarded by patients and

health professionals alike. This study is the first of its kind to provide further evidence that tonsillectomy improves patients' quality of life up to 5 years following surgery, and thereby demonstrates its ongoing clinical value as a funded NHS procedure.

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