

Social distancing reduces rates of recurrent tonsillitis in the paediatric population; a retrospective study of 44 children during the COVID-19 outbreak

Elliot Heward¹, John Roche¹, B. Nirmal Kumar¹, and Steve Izzat¹

¹Wrightington Wigan and Leigh NHS Foundation Trust

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Abstract

* There was a significant reduction in tonsillitis episodes and antibiotic requirement during the 2-month lockdown period in comparison with 2 months prior to lockdown * Household smoking did not seem to affect tonsillitis frequency in this study * In 70% of cases parents wanted their child's tonsillectomy during the coronavirus outbreak * Viral exposure is possibly a key factor in the pathophysiology of recurrent tonsillitis * Social distancing measures may reduce the frequency of tonsillitis

Social distancing reduces rates of recurrent tonsillitis in the paediatric population; a retrospective study of 44 children during the COVID-19 outbreak

Key Points

- There was a significant reduction in tonsillitis episodes and antibiotic requirement during the 2-month lockdown period in comparison with 2 months prior to lockdown
- Household smoking did not seem to affect tonsillitis frequency in this study
- In 70% of cases parents wanted their child's tonsillectomy during the coronavirus outbreak
- Viral exposure is possibly a key factor in the pathophysiology of recurrent tonsillitis
- Social distancing measures may reduce the frequency of tonsillitis

Key words : Tonsillitis, Coronavirus, COVID-19, Tonsillectomy, Social distancing

Introduction

Background/Rationale

The current outbreak of coronavirus (COVID-19) has forced a significant change in the delivery of services throughout the National Health Service (NHS) in the United Kingdom (UK). The majority of elective operations have been deferred to allow increased inpatient capacity for patients with COVID-19, allow surgeons to support critical care delivery and to reduce the risk of cross-infection to protect elective patients, staff and visitors. Postponing elective surgery has led to longer waiting lists in England with the median waiting time to elective treatment in April 2020 at 12.2 weeks compared with 7.2 weeks in April 2019⁽¹⁾. This is likely to continue to worsen causing a decrease in the quality of life (QoL) of our patients and an increase in the incidence of associated disease sequelae.

Tonsillectomy is the most common elective procedure undertaken in the field of Ear, Nose and Throat (ENT) surgery within the UK. It makes up 17% of the elective workload and costs £68 million per year. The most common indications for tonsillectomy or tonsillotomy are recurrent tonsillitis and Obstructive Sleep Apnoea (OSA).

It has previously been demonstrated that a proportion of the paediatric population with recurrent tonsillitis will recover whilst on the waiting list for surgery. Prim et al found that 18.6% of their patients on their waiting list no longer fulfilled the criteria for tonsillectomy; the average waiting time was 10.8 months. Woolford et al contacted patients who had been on their waiting list for longer than 9 months and found that 27% of their paediatric population no longer required tonsillectomy. As such it can be deduced that a proportion of children, with recurrent tonsillitis, will spontaneously resolve over time. It is not known however how to identify this subset of the waiting list accurately.

The pathophysiology of recurrent tonsillitis in children has focussed on the microbiome of the pharynx. Cultivation studies have demonstrated numerous pathogenic bacteria in the pharynx in asymptomatic children and in those with recurrent tonsillitis. Similar studies have demonstrated latent viral reservoirs which also may play a role. It has been shown the Epstein Barr Virus (EBV) is reactivated in astronauts as a result of the stressors of spaceflight and it is understood that the virus' life cycle is regulated by both cellular and viral factors. There is a lack of research surrounding the role that viral load, within the patient's surroundings and how social distancing may affect the pathophysiology of recurrent tonsillitis. The recent COVID-19 outbreak, within the UK, has led to numerous public health measures to reduce human contact. Schools have been shut to the majority of pupils and the population has been advised to keep a distance of 2 metres apart unless residing in the same household.

Objectives

We recognised the burden of delayed elective procedures on future resources within Ear, Nose and Throat surgery and as such conducted a service evaluation of our paediatric patients on our waiting list for tonsillectomy to treat recurrent tonsillitis. Our primary aim was to assess if patients were still suffering from recurrent tonsillitis and secondary aim to see if their parents or guardians wished to proceed with the operative intervention in spite of the coronavirus outbreak.

Materials and Methods

Study Design

This cross-sectional single centre retrospective study surveyed the parents of children ([?]16 years) on the tonsillectomy waiting list for recurrent tonsillitis 2 months after the coronavirus lockdown. Parents were asked a standardised questionnaire created by the authors prior to study commencement. Duration on waiting list was defined as date listed to 25/05/2020. The service evaluation was registered with the local audit department. The coronavirus lockdown period was defined as 23/03/2020-17/05/2020 and 2 months previous to lockdown as 27/01/2020-22/03/2020. The STROBE reporting guideline was used.

Setting

Phone call consultations were performed between 25/05/2020-28/05/2020. Parents were called a second time on a consecutive day if no response after the first call.

Participants

Patients were identified from the tonsillectomy waiting list on 25/05/2020 and patient demographics were collected from the electronic health information system. Three children had continued to attend school during the lockdown period so were excluded from the results.

Statistical Methods

Statistical analysis was performed on GraphPad Prism version 8.0. An unpaired T test was used for comparison of different groups and a paired T test was performed assess the differences in tonsillitis episodes and antibiotic use in the period prior to and during lockdown. Parametric testing was used, and a statistical significance was defined as $p < 0.05$. Data is displayed as mean and standard error of the mean (SEM).

Results

Participants

Of the 69 children on the waiting list for tonsillectomy 44 responded and did not attend school or nursery during lockdown. The mean child age at listing was 7.6 years (range 1.9 - 14.9 years). The cohort contained 20 females and 24 males. The mean number of days on the waiting list was 144.2 days (range 62 - 279 days) and tonsillitis episodes 12 months prior to lockdown was 8.25 (range 3 - 18 episodes). All patients met the SIGN criteria for tonsillectomy (Figure 1)⁽⁹⁾. Four patients had also been diagnosed with concurrent obstructive sleep apnoea, no patients were immunosuppressed, had diabetes or cardiac disease.

Main Results

The number of tonsillitis episodes experienced during the lockdown 2 months (mean 0.84 SEM 0.17) was significantly less than in the 2 preceding months (mean 1.80 SEM 0.17) ($p=0.0001$) (Figure 2). In terms of antibiotic requirement for tonsillitis, there was a significant decrease in patient use from the 2 months prior to lockdown (70% of patients) versus the 2 months of lockdown (32% of patients) ($p=0.0002$). None of the patients attended hospital during the lockdown period as a result of tonsillitis compared with 4 patients in the prior 2 months. No patients suffered a tonsillitis related complication in either period.

The average number of children per household was 2.3. There was no significant difference in the number of children per household in the cohort of children who suffered with tonsillitis during the lockdown (2.4 per household) compared to those who were tonsillitis free (2.2 per household) ($p>0.05$).

All parents wanted to go ahead with the tonsillectomy when asked. Parents were asked whether they would like their child's tonsillectomy to be during the COVID-19 outbreak or after the outbreak. Thirty-one parents were happy for their child's tonsillectomy to occur during the COVID-19 outbreak with 13 wanting to postpone until after the outbreak (Figure 3). The group who elected to delay their procedure until after the outbreak had a significantly lower average number of tonsillitis episodes during the lockdown than the group who wanted surgery during the outbreak (0.08 vs 1.6 episodes respectively, $p=0.0001$). This was not the case for the 2 month period prior to lockdown ($p>0.05$) (Figure 4).

Other Analyses

In households where smoking was present there was no significant difference in the number of tonsillitis episodes per year (8 episodes/year) compared to non-smoking households (8.31 episodes/year) ($p>0.05$).

Discussion

Key Results

This service evaluation has demonstrated a significant reduction in recurrent tonsillitis in our paediatric patients following the introduction of Public Health measures designed to reduce the spread of COVID-19. We hypothesise that social distancing and repeated hand washing will have led to reduced viral exposure in this population; which could be the driving factor behind this reduction in recurrent tonsillitis rates.

In addition to the reduced rate of tonsillitis during the lockdown period, we have demonstrated that antibiotic demand for acute tonsillitis was significantly less and presentations to hospital fell during the lockdown period. The reduced frequency of tonsillitis and public concern regarding hospital attendance during the COVID-19 outbreak may have contributed to these changes.

Household smoking has been linked to increased risk of developing recurrent tonsillitis in adults⁽¹⁰⁾. In our population there was no difference in the number of episodes of tonsillitis per year for children living in households with or without smokers. In the paediatric population passive smoking may not be as irritative to the mucosa of the upper airway as active smoking seen in adults.

It could be assumed that families' with more children in the household would have a higher risk of developing tonsillitis due to viral exposure from their siblings during the lockdown period. Our results have shown this is not the case and that the number of siblings in a household did not increase the risk of developing tonsillitis

during lockdown. The lockdown family ‘bubble’ seems to have limited infection from external sources so preventing transmission between siblings.

Despite the reduction in rates of recurrent tonsillitis all parents and guardians wanted to proceed with tonsillectomy with the majority preferring an operative date during the COVID-19 outbreak. This could be as a result of the relatively short period of improvement that their child has experienced when compared to the overall course of their disease. The results show that those who wanted to postpone their operation date until after the COVID-19 outbreak had significantly less episodes of tonsillitis during the lockdown period than those who wanted to proceed during the outbreak (figure 4). This likely explains the differing parental decision.

We were unable to reduce the burden on our waiting list as a result of this evaluation as all parents/guardians opted to proceed with the tonsillectomy in spite of reduced episodes of recurrent tonsillitis and the COVID19 pandemic.

Limitations

There were however limitations to this study as we compared two subsequent time periods and seasonal variation in tonsillitis rates has been demonstrated previously. This methodology was chosen to improve recall of tonsillitis episodes and achieve a more accurate rate of retrospective data collection. Anecdotally the rates of tonsillitis are thought to increase during the winter months but there is little data to support this. We also know that a proportion of children will recover from episodes of recurrent tonsillitis whilst on the waiting list and this needs to be taken in to account when interpreting our findings.

Conclusion

These findings demonstrate that viral exposure is possibly a key factor in the pathophysiology of recurrent tonsillitis and that social distancing measures may reduce the frequency of recurrent acute tonsillitis. Passive smoking and number of siblings doesn’t seem to make children more prone to recurrent tonsillitis. Interestingly the majority of parents wanted their child’s tonsillectomy during the coronavirus outbreak. Those parents who were in favour of postponing their child’s procedure were likely influenced by a reduced frequency of tonsillitis episodes during lockdown.

References

1. NHS England and NHS Improvement. Referral to treatment (RRT) Waiting Times England. [Cited 2020 June 21] Available From: <https://www.england.nhs.uk/statistics/statistical-work-areas/rtt-waiting-times/rtt-data-2020-21/#Apr20>
2. Marshall A. Ear, Nose and Throat Surgery GIRFT Programme National Speciality Report. GIRFT 2019.
3. Hallenstal N, Sunnergren O, Ericsson E, Hemlin C, Hessen Soderman AC, Nerfeldt P, et al. Tonsil surgery in Sweden 2013-2015. Indications, surgical methods and patient-reported outcomes from the National Tonsil Surgery Register. *Acta Otolaryngol* 2017; 137:1096-1103.
4. Prim MP, de Diego JI, Larrauri M, Diaz C, Sastre N, Gavilan J. Spontaneous resolution of recurrent tonsillitis in pediatric patients on the surgical waiting list. *Int J Pediatr Otorhinolaryngol* 2002; 65:35-38.
5. Woolford TJ, Ahmed A, Willatt DJ, Rothera MP. Spontaneous resolution of tonsillitis in children on the waiting list for tonsillectomy. *Clin Otolaryngol Allied Sci* 2000; 25:428-430.
6. Johnston JJ, Douglas R. Adenotonsillar microbiome: an update. *Postgrad Med J* 2018; 94:398-403.
7. Lv DW, Zhang K, Li R. Interferon regulatory factor 8 regulates caspase-1 expression to facilitate Epstein-Barr virus reactivation in response to B cell receptor stimulation and chemical induction. *PLoS Pathog* 2018; 14:e1006868.
8. Public Health England. Stay at home: guidance for households with possible coronavirus (COVID-19)

infection. [Cited 2020 June 18] Available from: <https://www.gov.uk/government/publications/covid-19-stay-at-home-guidance/stay-at-home-guidance-for-households-with-possible-coronavirus-covid-19-infection>

9. SIGN (2010). Management of sore throat and indications for tonsillectomy: a national clinical guideline. Scottish Intercollegiate Guidelines Network.

10. Cinamon U, Goldfarb A, Marom T. The Impact of Tobacco Smoking Upon Chronic/Recurrent Tonsillitis and Post Tonsillectomy Bleeding. *Int Arch Otorhinolaryngol.* 2017; 21:165–170.

Figures

Figure 1. Indication for tonsillectomy (RAT; Recurrent Acute Tonsillitis)

Figure 2. Mean number of tonsillitis episodes during the 2 months preceding lockdown versus 2 months during lockdown (Error bars: SEM 0.17)

Figure 3. Parental choice of operation date

Figure 4. Difference in parental attitudes to operative date based on frequency of tonsillitis in the 2 months prior to lockdown and 2 months during lockdown



