Paediatric Tonsillotomy – An Irish Perspective on Potential Evolving Indications

Abstract:
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Tonsillotomy is the preferred treatment of some otolaryngologists for younger patients (under 3 years) with low body weight (under 15kgs) and a history of obstructive sleep apnoea. The use of the technique in the same patient cohort for recurrent tonsillitis remains controversial. The aim of this study was to evaluate the indications and outcomes of paediatric partial (undertaking tonsillotomy (with or without adenoidectomy) at a paediatric ENT centre in Ireland. Patients were identified from a prospectively maintained database and chart review was completed. A total of 23 patients were identified who underwent tonsillotomy. The commonest indication was Obstructive Sleep Apnoea (OSA) in 15 patients with 11 patients having a history of recurrent tonsillitis. No intra-operative or post-operative complications were recorded (0%). No patients required readmission or later tonsilectomy (0%). At follow-up, 19/23 patients with OSA (82.6%) had complete symptom resolution. Tonsillotomy appears to represent a safe, effective treatment option in the paediatric population, however, its role in recurrent tonsillitis remains controversial.

Introduction
Tonsillotomy, or subtotal tonsillectomy, has regained popularity as a concept since the early 1990’s but remains a selectively-used technique in most specialist otolaryngology practices. Its role has been highlighted particularly in the treatment of children with obstructive sleep apnoea (OSA) who are of a low weight (<15kgs) or under 36 months of age. The technique relies on the principle that utilizing intracapsular dissection of the tonsil reduces morbidity. The risk of morbidity, in particular of haemorrhage causing hypovolaemia, is considered too high for traditional extracapsular tonsillectomy to be carried out in patients of this young age or low bodyweight. The role of tonsillotomy in the treatment of recurrent tonsillitis remains a controversial topic for further infection of residual tonsillar tissue. The aim of our study was to review the indications and outcomes of tonsillotomy carried out at our paediatric otolaryngology centre between 2008 and 2014. This represents the first published data series relating to tonsillotomy in Ireland.

Methods
Patients who underwent tonsillotomy under a single surgeon (MC) at Children’s University Hospital, Temple Street between 2008 and 2013 were identified from a prospectively maintained database of surgical procedures. Retrospective review of relevant patient data was completed. Data was collated and analysed. Intracapsular tonsillotomy (subtotal tonsillectomy) was completed under direct vision using a 12 ´ 0 microdebrider (Medtronic XO Inc.) in all cases. Tonsillar tissue was resected in a gradual, stepwise fashion, leaving the tonsillar capsule intact with a small rim of overlying residual tissue. Additional haemostasis was achieved using bipolar diathermy where required. Standard institutional pre-operative and post-operative protocols were followed. Additional outpatient follow-up was completed following tonsillotomy with patients undergoing tonsillectomy.

Results
In total, 23 tonsillotomies were performed between 2008 and 2004. Of these, 21 were carried out in combination with endoscopic adenoidectomy. 15 male and 8 female patients were included. Median age was 31 months (range 23 to 83 months). The median weight of patients included was 14.8kg (range 12 to 19.9kg). OSA represented the most common indication with 15 patients. 7 further patients had a history of OSA and tonsillitis (at least 1 episode prior to presentation). 1 child (age 2 years 6 months, weight 14.7kg) presented with a history of severe recurrent tonsillitis complicated by complex febrile convulsions. Comorbidities recorded included genetic syndromes (n=3), cleft palate (n=2), asthma (n=2) and febrile convulsions (n=1). The median operative time recorded was 15 minutes. No intra-operative complications were recorded. The median total estimated blood loss was <10mls. No post-operative complications (primary or secondary haemorrhage, readmission with dehydration, increased analgesic requirements, delayed return to diet) were seen in any case. All patients were discharged at day 1 post-operation as standard. A follow-up review was arranged for all patients who underwent tonsillotomy. At follow-up, 82.6% (n=19/23) of patients with OSA symptoms on presentation had complete symptom resolution. Tonsillotomy appears to represent a safe, effective treatment option in the paediatric population.

Discussion
Throughout the 1800s, tonsillotomy by tonsillar guillotine represented the preferred treatment for recurrent tonsillitis due to the speed of the procedure and acceptably low bleeding risk. Concerns were later raised, however, that residual tonsillar tissue left in situ caused tonsillar capsule following tonsillotomy. With improvements in anaesthetic techniques and the introduction of halothane in the 1950s, otolaryngologists moved to using total extracapsular tonsillectomy as standard. Linder et al. and Mulcahy et al. published the first papers describing what is now regarded as the modern tonsillectomy technique in 1999 for children with OSA using carbon dioxide laser 5,6,7. Since that time, a series of studies have examined the role of tonsillotomy in the treatment of OSA, with two major systematic reviews published in 2012 8,9. Of particular interest is the study by Linder et al. 5,6,7. With improvements in anaesthetic techniques and the introduction of halothane in the 1950s, otolaryngologists moved to using total extracapsular tonsillectomy as standard. Linder et al. and Mulcahy et al. published the first papers describing what is now regarded as the modern tonsillectomy technique in 1999 for children with OSA using carbon dioxide laser 5,6,7. Since that time, a series of studies have examined the role of tonsillotomy in the treatment of OSA, with two major systematic reviews published in 2012 8,9. Of particular interest is the study by Linder et al. 5,6,7. Although some authors have highlighted the potential for recurrent tonsillitis following tonsillotomy in between 0.7% to 5.8% of cases, these figures indicate potential low recurrence and recurrent tonsillitis rates following tonsillotomy, however, there is a lack of data relating to patients with recurrent tonsillitis as an indication for tonsillotomy to confirm rates in that group. Reduced rates of readmission due to dehydration, as well as reduced analgesic use post-operatively have been reported following tonsillotomy. While patients undergoing tonsillectomy are at risk of secondary bleeding, these rates were significantly lower. Our data appears to support these reported findings. In our group, we recorded no intra-operative and no post-operative complications. No patients required readmission post-operatively and to date no patients have undergone total extracapsular tonsillectomy.

In our series we note one patient under age 3 who underwent tonsillotomy for severe recurrent tonsillitis with associated complex febrile convulsions. Little data exists regarding the potential application of the modern tonsillectomy in this group. One large series examining tonsillectomy for recurrent tonsillitis in children (median age...
7.8 years) described a rate of tonsillitis following surgery of 16.3% for tonsillotomy compared with 14.5% for extracapsular tonsillectomy. Another study of adolescents and adults found 1.3% of patients later required formal extracapsular tonsillectomy following tonsillotomy. This data appears to suggest similar risk of post-tonsillotomy infection and requirement for further surgery in tonsillotomy versus tonsillectomy patients. Both papers, however, focused on patients over 3 years of age and 15kg bodyweight. Treating patients under age 3 with severe recurrent tonsillitis and associated comorbidities remains a challenge for the paediatric otolaryngologist, and indeed the primary care physician. Excessive morbidity in the form of bleeding and risk of hypovolaemic shock and death continues to preclude total extracapsular tonsillectomy. In the setting of severe recurrent infections requiring antibiotic treatment and hospital admission, however, improved treatment solutions are being sought in the management of this patient group. Further research is required to establish whether tonsillotomy may represent a safe future alternative in the paediatric population under age 3.

In conclusion, tonsillotomy represents a safe, effective treatment method in the setting of OSA in children, even when under 3 years of age and less than 15kg. Low rates of post-operative tonsillitis and tonsillar regrowth in literature published to date suggests that a role may exist for this technique to be applied selectively in the setting of severe recurrent tonsillitis in children under 3 years of age and less than 15kg.

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