**A pilot study to determine feasibility of acute coblation tonsillectomy for patients with recurrent acute tonsillitis**

[Document Subtitle]

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## Short name and summary

HOT TONSILLECTOMY

The aims of this study are to determine if immediate tonsillectomy in patients presenting with acute tonsillitis is a safe and acceptable alternative to delayed elective tonsillectomy for patients with recurrent acute tonsillitis. Currently patients undergo elective tonsillectomy for recurrent tonsillitis but may wait for approximately 12 months on the public hospital waiting list for their procedure. Elective tonsillectomy represents a significant burden on the public hospital waitlist and patients may suffer from recurrent episodes of acute tonsillitis while waiting for surgery. This is a single site, prospective clinical trial to evaluate if tonsillectomy can be safely performed in patients over the age of 16 years who present to the emergency department with acute tonsillitis. Suitable patients who present to the hospital with acute tonsillitis will receive routine medical management but will proceed to coblation-assisted tonsillectomy under general anaesthesia. Patients will have routine post-tonsillectomy follow-up after surgery to assess for early post-operative complications including re-admission and post-operative bleeding. If tonsillectomy in the acute setting has equivalent outcomes to elective tonsillectomy, it may prove a useful alternative to the current management of recurrent tonsillitis. Treatment in the acute setting will reduce the numbers of patients on the elective waiting list and avoid the morbidity and financial costs of recurrent tonsillitis, whilst waiting on the waiting list to have surgery.

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# Protocol Authorisation

I confirm that I have read and understood the protocol version 1.0 dated 09 Feb 2019. I agree to comply with the study protocol, the principles of good clinical practice, research governance, clinical trial regulations and appropriate reporting requirements.

…………………………………………………………………. Date:

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# Glossary of Abbreviations

# Introduction

Elective tonsillectomy is currently indicated in patients suffering from recurrent acute tonsillitis. Currently the waiting list in New South Wales alone has a substantial number of such patients waiting to undergo elective tonsillectomy. Whilst waiting for surgery, patients may develop recurrent episodes of acute tonsillitis, which lead to time away from work or study and contribute to loss of income for patients and also caregivers for younger patients. These and other factors contribute to a reduced quality of life for both patients and caregivers. There is also an associated increase in public health costs due to management of re-presentations of acute tonsillitis to the emergency department and hospital admissions. The aims of this study are to determine if patients with a history of recurrent acute tonsillitis can safely undergo tonsillectomy at the time of presentation with acute tonsillitis to avoid further delays in their definitive treatment and to reduce the waiting list burden.

# Background

The Joint Position Paper of the Paediatrics and Child Health Division of The Royal Australasian College of Physicians and The Australian Society of Otolaryngology Head and Neck Surgery recommends adenotonsillectomy or tonsillectomy following seven episodes of acute tonsillitis in the preceding one year, or five in each year for the preceding two years, or three per year for the preceding three years(1). It is also recommended that the severity of such episodes be taken into consideration prior to surgery due to the risks of post-operative morbidity. These guidelines are similar to those of the American Academy of Otolaryngology and the Scottish Intercollegiate Guidelines Network(2,3). These recommendations are largely based on the study by Paradise *et. al.* who found that children aged 3 – 15 years with this history of sore throat or fever, had a statistically significant reduction in the incidence of these symptoms in the two years following surgery(4). A recent Cochrane review also suggested that adenotonsillectomy had a modest reduction in the incidence of sore throat in children, particularly those with more severe disease(5). There have been some suggestions that children “grow out” of tonsillitis but this has been refuted by studies of paediatric waiting lists, which show that 73% in one study and 81.4% in another, still met the indications for surgery after waiting a mean of 9 to 10 months for their surgery(6,7).

The evidence for adenotonsillectomy in adults with recurrent tonsillitis is somewhat less rigorous, but one randomised controlled trial has demonstrated a significant reduction in the incidence of sore throat following tonsillectomy in adults with streptococcal pharyngitis(8). It is also generally recommended that adults with recurrent severe sore throat also undergo tonsillectomy(3).

The improvements in patient quality of life following tonsillectomy for recurrent tonsillitis or sore throat are quite significant and in the absence of absolute criteria for tonsillectomy, it is often the impact of quality of life which influences whether or not a patient is scheduled for elective tonsillectomy. A recently published review of quality of life studies following tonsillectomy demonstrated statistically significant improvements in quality of life scores for patients’ general health and physical function(9). This review and other studies, have shown that in adults and children, that there is a marked reduction in visits to primary health physicians, antibiotic use, and time off work or study for patients and carers, which contribute to the overall cost effectiveness of this procedure(9-11).

Tonsillitis is a common condition and in our institution there are on average 39 presentations with a diagnosis of “tonsillitis” to the Emergency Department every month. Patients waiting for elective tonsillectomy for recurrent tonsillitis represent a large portion of the Canterbury Hospital waiting list burden. One potential approach to reducing the number of patients on the waiting list for elective tonsillectomy for recurrent acute tonsillitis is to perform tonsillectomy when patients re-present acutely. Reducing waiting list times for patients improves delivery of medical care to the wider community and reduces morbidity in patients waiting for surgery.

Tonsillectomy in the acute setting has not been well studied. There has historically been a preference to manage this condition conservatively with analgesia, antibiotics and corticosteroids. Patients with peritonsillar abscess typically undergo aspiration or open drainage of the abscess if present with operative management acutely limited to tonsillectomy for abscesses which fail to settle with these measures. There are a small number of studies which have evaluated immediate tonsillectomy (unilateral or bilateral) in the setting of peritonsillar abscess, so called tonsillectomy a chaud(12,13). Immediate tonsillectomy confers several advantages including complete drainage of the peritonsillar abscess, without risk of recurrence and it avoids a second hospital admission for interval tonsillectomy. Historically, the limited trials comparing tonsillectomy for peritonsillar abscess and drainage procedures showed fewer days off work and shorter length of stay following immediate tonsillectomy compared to abscess drainage alone and interval tonsillectomy(14,15). As far as we are aware, immediate tonsillectomy for acute tonsillitis, with or without peritonsillar abscess has not been evaluated. This approach represents a shift in current treatment paradigms much the same as in other infective surgical pathologies such as in the case of acute cholecystitis where patients preferentially have laparoscopic cholecystectomy acutely rather than resolving the acute episode with antibiotics, to have the patient re-present in several weeks for an elective cholecystectomy.

More recently, studies have examined how rates of tonsillectomy can have a wider impact on health outcomes. A study by Yap *et. al.* in 2017 noted that a reduction in the rate of tonsillectomy in Wales led to an increase in admission rates for management of tonsillitis related complications, such as deep neck space infections (21). It was suggested that the criteria for performing tonsillectomy should be revisited as a reduction in tonsillectomy may have actually increased the rate of hospitalization for serious deep neck space infections. Douglas *et. al.* reported similar findings from Scotland, where there was a drop in tonsillectomy procedures by 48% resulting in a concomitant 136% increase in tonsillitis admissions, a 167% increase in abscess admissions, and a 500% increase in deep neck space infections (22). This had resulted from a change in national policies for the management of sore throat and a reduction in antibiotic prescribing. There has been one pilot study similar in design to the present study, performed by Amernik *et. al.* (23). A “hot” tonsillectomy was performed on a cohort of 21 patients (similar size to the present study) with peri-tonsillar abscess specifically, showing that the procedure could be performed safely in this context. Our study is similar but with a distinct patient cohort, comprising patients with recurrent acute severe tonsillitis requiring admission to hospital, with or without peri-tonsillar abscess.

One of the most serious complications following tonsillectomy is post-operative haemorrhage. This has been described as either primary or secondary. Primary haemorrhage occurs early after surgery and is due to operative failure to achieve haemostasis and is rare with reported rates of 0.64 - 1.3%(16). Delayed haemorrhage can present up to 10 days following surgery and is thought to be due to a variety of factors. Several risk factors for delayed bleeding have been identified including infection in the surgical bed, ketorolac use in adults, older age, smoking, male sex (17,18). The rates of delayed haemorrhage are exceedingly variable and comparisons amongst studies are difficult to make because often the surgical techniques used are not described and particularly the incidence of minor post-operative bleeding is poorly captured. Attempts to standardize the types of post-operative haemorrhage have been attempted and we will use that described by Walner and Karas which describes five types of post-operative bleeding(19):

* Type I bleeding is that which is historical or observed and does not require intervention.
* Type II bleeding requires intervention to achieve haemostasis under local anaesthesia.
* Type III is that which requires operative measures under general anaesthesia.
* Type IV bleeding requires external carotid artery ligation or angiographic guided embolisation.
* Type V bleeding is that which results in patient death.

In our study we will avoid the use of non-steroid anti-inflammatory drugs in the peri-operative period as this is a potential risk factor for post-operative haemorrhage(18) and perform tonsillectomy using a coblation technique that has not been demonstrated to increase post-operative haemorrhage rates(20). This technique is also suited to the acutely inflamed tonsil which is often friable and difficult to excise using other techniques due to peritonsillar inflammation. There will be no limitations placed on the surgical operators on the choice of additional techniques to achieve post-operative haemostasis.

# Study protocol

## AIMS/OBJECTIVES

The aims of this feasibility study are to determine if immediate tonsillectomy in patients presenting with acute tonsillitis is a safe and acceptable alternative to delayed elective tonsillectomy for patients with recurrent acute tonsillitis. It is necessary to establish if this is an acceptable alternative treatment option to current medical management of acute tonsillitis. Throat pain is a symptom of acute tonsillitis and is also a side effect of the surgery. It is unknown if patients will choose a procedure that does not immediately alleviate one of their presenting symptoms.

For patients undergoing immediate tonsillectomy for acute tonsillitis, it is currently not well established if there is an unexpected increase in post-operative complication rates. Post-tonsillectomy haemorrhage is potentially the most serious complication following tonsillectomy. Throughout the study, participants will be closely observed and followed up to determine the incidence of post-tonsillectomy haemorrhage following coblation-assisted tonsillectomy in acute tonsillitis.

## HYPOTHESIS – PRIMARY AND SECONDARY OUTCOMES

The aim is to evaluate whether immediate tonsillectomy for acute tonsillitis in patients with a history of recurrent tonsillitis, is a safe alternative to medical management in the acute period. The primary outcomes of interest include:

* Primary post-operative haemorrhage, using the Walner and Karas description, within the first 24 hours
* Post-operative analgesia requirements during inpatient admission
	+ This will be assessed according to the medication chart, which documents the time and date that the analgesia was administered
* Length of hospital stay post-operatively

The secondary outcomes to be evaluated aim to determine whether acute tonsillectomy has equivalent post-operative complication rates to elective tonsillectomy in the early follow-up period. Complications following acute tonsillectomy to be assessed include:

* Readmission rate at 30 days
* Secondary post-operative haemorrhage, using the Walner and Karas description, within 3 weeks post-operatively
* Post-operative infection within 3 weeks post-operatively
	+ A clinical diagnosis made on the grounds of signs of infection (pain, redness, fever, temperature, systemic inflammatory response) with the source of infection appearing to be the tonsil bed in which the operation has been performed. This is often supported by blood tests which may indicate a raised white cell count or C-reactive protein, although this is not always the case.

Other parameters to be evaluated include operating time and return to tolerance of oral diet in the post-operative period.

## STUDY DESIGN

This is a single centre clinical trial which will prospectively recruit a cohort of patients who present to our institution via the Emergency Department with acute tonsillitis. The trial will operate for a period of 12 months or until the total number of patients is recruited, whichever comes first.

## STUDY POPULATION

### Sample size

The number of patients to be recruited to this study is 20.

### Inclusion criteria

Patients aged 16 years or older

Acute episode of tonsillitis with or without peritonsillar abscess

A history of recurrent tonsillitis or sore throat with a clinically relevant episode of sore throat meeting the Paradise Criteria (sore throat plus one of the following qualifies as an episode of acute infection):

* Fever >38.3°C
* Cervical lymphadenopathy
* Tonsillar exudate
* Culture positive for Group A β-hemolytic Streptococcus

### Exclusion criteria

Patients under the age of 16 years old

Unable to provide informed consent for any reason

Only a single documented episode of sore throat or tonsillitis or unable to establish history of previous episodes.

Tonsillectomy for obstructive sleep apnoea as the only indication

Pregnancy

Suspected tonsillar malignancy

Significant medical co-morbidities including patients with an ASA of 3 – 4 or haematological disorders with bleeding diathesis.

### Withdrawal

Patients may opt out of the trial at any time prior to surgery and this is outlined in the Patient Study Information Brochure (Appendix). Patients who do withdraw from the study will be offered the current accepted management of acute tonsillitis including drainage of peritonsillar abscess if indicated. Patients who have recurrent acute tonsillitis will be referred to an ENT surgeon for consideration of elective tonsillectomy.

## METHODS

Participants will be recruited from the Emergency Department and provided with Patient Information Study Brochures. Verbal and written consent will be taken prior to surgery.

Patients will be admitted to the Canterbury Hospital and receive the usual current medical management prior to undergoing emergency tonsillectomy. This may include intravenous fluids, analgesia, corticosteroids or antibiotics. Patients will undergo blood tests and radiological investigations as deemed to be medically necessary for management of their tonsillitis and for pre-operative assessment. This may include, but is not limited to, chest x-ray and electrocardiogram.

All surgical procedures will be performed by the Chief Investigator and Co-Investigators at the Canterbury Hospital. Patients will be scheduled for tonsillectomy once medically stable. The timing of tonsillectomy will be determined by the following clinical parameters:

* temperatures <37.5°C
* heart rate <100 bpm
* normotensive
* absence or resolution of trismus preventing assessment of airway for intubation

Tonsillectomy will be performed under General Anaesthesia after a minimum of 6 hours of fasting. The medications used for induction and maintenance of anaesthesia will be at the discretion of the Anaesthetic Consultant in charge of the procedure. Patients will receive 1.2g of intravenous benzyl penicillin (or suitable alternative in cases of Penicillin Hypersensitivity) on induction, if not previously administered in the preceding 4 hours. Tonsillectomy will be performed using the technique of coblation. Haemostasis may be achieved by any methods determined appropriate by the operating surgeon. This may include suture ligation, bipolar or unipolar diathermy. Administration of local anaesthesia before or after tonsillectomy will be at the discretion of the surgeon.

Patients will be returned to the ward following surgery and have routine post-operative care including analgesia, antibiotics and intravenous fluids until resumption of normal oral intake.

Patients will be discharged following surgery when the following criteria have been met:

* tolerating sufficient oral intake to maintain normal hydration
* acceptable analgesia
* resolution of fever and clinical signs of sepsis

Analgesia use and length of post-operative stay will be recorded.

Patients will follow up with the Chief Investigator, or co-investigators between 4 to 8 weeks following surgery.

The trial will be terminated early if the results of the trial suggest a significant increased incidence of post-operative complications especially post-tonsillectomy haemorrhage or if the trial fails to recruit sufficient patients due to a lack of acceptance of acute tonsillectomy as an alternative treatment for acute tonsillitis.

## DATA ANALYSIS AND REPORTING

The data sheet in Appendix 1 demonstrates the data that will be collected during this study.

The data will be the property of the Chief Investigator. Publication will be the responsibility of the Chief Investigator. The results of this pilot study may be presented in a scientific journal or scientific meeting however specific patients will not be directly identified.

## INVESTIGATOR OBLIGATIONS

The conduct of this study will be in accordance with the NHMRC Guidelines and NSW State Health Policies on the conduct of scientific research.

Data from the trial will be regarded as strictly confidential and kept in a secure location within the Department of Surgery at The Canterbury Hospital in accordance with NSW Health Policy Directive PD2006\_077 *Data Collections – Disclosure of unit record data held for research or management of health services*. Patients will be identified according to the hospital issued Medical Record Number (MRN). Patient contact details will be accessed from the Electronic Medical Record. Copies of Patient Information Study Brochures and Consent Forms will be placed in the patient medical records in accordance with State and Federal Department Guidelines.

Whilst complications can arise after any surgical procedure, patients who develop complications following surgery will be advised to present to their nearest Emergency Department for life-threatening complications. For the management of all other complications or concerns, patients will be offered clinical assessment through the Canterbury Hospital Emergency Department or on an outpatient basis with the Chief Investigator for non-urgent issues.

## REFERENCE LIST

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