

# Tonsil surgery

STUDIES ON SURGICAL METHODS  
AND POSTOPERATIVE HAEMORRHAGE

***Akademisk avhandling***

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligen försvaras i Jubileumsaulan, Gula stråket 2B, Sahlgrenska Universitetssjukhuset, Göteborg, den 1 februari, klockan 13.00.

av

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## AVHANDLINGEN BASERAS PÅ FÖLJANDE DELARBETEN

- I. Söderman AC, Odhagen E, Ericsson E, Hemlin C, Hultcrantz E, Sunnergren O, Stalfors J.**  
Post-tonsillectomy haemorrhage rates are related to technique for dissection and for haemostasis. An analysis of 15734 patients in the National Tonsil Surgery Register in Sweden.  
*Clinical Otolaryngology*, 2015 Jun;40(3):248-54
- II. Odhagen E, Sunnergren O, Söderman AH, Thor J, Stalfors J.**  
Reducing post-tonsillectomy haemorrhage rates through a quality improvement project using a Swedish National quality register: a case study.  
*European Archives of Otorhinolaryngology*, 2018 Jun;275(6):1631-1639
- III. Odhagen E, Sunnergren O, Hemlin C, Hessén Söderman AC, Ericsson E, Stalfors J.**  
Risk of reoperation after tonsillotomy versus tonsillectomy: a population-based cohort study.  
*European Archives of Otorhinolaryngology*, 2016 Oct;273(10):3263-8
- IV. Odhagen E, Stalfors J, Sunnergren O.**  
Morbidity after pediatric tonsillotomy versus tonsillectomy: a population-based cohort study.  
*Accepted for publication in The Laryngoscope* 12 Oct 2018

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## STUDIES ON SURGICAL METHODS AND POSTOPERATIVE HAEMORRHAGE

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### Abstract

*Tonsil surgery is one* of the most common surgical procedures in the world, with about 13,500 operations performed annually in Sweden. Sleep-disordered breathing in children and infection-related problems are the two most common indications. Tonsil surgery is an effective treatment, but is often associated with pain and discomfort, as well as risk of complications, the most serious of which is postoperative haemorrhage. There are two types of tonsil surgery: complete removal of the tonsils (tonsillectomy) or partial removal (tonsillotomy). Given the large number of procedures carried out annually, it becomes extremely important to minimise the risks of this procedure insofar as possible. The overarching purpose of the thesis is to identify risk factors for preventable complications of tonsil surgery. The purpose was also to assess and compare postoperative complications and the risk of reoperation following TT and TE in children.

**METHODS/RESULTS:** *Paper I*, a retrospective cohort study based on the National Tonsil Surgery Register in Sweden (NTSRS), describes the occurrence of post-tonsillectomy haemorrhage (PTH), as well as how the risk of haemorrhage is related to surgical technique. The study, which included 15,734 patients, shows that all hot techniques used for dissection and haemostasis increase the risk of late PTH, compared with cold dissection and cold haemostasis. The study also shows that the occurrence of early PTH (during hospital stay) increases the risk of late PTH after discharge.

*Paper II* aims to describe and assess a quality improvement project (QIP) with the goal of reducing postoperative haemorrhage following tonsillectomy. Six ENT surgical centres, all with PTH rates above the Swedish average, participated in a seven-month QIP. A case study design is used in which changes implemented by the surgical centres are described and the outcome monitored in the NTSRS. The six surgical units reduced the rate of PTH from 12.7% the year before the project to 7.1% the year after.

*Paper III*, a retrospective register-based cohort study, compares the risk of reoperation after TE and TT in children with upper airway obstruction. A total of 27,535 patients, aged 1-12 years, who had tonsil surgery between 2007 and 2012 in Sweden, were identified using the National Patient Register (NPR). The risk of additional tonsil surgery was 7 times higher after TT compared with TE, with the greatest differences between groups found among the youngest children.

*Paper IV*, a register-based cohort study, describes postoperative morbidity following TE and TT in children with tonsil-related upper airway obstruction. A total of 35,060 patients, aged 1-12 years, who had tonsil surgery between 2007 and 2015 in Sweden were identified through the NPR. TT entails less risk for postoperative complications than TE. This was observed for all outcome variables: readmission due to postoperative haemorrhage, return to theatre due to postoperative haemorrhage, readmission for any reason, and postoperative contact with health services for any reason.

**CONCLUSIONS:** Hot surgical techniques increase the risk of late PTH compared with cold dissection and cold haemostasis. The rate of PTH can be reduced by a QIP based on data from a national quality register. The risk of reoperation is seven times higher following TT compared with TE in children with tonsil-related upper airway obstruction. TT is associated with significantly less risk of postoperative complications compared with TE among children treated surgically for upper airway obstruction.