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English version

The clinical and organisational appropriateness of tonsillectomy and adenoidectomy

Ministero della Salute
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Istituto Superiore di Sanità
National Institute of Health

Agenzia di Sanità Pubblica
Regione Lazio
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SUMMARY

The issue of the appropriateness of tonsillectomy and adenoidectomy has yet to be resolved, so that clinicians are uncertain as to the validity of the specific indications for surgery, leading to great variability in clinical practice. In fact, for many of the reported indications, the available evidence on the effectiveness of surgery is insufficient or inadequate.

In this document, the available evidence on the effectiveness of tonsillectomy and adenoidectomy, performed either separately or combined, is discussed. Based on this evidence, which was collected and analysed by a multidisciplinary group of experts, suggestions for good clinical practice are provided. Although the literature considered in this document mainly refers to children, surgery in adults is also addressed.

INDICATIONS FOR SURGERY

Adenotonsillectomy is advisable in children with significant obstructive apnoea. The decision to perform surgery should be based on clinical parameters or, if doubts exist, on the results of overnight polysomnography. For children and adults with severe recurrent acute tonsillitis, tonsillectomy should be performed for those who, in a one-year period, experience at least five documented bacterial episodes that are both disabling and prevent normal functioning, yet only after an additional observational period of at least six months. More flexibility can be used in applying these criteria in the presence of significant and persistent laterocervical lymphadenopathy caused by tonsillitis; episodes of peritonsillar abscess; or febrile convulsions. Tonsillectomy is also recommended in cases of confirmed or suspected neoplasia of the tonsil and squamous carcinoma of the neck or head of unknown primary site.

For treating peritonsillar abscesses, drainage and antibiotic therapy are recommended, whereas the decision of whether or not to perform tonsillectomy can be delayed until after the acute phase of the abscess (if there is a recurrence), or (if there are no recurrences) when the individual meets the criteria for recurrent acute tonsillitis.

For healthy carriers of group A beta-hemolytic streptococcus, no indications for surgery exist. Persons with other conditions related to streptococcal infections need to be evaluated on an individual basis. Because of insufficient evidence, PFAPA syndrome (periodic fever, aphthous stomatitis, pharyngitis, and cervical adenitis) cannot be considered as an indication for tonsillectomy.

The effectiveness of adenoidectomy in treating recurrences of acute otitis media has only been shown for children previously treated with tympanostomy and ventilation-tube placement. Nonetheless, in Italy, adenoidectomy is often performed before or simultaneously with ventilation-tube placement. For persons with otitis media with effusion, adenoidectomy is not indicated as the first choice of treatment. In children with recurrent or chronic sinusitis, only if appropriate antibiotic therapy has failed is adenoidectomy advisable, either alone or in combination with endoscopic sinus surgery.

PERFORMING SURGERY

Given the lack of evidence for justifying partial tonsillar ablation, total bilateral tonsillar removal seems to be indicated, even for treating obstructive forms in children. Since there is not enough evidence for determining the best surgical technique for performing

tonsillectomy (i.e., cold dissection, diathermy, radiofrequency, or laser), the choice should be based on the surgeon's experience.

In both children and adults, tonsillectomy and adenoidectomy should be performed using general inhalatory anaesthesia balanced with intravenously administered opiates, so as to prevent agitation upon awakening. Because of greater safety and accessibility for surgery, tracheal intubation is preferable to laryngeal mask, and controlled mechanical ventilation is preferable to spontaneous mechanical ventilation.

Regarding the risk of haemorrhage, since coagulation tests do not seem to be very predictable, preoperative screening for coagulopathies should be based on accurate information on personal and family history. If preoperative tests are necessary, then they should be limited to checking haemoglobin, prothrombin time (PT), and partial thromboplastin time (PTT). Routine chest X-ray is not recommended, especially not for children.

MANAGING TONSILLECTOMY PATIENTS

To reduce the incidence and duration of postoperative events, the preoperative administration of antibiotics seems to be advisable in both children and adults. In preventing postoperative bleeding, the available data are insufficient for determining whether or not locally applied pastes or fibrin glue are effective.

In managing postoperative pain, the available evidence indicates that local anaesthesia in the peritonsillar region should not be used and that no one type of analgesic treatment is more effective than others. Thus paracetamol, which is both safe and effective, is recommended, whereas non-steroidal anti-inflammatory drugs should not be used, since they may inhibit platelet aggregation.

Corticosteroids are effective in treating postoperative vomiting in children yet they are not effective in controlling postoperative pain. Of the other antiemetic drugs, perphenazine is both effective and relatively inexpensive.

HEALTHCARE SETTINGS

In Italy, one-day surgery (i.e., day surgery followed by one-night hospital stay) seems to be the most suitable option for performing tonsillectomy, with or without adenoidectomy, in both children and adults with no clinical or social contraindications. This fulfils the necessity of keeping the patient under observation for at least 4-8 hours following surgery, so as to minimise the risk of complications. However, one-day surgery is not recommended for persons who, according to the classification system of the American Society of Anesthesiologists (ASA), have a physical status in categories higher than II, for children who are less than 6 months of age, or for children who weigh less than 5 kilograms. Adenoidectomy without tonsillectomy can be performed safely as one-day surgery without overnight stay.

The perioperative care of children should consist of a warm and friendly environment, pre-anaesthesia that guarantees a good level of sedation, and the presence of the child's parents in the preparation room at the time of pre-anaesthesia and upon the child's awakening.

INTRODUCTION

EPIDEMIOLOGY OF TONSILLECTOMY AND ADENOIDECTOMY IN ITALY

In Italy, tonsillectomy and adenoidectomy are the most common types of surgery in children. Data from the hospital information system of the Italian Ministry of Health indicate that, in 2000, more than 44,000 tonsillectomies (with or without adenoidectomy) and 32,000 adenoidectomies were performed in persons less than 18 years of age, and around 17,000 tonsillectomies were performed in adults. In the same year, the corresponding tonsillectomy rate was 10.6 per 10,000 among the general population and 94.3 per 10,000 among children aged 4-9 years, with a relatively stable rate in the period from 1997 to 2000. The reason for performing tonsillectomy was tonsillar infection in 45% of the cases and treatment of tonsillar hypertrophy in 43% of cases; 12% of tonsillectomies were performed for other reasons.

Regarding geographical variability (Italy is divided into 20 Regions and two Autonomous Provinces), in 2000, the rate of tonsillectomy (both with and without adenoidectomy) for the general population, standardised for age and gender, ranged from 3.5% per 10,000 for the Region of Basilicata (southern Italy) to 19.0% per 10,000 for the Region of Piemonte (northern Italy), with a marked nationwide north-south gradient. Considerable variation in the rate of tonsillectomy has been reported even when comparing adjoining Regions (e.g., 16.0 per 10,000 population in the Autonomous Province of Bolzano and 8.6 per 10,000 in the adjoining Autonomous Province of Trento), meaning that in all likelihood these differences are not entirely due to environmental or climatic differences. Similar geographic variability has been reported in the United Kingdom (14.2 per 10,000 in the Health Authorities in the south-west and 21.0 per 10,000 in those in the north-west)¹, with the variation being attributed more to differences in clinical practice and in the training of specialists than to differences in actual morbidity¹.

In Italy², the rate of tonsillectomy has also been reported to vary by socio-economic status, with higher rates among children living in the most deprived areas. Socio-economic inequalities in the rate of tonsillectomy have also been reported in Scotland³. These inequalities could be related to a greater prevalence of tonsillar infections, a greater risk of undergoing inappropriate surgery, or both, among more deprived persons. In Switzerland, children of physicians have been reported to have a lower lifetime risk of undergoing tonsillectomy than the general population⁴.

The geographic and socio-economic variations in the rate of tonsillectomy could in part be explained by differences in clinical practice, which could reflect uncertainties regarding surgical indications. In the United Kingdom, it has been estimated that only 50% of tonsillectomies are justifiable and that only one-fourth of tonsillectomies for recurrent throat infection meet evidence-based criteria⁵.

In Italy, in 2000, most tonsillectomies and adenoidectomies were performed in an acute-care setting, yet, again, with marked geographical differences: in northern Italy, more than 70% of tonsillectomies and 43% of adenoidectomies were performed in acute-care settings, whereas in southern Italy these proportions were 96% and 91%, respectively (the percentages reported for central Italy were somewhere in between those for the north and south).

Regarding postoperative complications associated with tonsillectomy, no data are available for Italy. In Scotland, the incidence of these complications has been estimated to

be around 2%⁶. The reported postoperative mortality for tonsillectomy is similar to that for general anaesthesia alone, with 1 death per 10-35,000 cases^{7,8}. The major causes of death are anaesthesia-related complications, haemorrhaging, and hyponatremia due to the excessive intravenous administration of hypotonic fluids in children⁹.

In Italy, based on hospital data reported to the Ministry of Health, it has been ascertained that, in the period from 1999 to 2001, three deaths occurred following adenotonsillectomy, which translates into 1 death per 95,000 surgical interventions. Although these data have been confirmed by an ad hoc study, it is not possible to exclude underreporting.

AIM OF THE PRESENT DOCUMENT

In the present document, the issue of the effectiveness of tonsillectomy and adenoidectomy is addressed, and suggestions for good clinical practice, formulated by the group of experts who created this document, are provided. Although tonsillectomy and adenoidectomy are mainly performed in children, the indications provided herein refer to both children and adults, unless otherwise specified.

The objective of this document is to contribute to ensuring that tonsillectomies and adenoidectomies, when performed, are clinically appropriate and safe and that they are carried out in suitable healthcare settings. To this end, the document attempts to define the most appropriate indications and healthcare procedures and is intended for use by paediatricians, general practitioners, and otorhinolaryngologists involved in the treatment of adenotonsillar pathologies.

METHODS

This document was created in accordance with the recommendations provided in the Manual for Writing Clinical-Practice Guidelines of the "Programma Nazionale Linee Guida" (PNLG; Italian National Program for Guidelines)¹⁰. The specific steps made towards creating this document were as follows:

- 1) A multidisciplinary group of experts was formed (experts were from all areas considered to be pertinent to the writing of this document, including representatives of laypersons and consumers).
- 2) The group of experts formulated a list of the most important issues to be addressed, focussing on those issues surrounded by the greatest uncertainty.
- 3) A review of the literature addressing these issues was conducted, as described below.
- 4) The evidence provided by the literature was then evaluated using the grading system adopted by the PNLG (see Table on page 8).
- 5) The information collected was summarised.
- 6) Based on the available evidence, the group of experts formulated a series of suggestions (it should be stressed that this document does not provide recommendations per se but instead offers suggestions and advice).
- 7) The group of experts, together with other representatives of the scientific-medical field, discussed the clinical and organisational issues, the formulated suggestions, and a preliminary draft of this document.
- 8) Based on these discussions, the draft was modified and the document was finalised.

REVIEW OF THE LITERATURE

The review of the literature was conducted to identify the following:

- a) Systematic reviews of experimental studies and Cochrane Collaboration review protocols focussing on the evaluation of the effectiveness of treatment and pertinent to the clinical issues identified by the group of experts;
- b) Other documents providing evidence of the effectiveness of treatment (reviews not developed by Cochrane Collaboration and guidelines);
- c) Primary experimental studies: randomised controlled trials on clinical issues not considered in the systematic reviews or guidelines; and
- d) Other types of primary studies: cohort and prospective studies; retrospective registry-based studies; case-control studies; cross-sectional studies; and consecutive-case studies, on clinical issues not considered in the systematic reviews or guidelines.

Sources

The systematic reviews, review protocols, and guidelines were taken from the following sources:

- Databases: Cochrane Library, Edition 2003.1, on CD: The Cochrane Databases of Systematic Reviews (CDSR); Database of Abstracts of Reviews of Effectiveness (DARE); Health Technology Assessment Database (HTA)
- Web-sites: HSTAT, Health Services Technology/Assessment Text: <http://hstat.nlm.nih.gov>; Agency for Healthcare Quality and Research: <http://ahrq.gov>; TRIP: www.tripdatabase.com; AREAS: www.areas.it
- Books and journals: Clinical Evidence (edition 2002). The following Cochrane Editorial Groups were contacted: Effective Practice and Organization of Care (EPOC); Oral Health Group; Airways; Acute Respiratory Infections; Anaesthesia; Renal; Infectious Disease; Muscoskeletal. These groups were asked to provide information on updates

of the reviews and on the progress of review protocols. The authors of some of the Cochrane protocols were contacted directly and asked to provide information on as-yet-unpublished reviews. Guidelines produced by Italian associations of paediatricians, otorhinolaryngologists, and anaesthesiologists were also reviewed. For the search of randomised control trials and other primary studies, the Cochrane Controlled Trials Register (version 2002.3), MEDLINE, and EMBASE, for the period from 1990 to 2002, were consulted, with no language restrictions.

Data collection

For all of the systematic reviews, guidelines, and primary studies that were judged to be pertinent (based on two separate evaluations performed by two different individuals), data were extracted using forms specifically designed for each type of document; the forms were created based on models published by the Cochrane Editorial Groups, the AGREE Collaboration, the National Institute for Clinical Excellence (NICE), the Scottish Intercollegiate Guidelines Network (SIGN), and the PNLG. For the systematic reviews, data were extracted by two reviewers independently and then cross-checked. For the guidelines, data were extracted by a reviewer and then checked by another reviewer.

Search results

Of the approximately 1,500 references initially identified, data were extracted from five Cochrane reviews, two Cochrane protocols, five sets of guidelines, and approximately 100 primary studies (i.e., original studies not included in systematic reviews). The complete articles were taken from libraries in Italy or other countries or from publishing houses. Some studies were identified by reviewing the bibliography of primary studies or following indications provided by the members of the group of experts.

LEVEL OF EVIDENCE

The classification of the level of evidence was that developed by the "Centro per la Valutazione dell'efficacia dell'Assistenza Sanitaria" (CeVEAS; Center for the Evaluation of the Effectiveness of Healthcare) of the city of Modena (Italy) and adopted by the PNLG¹⁰.

Level of evidence	Criteria
I	Evidence from more than one randomised controlled clinical trial and/or from systematic reviews of randomised trials
II	Evidence from a single randomised controlled clinical of sound design
III	Evidence from cohort studies with concurrent or historical control groups
IV	Evidence from retrospective studies, such as case-control studies or their metaanalysis
V	Evidence from case series with no control group
VI	Evidence based on the opinions of renowned experts or expert committees, as indicated in guidelines or consensus conferences

Randomised trials of inadequate design were assigned a level of evidence of III (as opposed to II for sound randomised trials).

CHAPTER 1. INDICATIONS FOR TONSILLECTOMY AND ADENOIDECTOMY

OBSTRUCTIVE SLEEP APNOEA SYNDROME FROM ADENOTONSILLAR HYPERTROPHY IN CHILDREN

Obstructive sleep apnoea syndrome (OSAS) is the reduction (hypopnoea) or cessation (apnoea) of airflow during sleep due to the reduction, until collapse, of the pharyngeal space. OSAS is the most clinically severe sleep-associated respiratory dysfunction, the least severe being snoring^{11,12}, and it can cause important cardiovascular and neurocognitive sequela^{13,14}. The most common cause of OSAS in children is adenotonsillar hyperplasia.

There are no universally accepted criteria for diagnosing or treating OSAS in children¹⁵. However, rhinopharyngeal obstruction can be measured with transnasal fibroendoscopy of the nasopharyngeal cavity¹⁶. To define the severity of OSAS, overnight polysomnography allows variations in cardiac and physiological parameters to be measured (oximetry, oronasal airflow, heart frequency, thoracic and abdominal respiratory movement, and arousals). The Apnoea-Hypopnoea Index (AHI), which corresponds to the number of episodes of apnoea and hypopnoea per hour of sleep, is the most common polysomnographic measurement¹⁶, and its use has been proposed, also in combination with haemoglobin saturation levels, for defining the severity of OSAS, as follows: severe (AHI >50, haemoglobin saturation <80%), moderate (AHI = 21-50, haemoglobin saturation 80-85%), and mild (AHI =5-20, haemoglobin saturation >85%)¹⁶.

A diagnosis of full-blown OSAS can be made when the clinical picture consists of loud snoring, disturbed sleep, paradoxical thoracic-abdominal movement, episodes of dispnoea leading to apnoea, and daytime sleepiness, not related to respiratory tract infections. In adults, the diagnosis can be based on the clinical picture and on polysomnographic measurements, which can also be taken using portable instruments¹³.

Evidence of the effectiveness of tonsillectomy and adenoidectomy

Tonsillectomy and adenoidectomy are the most common types of surgery for treating OSAS in children¹². The Cochrane review of Bridgman et al.¹⁶ does not identify any randomised controlled trials on the efficacy of surgery. It is thus suggested that surgery be performed only in the framework of clinical studies.

In a Cochrane review, Lim and McKean¹² conclude that adenotonsillectomy should be performed in children with what the authors define as "significant" OSAS, although these conclusions are based on evidence from non-randomised and non-controlled studies (level of evidence III). This is consistent with the guidelines of the American Academy of Pediatrics¹⁷, which, although not adopting rigorous criteria for defining OSAS and taking into considerations studies that use different case-definitions, recommend that adenotonsillectomy be considered as the treatment of choice in children with OSAS from adenotonsillar hypertrophy and that continuous positive airway pressure (CPAP) be limited to children for whom surgery is contraindicated or who have persistent OSAS following surgery¹⁷.

There is only limited evidence that OSAS can alter the development of the craniofacial mass or the dental arch morphology, or that tonsillectomy is effective in normalising facial growth¹⁸ (level of evidence III).

Suggestions for clinical practice

- Adenotonsillectomy should be performed in children with "significant" OSAS. However, since there is no single set of universally accepted criteria for evaluating and managing OSAS in children, it is suggested that the decision to perform surgery be based on clinical evaluation (i.e., daytime sleepiness, loud snoring, disturbed sleep, dispnoea/apnoea, and open-mouth breathing, eventually associated with low haemoglobin saturation, secondary polycythemia, and pulmonary heart disease).

Clinical evaluation is also sufficient for:

- Diagnosing full-blown OSAS for performing adenotonsillectomy;
- Excluding cases not requiring additional instrumental diagnosis or surgery; and
- Diagnosing obstructive forms associated with other causes (obesity, craniofacial anomalies, hypothyroidism, and nasal obstructions).
- Transnasal fibroendoscopy of the nasopharyngeal cavity is useful in defining the entity of the mechanical obstruction induced by adenotonsillar hypertrophy in children. Radiography of the craniofacial mass must, instead, be limited to cases in which bone-structure anomalies are suspected.
- Overnight polysomnography, which allows the severity of the sleep-associated disturbance to be objectively evaluated, is useful in cases for which the clinical evaluation is insufficient.

RECURRENT TONSILLITIS

Tonsillectomy is often performed in children and adults with recurrent acute tonsillitis, chronic tonsillitis, and recurrent episodes of sore throat. The most widely accepted criteria for defining severe tonsillar infection and the appropriateness of tonsillectomy are those first proposed by Paradise et al.¹⁹, specifically: at least seven episodes of tonsillitis, pharyngitis, or tonsillopharyngitis in the previous year, or five episodes per year in the previous two years, or three episodes per year in the previous three years. Each episode should be documented and be characterised by at least one of the following: fever (>38.3°C), laterocervical lymphadenopathy exceeding 2 centimetres, purulent exudate on the tonsillar tissue, and positive culture for group A beta-hemolytic streptococcus¹⁹. However, in clinical practice, the criteria used for deciding whether or not to perform tonsillectomy for treating tonsillar infection are much less stringent and extremely variable.

Evidence of the effectiveness of tonsillectomy

In their Cochrane review, Burton et al.²⁰ do not mention any studies on the effectiveness of tonsillectomy in adults. With regard to children, the authors conclude that the two trials in Pittsburgh coordinated by Paradise et al.^{19,21} do not provide definitive evidence of the efficacy of tonsillectomy in treating chronic or recurrent acute tonsillitis²⁰. In their reply to this critique, Paradise et al. claim that tonsillectomy is undoubtedly efficacious in reducing the occurrence of pharyngeal infections in the two years following surgery in children with severe forms of recurrent tonsillitis²⁰.

Another randomised controlled trial conducted by Paradise et al.²² concludes that tonsillectomy cannot be justified in children with recurrent infections not meeting the above criteria for severe infections, given the risks, cost, and postoperative morbidity (level of evidence III). The review produced by Clinical Evidence also reports that there is only evidence of the effectiveness of tonsillectomy for children with severe forms of recurrent acute tonsillitis yet that this evidence is limited²³.

In the guidelines of SIGN²⁴, on the basis of the opinions of experts (grade of recommendation C), tonsillectomy is indicated for both children and adults with recurrent acute tonsillitis characterised by five or more episodes per year that are disabling and interfere with normal activity. The symptoms must be present for at least 12 months and surgery must be preceded by an additional observational period of 6 months, so that the symptoms can be evaluated and the patient and his/her family can be informed of the implications of surgery. Once tonsillectomy is indicated, based on the above criteria, it must be performed as soon as possible.

No randomised controlled trials have evaluated the effect of tonsillectomy on the child's general wellbeing, development, or behaviour, although these can be important indicators of the outcome of treatment²³.

Suggestions for clinical practice

- Based on the SIGN recommendations²⁴, which are both reasonable and complete and which consider the impact of illness on daily activities, it is suggested that tonsillectomy be limited to children and adults with recurrent acute bacterial tonsillitis of proven severity, meeting the following criteria:
 - Five episodes of tonsillitis per year;
 - Episodes that are disabling and prevent normal functioning; and
 - Symptoms lasting at least 12 months

The episodes and symptoms must be documented in a special diary filled-out by the patient or his/her parents (see example below). An additional observational period of six months is necessary for evaluating the progress of the symptoms.

- For persons whose infection is not defined as severe and who respond to antibiotics, surgery is not advised.
- The above criteria can be applied with greater flexibility if any of the following conditions are met:
 - Significant laterocervical adenopathy (exceeding 2 centimetres) due to recurrent tonsillitis and persisting after antibiotic therapy;
 - One or more episodes of peritonsillar abscess;
 - Febrile convulsions; and
 - Malformative conditions of the respiratory or cardiocirculatory systems or other serious chronic illnesses.

Unless otherwise clinically indicated, the combined performance of tonsillectomy and adenoidectomy is not recommended.

SUSPECTED MALIGNANCY

A suspected neoplasm of tonsil can on rare occasions be an indication for tonsillectomy. The two most frequent events are squamous carcinoma of the head and neck of unknown primary site and unilateral tonsillar enlargement.

Evidence of the effectiveness of tonsillectomy

A retrospective registry-based study indicates that occult tonsillar carcinoma is often the origin of squamous carcinoma of the neck of unknown primary site²⁵. Bilateral tonsillectomy can aid in diagnosis and contribute to improving prognosis in these patients (level of evidence V).

Unilateral tonsillar enlargement, when not associated with other signs or symptoms of neoplasia, does not seem to represent an indication for immediate tonsillectomy in order to perform histological examination (level of evidence V). In a retrospective study, no cases of neoplasia were detected among 47 children less than 16 months of age with unilateral tonsillar enlargement and who had undergone tonsillectomy²⁶. Nonetheless, tonsillar lymphoma should be suspected in the presence of the following: unilateral tonsillar enlargement in immunocompromised children; previous neoplasia; acute asymmetrical tonsillitis with persistent asymmetry in volume and unresponsiveness to suitable medical treatment; and rapid bilateral enlargement of the tonsils²⁷ (level of evidence V).

Suggestions for clinical practice

- It is suggested that tonsillectomy be performed for confirmed or suspected tonsillar neoplasia and squamous carcinoma of the head and neck of unknown primary site.
- Monolateral tonsillectomy can be performed in select cases of malignant epithelial neoplasia of small dimensions, if metastatic laterocervical adenopathy has not occurred.
- In cases of unilateral tonsillar enlargement with no other signs or symptoms of neoplastic disease or conditions leading to neoplastic disease being suspected, the patient should be kept under clinical observation until a more complete clinical evaluation can be performed.

RECURRENT PERITONSILLAR ABSCESS

Peritonsillar abscess, which mainly occurs in adolescents and young adults²⁸, is the most common complication of acute tonsillitis, with pus accumulating in the space between the tonsillar capsule and the superior pharyngeal constrictor muscle, which can be involved in the infection. There are a number of non-mutually exclusive options for therapy, including antibiotic treatment, needle aspiration, surgical drainage, and immediate or delayed tonsillectomy.

Evidence of the effectiveness of treatment

One randomised controlled trial²⁹, one non-randomised controlled prospective study³⁰, and seven retrospective registry-based studies³¹⁻³⁷ have been identified. In the randomised controlled trial, persons who had undergone immediate tonsillectomy were compared to those who had undergone delayed tonsillectomy, in terms of the occurrence of perioperative complications, duration of hospital stay, and recovery time. Immediate tonsillectomy seems to be preferable²⁹ (level of evidence II), and it has been reported to be more cost-effective than delayed tonsillectomy or simple drainage in both children and adults³¹ (level of evidence V). In a prospective registry-based study conducted among 189 children treated with incision and drainage (without general anaesthesia) and intravenously administered antibiotics, resolution of the abscess was observed in most cases, and nearly half of the recurrences occurred within one month of discharge³², indicating that incision and drainage, combined with antibiotics, is effective in treating peritonsillar abscess (level of evidence V).

The rate of recurrence of abscesses is reported to range from 7%³³ to 16%³² in persons who have not undergone a tonsillectomy.

Given that little evidence is available, it is not possible to determine whether or not tonsillectomy is preferable to other types of treatment for peritonsillar abscess.

Suggestions for clinical practice

- In light of the scarcity of evidence, it is suggested that peritonsillar abscess be treated with incision and drainage combined with antibiotic therapy. The decision of whether or not to perform a tonsillectomy can be postponed until after the resolution of the acute phase (if recurrences are observed) or based on the above-specified criteria for recurrent tonsillitis.

CONDITIONS ASSOCIATED WITH GROUP A BETA-HEMOLYTIC STREPTOCOCCUS INFECTION (UPON EXCLUSION OF RECURRENT TONSILLITIS)

In this section, the term "conditions associated with group A beta-hemolytic streptococcus infection" is used to refer to the following: healthy carriers, patients with altered haematochemical parameters (indices of phlogosis and/or high anti-streptolysin titres), and patients with pathologies correlated with group A beta-hemolytic streptococcus infection [acute articular rheumatism, heart and kidney disease, and PANDAS (paediatric autoimmune neuropsychiatric disorder associated with group A streptococcus infection)].

Evidence of the effectiveness of tonsillectomy and adenoidectomy

No studies were identified on the effectiveness of tonsillectomy and adenoidectomy, either alone or combined, in treating the above conditions.

Suggestions for clinical practice

- It is generally accepted that tonsillectomy and adenoidectomy should not be performed for healthy carriers of group A beta-hemolytic streptococcus, which is perhaps reflected by the absence of studies.
- Antibiotic therapy has been proven to be effective in treating actual streptococcal infections³⁸ and correlated pathologies such as PANDAS³⁹.
- Patients with other clinical conditions associated with streptococcal disease should be evaluated on an individual basis.

PFAPA SYNDROME

PFAPA is a chronic syndrome occurring in children and characterised by periodic episodes of high fever (>39°C) lasting 3-6 days and recurring every 3-8 weeks, accompanied by aphthous stomatitis, pharyngitis, and cervical adenitis⁴⁰.

Evidence of the effectiveness of tonsillectomy

In three retrospective registry-based studies conducted among a limited number of persons with PFAPA who had undergone tonsillectomy (with or without adenoidectomy), clinical remission following surgery was observed in most cases (level of evidence V)⁴⁰⁻⁴². PFAPA has also been shown to respond to corticosteroids⁴⁰, and within a variable period of time it spontaneously resolves without sequelae⁴¹.

Suggestions for clinical practice

- Given that the evidence of the effectiveness of tonsillectomy in children with PFAPA is extremely weak (level of evidence V), it is suggested that tonsillectomy not be performed.

RECURRENT ACUTE OTITIS MEDIA AND CHRONIC OTITIS MEDIA WITH EFFUSION

Recurrent acute otitis media and chronic otitis media with effusion are two distinct middle-ear infections which occur in childhood. Chronic effusive otitis media is characterised by serous or mucoid, yet not mucopurulent, fluid in the middle ear ("glue ear") for more than 12 weeks; children present with modest hearing impairment and speech difficulties. Differently from acute otitis media, chronic effusive otitis media does not induce pain, fever, or general malaise⁴³. Recurrent acute otitis media is diagnosed when three or more episodes of acute otitis media, with local and general symptoms, occur within six months, or when four or more episodes occur within twelve months⁴⁴. The factors associated with a greater risk of recurrence are: inadequate treatment of acute otitis media, second-hand smoke, diabetes mellitus, immunodeficiency, chronic sinusitis, cystic fibrosis, and allergies⁴⁵.

Evidence of the effectiveness of adenoidectomy

According to a systematic review with metanalysis of five randomised controlled trials⁴⁶, adenoidectomy decreases the recurrence of acute otitis media in children who have undergone tympanostomy with ventilation placement (level of evidence I), whereas there is no apparent effect in children without tube placement. However, the populations of these trials were small and not totally comparable. The guidelines of the U.S. Institute for Clinical Systems Improvement (ICSI) for the treatment of otitis media⁴⁴ indicate that adenoidectomy is effective in treating recurrent acute otitis media after treatment with antibiotics and ventilation-tube placement, regardless of the size of the adenoids or the obstructive symptomatology. The effectiveness of adenoidectomy has only been demonstrated in children 4-8 years of age, yet the results can be generalised to a more inclusive age group⁴⁴. That the insertion of tympanostomic ventilation tubes and adenoidectomy, alone or combined, are effective in the long-term in treating chronic otitis media with effusion has not been proven⁴³. Moreover, there is no evidence of the effectiveness of tonsillectomy in chronic otitis media with effusion⁴³.

Suggestions for clinical practice

- It is first necessary to address the risk factors for recurrent acute otitis media (i.e., second-hand smoke, diabetes, immune deficiencies, cystic fibrosis, and allergies).
- Any infection in a nearby site must be treated, as in the case of chronic sinusitis and adenotonsillar infections.
- The available evidence suggests that adenoidectomy should be limited to children with recurrent acute otitis media previously treated with tympanostomy and ventilation-tube placement. In Italy, it has been generally accepted that obstructive adenoid hypertrophy can be treated with adenoidectomy and previous or concurrent ventilation-tube placement.
- On the basis of the available evidence, adenoidectomy is not recommended as the therapy of choice for chronic effusive otitis media. The presence of obstructive adenoids should be considered as a possible indication for surgery.

RECURRENT AND CHRONIC SINUSITIS

Chronic sinusitis is characterised by nasal congestion, rhinorrhoea, cough, cephalgia, and fever for more than 12 weeks⁴⁷. Given that the adenoids could act as a receptacle of infection, adenoidectomy has been indicated for treating chronic refractory sinusitis in children⁴⁸.

Evidence of the effectiveness of adenoidectomy

There is only weak evidence of the effectiveness of adenoidectomy in reducing the symptoms of chronic sinusitis in children (level of evidence III). This evidence derives from a prospective study⁴⁹ and a retrospective registry-based study⁴⁸; in the latter study, individuals who had undergone an adenoidectomy had previously been treated with antibiotics, yet unsuccessfully. A non-randomised prospective study showed that endoscopic sinus surgery was more effective than adenoidectomy in treating chronic sinusitis that was resistant to antibiotics, decongestants, and anti-allergens for at least six months⁵⁰ (level of evidence III). Another retrospective registry-based study reported that intravenous antibiotic therapy, in some cases combined with adenoidectomy, was effective in treating chronic sinusitis in children⁴⁷ (level of evidence V).

Suggestions for clinical practice

- Appropriately administered systemic antibiotic treatment⁵¹ should be considered as the treatment of choice for children with chronic sinusitis.
- Endoscopic sinus surgery and/or adenoidectomy are indicated if treatment with antibiotics is unsuccessful, which occurs more often in children with associated pathologies, that is, asthma or allergies, and with a high score according to the CT-staging system of Lund-MacKay⁵².

CHAPTER 2. PERFORMING TONSILLECTOMY AND ADENOIDECTOMY

SURGICAL TECHNIQUES

There exist various techniques for performing tonsillectomy. The removal of tonsillar tissue is generally performed through incision of the pharyngeal mucosa and dissection of the tonsil, followed by haemostasis with vessel ligatures (traditional “cold” or guillotine dissection).

Other surgical techniques, which allow the tonsils to be removed simultaneously with haemostasis, include:

- Electrosurgery or diathermy (monopolar and bipolar techniques);
- Radiofrequency, in which heat is generated by electromagnetic radiation (Bovie, Elmed, somnoplasty, coblation, argon plasma coagulators, echo-guided harmonious scalpel, microscope-assisted procedures); and
- Laser surgery (CO₂, KTP532, YAG, diode)

As an alternative to bilateral tonsillectomy, partial removal of the tonsillar tissue is sometimes used (tonsillotomy or partial intracapsular tonsillectomy), making ambulatory treatment possible. Complete adenoidal dissection, which is usually performed via the oropharynx, can be performed through the nostrils or using endoscopy, or it can be substituted by partial ablation. Whether or not any single technique is preferable in terms of effectiveness, safety, and cost-benefit continues to be a topic of debate.

Evidence of the effectiveness of the various surgical techniques

Given that few studies have been conducted and that these studies are small, it is not possible to evaluate the effectiveness of the various surgical techniques, nor is it possible to determine the potential advantages of novel techniques in terms of effectiveness, cost, or the risk of recurrence.

There is weak evidence (level of evidence II and III) that conservative surgery, such as tonsillectomy with CO₂ laser, partial intracapsular tonsillectomy, and partial adenoidectomy with microdebrider during endoscopy, reduces pain and postoperative recovery time and that these techniques are not less effective in resolving the obstructive symptoms two years after surgery⁵³⁻⁵⁷.

A systematic Cochrane review⁵⁸ and a more recent randomised controlled trial⁵⁹ compared conventional cold dissection to monopolar and bipolar diathermy in performing tonsillectomy, with or without adenoidectomy, in terms of postoperative morbidity (i.e., haemorrhaging, pain, and recovery time): the available data are not sufficient for demonstrating the superiority of one technique over another. Furthermore, diathermy, although apparently associated with reduced intra-operative bleeding, could increase postoperative pain. No differences in the occurrence of secondary haemorrhaging or in the time needed to return to normal functioning were observed.

A review of techniques for performing radiofrequency electrosurgery⁶⁰ reports that there is an association between the surgical treatment of tonsillar hypertrophy and reduced postoperative morbidity, although the same review mentions that additional studies are necessary for evaluating the effectiveness and cost-benefit ratio of these techniques.

Suggestions for clinical practice

The available evidence is not sufficient for justifying the performance of tonsillotomy or partial intracapsular tonsillectomy outside of clinical trials, although the techniques for performing these interventions differ from those used in the past. In addition to uncertainties regarding the advantages of these types of surgery, there exists a risk of recurrence due to residual tonsillar tissue.

- It is suggested that complete bilateral removal of the tonsils and adenoids be performed, even for treating obstructive forms.
- Given that there is no evidence of the superiority of any one surgical technique with respect to others, the choice should be based on the surgeon's experience.

ANAESTHESIOLOGICAL TECHNIQUES

General and local anaesthesia

Although local anaesthesia was used for tonsillectomy in the past, it has since been substituted by general anaesthesia, which is safer in terms of controlling the airways and the reaction to stress. For adenoidectomies, local anaesthesia is difficult to perform.

Evidence of the effectiveness of general vs. local anaesthesia

No recent studies have compared general anaesthesia to local anaesthesia. In a Cochrane review, local anaesthesia was only evaluated in terms of reducing pain following tonsillectomy⁶¹.

Suggestions for anaesthesiological practice

General anaesthesia constitutes the only suitable approach for performing tonsillectomy or adenoidectomy.

Intravenous and inhalatory general anaesthesia

General anaesthesia can be induced or maintained with anaesthetic drugs administered intravenously and/or through inhalation.

Evidence of the effectiveness of intravenous vs. inhalatory general anaesthesia

According to various randomised controlled trials, the completely intravenous administration of propofol is associated with a slower recovery of consciousness⁶², whereas the inhalatory administration of sevoflurane/desflurane is associated with a rapid yet more agitated awakening^{63, 64}. Differences in awakening times do not influence discharge times (level of evidence II)^{62, 65}. Two prospective studies have demonstrated that agitation upon awakening following anaesthesia induced by sevoflurane/desflurane can be prevented by adding nitrogen protoxide to the inhaled substances and by intravenously administering intraoperative analgesic opiates (level of evidence III)^{66, 67}.

Suggestions for anaesthesiological practice

- The available evidence suggests that inhalatory anaesthesia combined with intravenous opiates should be used to prevent agitation upon awakening.
- The choice of drugs and the means of administration can be left to the discretion of the anaesthesiologist, after having evaluated various clinical, instrumental, and laboratory parameters.
- Although the clinical studies mainly refer to children, the above suggestions can be generalised to adults.

Tracheal intubation and laryngeal mask airway

The laryngeal mask is placed in the hypopharynx and allows a direct connection with the airways to be established. It consists of a spoon-shaped mask with an inflatable rim and a tube which is connected at the distal end and which adapts itself to the ventilatory circuit. It is safer than a facial mask and can be used as an alternative to tracheal intubation.

Evidence of the effectiveness of tracheal intubation vs. laryngeal mask

Two randomised controlled studies have provided evidence that the laryngeal mask causes less stress for the patient than does tracheal intubation^{68, 69} (level of evidence II). However, its use also reduces the space available to the surgeon, potentially hindering performance⁶⁸. Moreover, it has been reported that in 4-11% of patients⁶⁸⁻⁷⁰ substitution of the laryngeal mask with a tracheal probe was necessary during surgery.

Suggestions for anaesthesiological practice

Given that it is safer and provides better access for surgery, tracheal intubation appears to be preferable to laryngeal mask in both children and adults.

Controlled and spontaneous ventilation

During general anaesthesia, pulmonary ventilation can be attained through spontaneous ventilation or controlled mechanical ventilation. The latter technique requires miorisolution obtained with curarizing drugs.

Evidence of the effectiveness of controlled vs. spontaneous ventilation

A randomised controlled trial conducted among persons 3-16 years of age indicates that spontaneous pulmonary ventilation leads to the inappropriate exchange of respiratory gases (O₂, CO₂) and haemodynamic instability⁷¹, compared to controlled ventilation (level of evidence II). Another randomised controlled trial shows that in children up to three years of age curarization is necessary, in that it facilitates tracheal intubation⁷².

Suggestions for anaesthesiological practice

- Controlled pulmonary ventilation provides a greater guarantee of safety in terms of the exchange of respiratory gases and haemodynamic stability, for both children and adults.
- Curarization facilitates tracheal intubation even in children up to 3 years of age.

PREOPERATIVE TESTS

Since haemorrhaging is potentially the most serious complication of adenotonsillectomy, preoperative screening is at times performed to identify patients at risk. Moreover, acute-phase reactants (ESR, RCP, and PCR) and/or antistreptolysin titres (AST) are at times required in preoperative testing. Chest X-ray is often used as part of routine examination.

Evidence of the effectiveness of preoperative tests

Some non-randomised studies on haematochemical screening for coagulopathies and anaemias have been identified, yet there are no studies on indices of phlogosis in the preparatory phase of surgery. The identified studies indicate that coagulative screening for perioperative haemorrhaging is not accurate in terms of sensitivity or specificity and that it has a limited predictive power in the absence of a clinical history of predisposition to bleeding⁷³⁻⁷⁵. The low prevalence of anaemia does not justify the routine use of preoperative haemoglobin estimation⁷⁶. No evidence is available on the utility of acute-phase reactants or on the performance of chest X-ray in preparation for surgery.

Suggestions for clinical practice

- Given the apparently low predictive power of haematochemical tests with respect to the risk of haemorrhage, it is suggested that, for both children and adults, preoperative screening for coagulopathies be performed using accurate information on the bleeding history, limiting the preoperative examinations, when necessary, to haemoglobin estimation, PT, and PTT.
- The use of acute-phase reactants (ERS, RCP, and PCR) and AST is not advised, in that they are of no clinical use in the preoperative phase.
- The routine use of chest X-ray is not advised, so as not to subject the patient, especially children, to unnecessary exposure to radiation.

CHAPTER 3. MANAGING TONSILLECTOMY PATIENTS

Following tonsillectomy, the patient may suffer sore throat and otalgia, halitosis, uvular swelling, difficulty in resuming a normal diet, stiff neck, malaise or prostration, fever, vomiting, and dehydration^{7, 77}. Sore throat is the most common disturbance and can last up to two weeks.

PERIOPERATIVE USE OF ANTIBIOTICS

Antibacterial prophylaxis is performed before, during, and/or after tonsillectomy to prevent streptococcal endocarditis in susceptible persons and to reduce the frequency and severity of postoperative symptoms, some of which could also depend on surgery-associated bacteremia.

Evidence of the effectiveness of perioperative antibiotics

In an observational study of persons who had undergone tonsillectomy for recurrent acute tonsillitis, haemoculture was positive for 40% of the patients; in most cases it was positive for *Haemophilus influenzae* and *Streptococcus viridans* (level of evidence III)⁷⁸. Resistance to penicillin and beta-lactamase production were observed in a high percentage of these patients⁷⁸.

Four randomised controlled trials (level of evidence II) have shown that perioperative antibiotic treatment reduces post-tonsillectomy morbidity and recovery time⁷⁹⁻⁸². These trials have also demonstrated that, in adults, amoxicillin and clavulanic acid, administered for seven days following surgery and preceded by intravenously administered ampicillin, are effective in reducing halitosis and the time necessary for returning to a normal diet and normal daily functioning⁷⁹; in children this regimen also reduces pain and the time necessary for returning to a normal diet⁸⁰. One trial also showed that cefaclor, a second generation cephalosporin, was no more effective than amoxicillin in reducing the severity and duration of postoperative symptoms in children⁸¹. However, whether or not certain antibiotics are more effective than others has not been concretely demonstrated, nor has the superiority of any one type of antibiotic regimen (i.e., single or repeated perioperative administration, prolonged oral postoperative treatment, topical use).

Suggestions for clinical practice

- To reduce the incidence and duration of postoperative symptoms in children and adults, it is recommended that amoxicillin and clavulanic acid (or other antibiotics with an analogous spectrum and cost) be administered in the short-term at a therapeutic dosage, simultaneously with the tonsillectomy.
- Macrolides should be avoided, given the potential presence of bacteremia from resistant agents, although they could be considered for patients who are allergic to beta-lactams.

PROPHYLAXIS FOR BLEEDING

Haemorrhaging represents the potentially most serious complication of tonsillectomy. When occurring within 24 hours of surgery, it is referred to as "primary haemorrhaging", whereas it is referred to as "secondary haemorrhaging" when occurring later (secondary haemorrhaging usually occurs within two weeks of surgery, most often within five to ten days). Although diathermy is associated with reduced intraoperative bleeding, the risk of postoperative haemorrhaging does not seem to depend on the specific surgical

technique^{58, 77, 83}. Primary and secondary haemorrhaging can require additional surgery, especially in children, who can suffer a significant loss in circulating volume.

The attempt to reduce the risk of haemorrhaging has included the use of locally applied bismuth subgallate-epinephrine paste and fibrin glue and, in light of reports of increased fibrinolysis following tonsillectomy, anti-fibrinolytic agents.

Evidence of the effectiveness of prophylaxis for bleeding

There is weak evidence, provided by a non-systematic review of three inadequately designed randomised trials and two retrospective studies⁸⁴ (level of evidence III), that locally applied bismuth subgallate-epinephrine paste is slightly effective after adenotonsillectomy, with an apparently low occurrence of side effects. The effect seems to depend on the epinephrine. A randomised controlled trial has shown that fibrin sponges locally applied after tonsillectomy are not effective in reducing the incidence of bleeding or pain in adults (level of evidence II)⁸⁵. No clinical studies on the use of anti-fibrinolytic agents in preventing haemorrhaging after tonsillectomy have been identified.

Suggestions for clinical practice

- In light of the available evidence, it is suggested that paste or glue not be used as prophylaxis for haemorrhaging after adenotonsillectomy.
- Given that there is no evidence of the effectiveness of anti-fibrinolytic agents in preventing haemorrhaging after tonsillectomy, the choice of whether or not to use them should be left to the discretion of the clinician.

PROPHYLAXIS AND TREATMENT OF POSTOPERATIVE PAIN AND VOMITING

Analgesics, local anaesthesia, non-steroidal anti-inflammatory drugs, opiates, and corticosteroids are the most commonly used drugs in preventing and treating tonsillectomy-induced pain, whereas corticosteroids and antiemetics (metoclopramide, perphenazine, ondansetron, granisetron, and tropisetron) are used to control postoperative vomiting. The safety of non-steroidal anti-inflammatory drugs in children who have undergone tonsillectomy has been questioned, in that the anti-aggregant activity of these drugs could lead to increased bleeding and risk of haemorrhaging.

Evidence of the effectiveness of prophylaxis and treatment of postoperative pain and vomiting

A Cochrane review⁶¹ has concluded that there is no evidence that the use of local anaesthesia at the peritonsillar level, either before or after tonsillectomy, reduces postoperative pain. The preliminary results of the Cochrane review of Siviter et al.⁸⁶ indicate that the available evidence is insufficient for advising against the use of non-steroidal anti-inflammatory drugs in children undergoing tonsillectomy. The use of non-steroidal anti-inflammatory drugs is associated with reduced nausea and postoperative vomiting⁸⁶, an effect that seems to be attributable to the diminished use of opiates. The means and times of administration and the specific molecules preferred in terms of effectiveness and safety remain to be determined. Two systematic reviews^{87, 88} provide contrasting results on the effectiveness of corticosteroids in reducing pain after tonsillectomy or adenotonsillectomy in children. However, intravenously administered corticosteroids have been shown to be efficacious in reducing postoperative vomiting and in decreasing the time for returning to a normal diet^{87, 88} (level of evidence I).

Some randomised controlled trials⁸⁹⁻⁹³ have shown that anti-emetics (perphenazine, ondansetron, and granisetron) are clinically efficacious in preventing vomiting in children who have undergone a tonsillectomy, either alone or combined with adenoidectomy (level of evidence I). It has also been reported that the less expensive perphenazine is just as efficacious as ondansetron^{89, 90} yet not as efficacious as granisetron⁹¹. Ondansetron is more efficacious than metoclopramide⁹², and granisetron is also efficacious in children with a history of motion sickness (level of evidence II)⁹³.

Suggestions for clinical practice

- The use of local anaesthetics in the peritonsillar region for controlling pain after tonsillectomy, alone or combined with adenoidectomy, is not advisable, also in consideration of the inhibitory effect on oro-pharyngeal reflexes.
- To control pain, it is suggested that effective and safe drugs, such as paracetamol, be used first. Because of anti-aggregant effects, the use of non-steroidal anti-inflammatory drugs is not advisable in either children or adults. They can be considered only after having evaluated the entity of the intra-operative bleeding.
- Acetylsalicylic-acid-based based drugs (aspirin) should not be used following adenotonsillectomy because of their potent anti-aggregant effects and the risk of developing Reye syndrome in children.
- Corticosteroids are useful in treating vomiting in children after tonsillectomy and can be used following individual clinical evaluation.
- It is suggested that corticosteroids not be used in managing pain following adenoidectomy.
- The simultaneous use of corticosteroids and non-steroidal anti-inflammatory drugs is not recommended because of the increased risk of erosive gastritis.
- It is suggested to limit the use of anti-emetic drugs of proven clinical efficacy to the treatment of postoperative vomiting, given both the possible side effects (dyskinesia) and the high cost. Perphenazine is just as efficacious as the newly developed anti-emetic drugs used in oncology and is available at about one-tenth the cost.

CHAPTER 4. CLINICAL AND ORGANISATIONAL ASPECTS OF ADENOTONSILLECTOMY

APPROPRIATE MEANS OF PROVIDING HEALTHCARE

In the Italian guidelines for day surgery developed by the Ministry of Health, the Regions, and the Autonomous Provinces of Trento and Bolzano, tonsillectomy and adenoidectomy are considered as interventions that can be performed as day surgery, as opposed to those requiring normal hospitalisation. Tonsillectomy, differently from adenoidectomy, is considered as one-day surgery (i.e., with overnight stay) or as requiring 24-hour stay in the hospital.

Day surgery may be performed in the following environments: in autonomous healthcare facilities that are functionally linked to hospitals, so as to manage eventual complications; in specialised day-surgery units; or in designated beds within wards for normal inpatient care⁹⁴. As reported in the Introduction of this document, in 2000, most tonsillectomies and adenoidectomies in Italy were performed as inpatient surgery, with an average trimmed duration of hospital stay of 2.5 and 2.1 days, respectively.

Evidence of the effectiveness and safety of various healthcare settings

In the Guidelines for Day Surgery in Otorhinolaryngology of the Italian Society of Otorhinolaryngology and Cervico-Facial Surgery, tonsillectomy and adenoidectomy are considered as one-day surgery⁹⁵, which is indicated for adenotonsillectomy because the postoperative observation period should not be too brief. These guidelines indicate that, based on the recommendations for anaesthesia in day-hospital settings developed by the Italian Society of Anaesthesia, Analgesia, Resuscitation, and Intensive Care⁹⁶, inpatient care should be limited to patients with severe clinical conditions (ASA physical status of >II).

In patients with severe OSAS, the administration of narcotics and sedatives during surgery has been associated with a risk of respiratory arrest⁹⁷. In fact, the use of these drugs could result in reduced pharyngeal muscle tone, which could critically aggravate obstruction. Nonetheless, to date, no universally accepted consensus has been reached on the best means of monitoring these patients after surgery or on the required duration of postoperative monitoring⁹⁷.

Determining the suitability of day care is also based on social criteria^{95, 96}. In particular, the patient (or his/her parents) should be able to follow medical instructions; the hygienic conditions where the patient plans to stay after surgery must be consistent with the postoperative indications; a responsible family member should accompany the patient and care for him or her in the 24 hours following surgery; and the patient (or person responsible for him/her) must have access to a telephone and should not be staying more than one half-hour from the facility where surgery was performed.

The prospective studies identified in the literature indicate that adenotonsillectomy in children can be safely performed as day surgery⁹⁸⁻¹⁰¹ or ambulatory care¹⁰²⁻¹⁰⁴, as long as there are no clinical or social contraindications (level of evidence III). Since the incidence of postoperative complications, in particular haemorrhage, appears to be limited in the first 4-8 hours after surgery, longer postoperative observation does not appear to be necessary. Analogous conclusions have been provided by studies on tonsillectomy in adults (level of evidence III)^{105, 106}.

Clinical-organisational suggestions

- Adenotonsillectomy must be performed by a specialist in Otorhinolaryngology.
- One-day surgery (one-night's stay, for a total stay of no more than 24 hours) appears to be, at least in Italy, the most suitable option for tonsillectomy, either alone or combined with adenoidectomy, in both children and adults with no clinical or social contraindications. This option is consistent with the recommended postoperative observation period of at least 4-8 hours, so as to minimise the risk of postoperative complications.
- In children with OSAS, perioperative care must be particularly attentive, in light of the decrease in pharyngeal muscle tone induced by narcotics and sedatives and the potential onset of collapse of the upper respiratory tract.
- Much attention must be placed on the risk of haemorrhaging after tonsillectomy in children, which is particularly dangerous in light of reductions in circulating volume.
- To guarantee optimal postoperative safety, tonsillectomy must be performed in a facility that can guarantee intensive care service.
- One-day surgery is not recommended for patients with an ASA physical status of >II.
- One-day surgery is not recommended if the following social conditions are not met:
 - The patient (or his or her parents or legal guardian) should be able to follow medical instructions.
 - The hygienic conditions where the patient plans to stay after surgery must be consistent with the postoperative indications.
 - A responsible family member must accompany the patient and care for him or her in the 24 hours following surgery or have access to a telephone or ensure that the patient will be staying no more than one half-hour from the facility where surgery was performed.
- Older age per se does not constitute a contraindication for one-day surgery.
- Upon discharge, the patient or his/her family must be provided with a discharge form that includes the care instructions to be followed at home and information on what to do in case of complications. The otorhinolaryngologist or the hospital paediatrician must be reachable by telephone 24 hours a day.
- Adenoidectomy without tonsillectomy can be performed as day-surgery without overnight stay.

CONDITIONS OF HEALTHCARE SETTINGS FOR CHILDREN

According to a Resolution of the European Parliament¹⁰⁷, children have the right to be admitted to a healthcare facility where there are other children, avoiding admission to a facility with adults. In Italy, the 1998-2000 Mother and Child Project developed in the framework of the National Health Plan states that children admitted to a healthcare facility should also be guaranteed the following:

- Admission to a facility appropriate for minors;
- The continuous presence of his/her parents (or a suitable substitute) in the healthcare facility;
- The availability of a play or study area, in cases of a prolonged stay in the facility; and
- Complete, accurate, and comprehensible information on the procedures to be performed.

The perioperative care of children should consist of the following:

- A warm and friendly environment;
- Pre-anaesthesia that guarantees a good level of sedation;

- Use of an anaesthetic cream before positioning the venous line; and
- The presence, both at pre-anaesthesia and upon awakening, of at least one of the parents, who must be granted access to the preparation and recovery rooms.

THE ROLE OF THE FAMILY PAEDIATRICIAN AND GENERAL PRACTITIONER

The family paediatrician and general practitioner are responsible for regularly following the patient during his/her stay in the healthcare facility and when at home. They are also responsible for performing and certifying the observations necessary for formulating an opinion and, when surgery is potentially indicated, referring the patient to a specialist in Otorhinolaryngology. The decision of whether or not to perform surgery and the specific techniques to be used is the responsibility of the otorhinolaryngologist.

The indications for tonsillectomy proposed by paediatricians, general practitioners, and otorhinolaryngologists vary greatly, as do the number of patients for whom tonsillectomy is recommended and the number of tonsillectomies performed¹. Before referring a patient to an otorhinolaryngologist, a more careful evaluation of the clinical indications provided by the paediatrician and general practitioner would be desirable. This evaluation would need to take into account the fact that parents are not always objective in reporting the frequency and severity of their child's symptoms. This is one of the reasons for which episodes of recurrent acute tonsillitis must be well documented and a period of controlled observation is necessary. In this light, the paediatrician and general practitioner's understanding of the dynamics of the patient's family is important, as is their ability to explain to the parents why it is best to wait before opting for surgery.

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