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What is the right size of the adenoid curette?

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Abstract

The use of an adenoid curette of appropriate size is recommended in operative textbooks for adequate adenoid removal and avoidance of potential injury to the eustachian tubes. The aim of this study is to calculate the right size of adenoid curettes to be used for children of different ages. The inter-tubal space (ITS) between the torus tubarius on both sides is the narrowest passage for adenoid curettage, and is identified in this study as the nasopharyngeal dimension to be considered in selecting the size of the adenoid curette. This prospective study is carried out on a series of 72 adenoidectomy cases aged from three to nine years at the Hearing and Speech Institute in Cairo, Egypt. The inter-tubal dimension (ITD) is measured for each child at the end of adenoidectomy and the results are recorded against the patient's age. The ITD ranged from 17–21 mm in our series with no significant difference between males and females. There is an increase in ITD with age with a sharp increase at ages five and seven years. Accordingly, the patients are divided into three age groups and recommendations for appropriate adenoid curette sizes ranging from 18 to 21 mm are given for each group.

Key words: Adenoids; Adenoidectomy; Anatomy; Nasopharynx; Surgical Instruments

Introduction

What sizes of adenoid curettes should be purchased for a new adenoidectomy instrument set, and which sizes of curettes should be selected for an adenoidectomy procedure in accordance with the patient's age? These are the questions that this study attempts to answer.

Adenoidectomy, being one of the most widely performed surgical procedures in otolaryngology, is indicated for the relief of nasal obstruction, recurrent or chronic ear and sinus infections in children, as well as for recurrent adenotonsillitis where it is performed together with tonsillectomy.[1]

In spite of recent reports on new methods for adenoidectomy utilizing nasal endoscopy, electrocautery, lasers and microdebriders, the technique most widely used remains the trans-oral adenoid curettage.[2–5] This is mainly due to its simplicity, low cost and limited incidence of complications.[6]

Although operative textbooks recommend the use of an adenoid curette of appropriate size to achieve thorough removal of the adenoid tissue and to avoid injury to the eustachian tube structure,[7] the selection of the right size of adenoid curette to be used, however, is not referred to and is left for the judgment of the surgeon during the operation. Moreover, in spite of wide debates on the effect of adenoidectomy on otitis media with effusion (OME), recommendations on the size of adenoid curettes to be used have not been addressed in the related literature.[8–10]

The author believes that the size of the adenoid curette used in adenoidectomy for a given patient age, is a variable that should be taken into consideration when evaluating the effect of adenoidectomy on the eustachian tube function. This may be explained by the following anatomical and technical considerations, which constitute the rationale of this study.

Rationale and aim of the study

By repeated direct and indirect visual examination of the nasopharynx and adenoids, the author has made the following observations. The main mass of the adenoid tissue is situated between the eustachian tube bodies (torus tubarius) on each side. Thus for an adenoid curette to engage well around the base of the adenoid and achieve complete removal, it should pass comfortably in the space between the torus tubarius on each side, that will be referred to as the inter-tubal space (ITS) (Figure 1).

If the curette is larger than the ITS, it will be hindered from abutting the posterior pharyngeal wall by the mass of the torus tubarius, and thus may not totally remove the adenoid flush with the pharyngeal wall, and may result in remnants of tissue. In addition, the resulting pressure by the curette on the eustachian tubes (ET) is a potential

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cause of blunt or sharp trauma to its lumen or orifice, an undesirable potential sequel, particularly when it is hoped to improve an associated OME by the procedure.

On the other hand if the curette is smaller than the ITS, adenoid remnants, mainly superiorly, may result following the first stroke. These remnants are usually difficult to remove by further strokes and, if neglected, may cause bleeding, infection or persistent symptoms.

Although it is recommended in most operative texts that adenoid curettage be done under vision using a postnasal mirror, in practice this is not always possible since the eustachian tubes are hidden from view by the mass of the adenoids, so the first stroke by the curette is usually taken blindly and the resulting bleeding will not allow clear vision into the nasopharynx during the following strokes.[6,11] Thus a correctly fitting curette cannot always be selected in time, assuming that an appropriate selection of curette sizes is available in the instrument tray.

In this prospective study we aim at measuring the width of ITS in otherwise normal children of different ages undergoing adenoidectomy. The resulting information is hoped to be useful for preoperative selection of the adenoid curette(s) of suitable size according to the child's age, in an attempt to offer the safest and best possible results by which the procedure of adenoidectomy can be more accurately evaluated. More over, the same findings may be useful as a guide for the purchase of appropriate curette sizes for a new adenoidectomy instrument set.

Material and methods

A prospective study was performed on a successive series of children undergoing adenoidectomy in the period from November 1997 to December 1999 at the Hearing and Speech Institute.

Patients aged between three and nine years of both sexes were included in the study. Ages above nine and below three were not included due to the lower number of cases beyond this age range.

Patients with evidence of craniofacial anomalies including cleft palate or Down's syndrome were excluded due to the possible variation in size of the nasopharynx.

The indications for adenoidectomy were adenoid hypertrophy presenting with significant respiratory disturbance, rhinitis, OME, or in association with tonsillectomy. The results were recorded in a computerized spreadsheet.

Structure of the adenoid curette

The adenoid curette is formed of a handle, a shaft, a shoulder, two arms and a sharp blade. The space surrounded by the arms and the blade is the fenestrum or cage of the curette (Figure 1).

The outer dimension (OD) will be used as reference to the size of the curette. The OD is the outer distance between the blade arms, while the inner dimension (ID) is the inner distance between the arms, equal to the width of the blade. The difference between OD and ID varies between 2 and 4 mm, according to the brand and make of the curette. This difference is determined by the thickness of the arms. The smaller the OD/ID difference, the wider is the fenestrum and thus the capacity of the curette.

Technique of measurement of the inter-tubal space (ITS)

Under general anaesthesia, adenoidectomy is performed using the best fitting curette in the ITS. After haemostasis is achieved, the soft palate is retracted using a catheter passed from one nostril to the mouth and its ends are held together by a haemostat. A laryngeal mirror of suitable size is warmed in hot water and held with the left hand to observe the nasopharynx, the ET structures, and posterior nasal choanae. At this stage any adenoid remnants can be removed under vision using small adenoid curettes (15–16 mm OD), upturned Blakesly forceps or curved haemostats.

The width of the ITS, or the inter-tubal dimension (ITD), is then measured using adenoid curettes and laryngeal mirrors of different sizes, ranging from 17 to 22 mm OD (Figure 2).

Measurement is done under indirect vision by holding the viewing laryngeal mirror in the left hand while the measuring instrument is gently passed in the ITS with the right hand. The width of the ITS is identified by the width of the measuring instrument which touches both torus tubarius simultaneously without causing indentation in either side. The findings are recorded immediately for each case.

Results

Seventy-two patients were identified in this study, 30 females and 42 males. Their ages range from three to nine with a mean age of 5.3 years.

All cases were operated on for adenoidectomy, either alone or associated with tonsillectomy, myringotomy or both.

The results were recorded in a computerized tabular spreadsheet with columns for patient name,

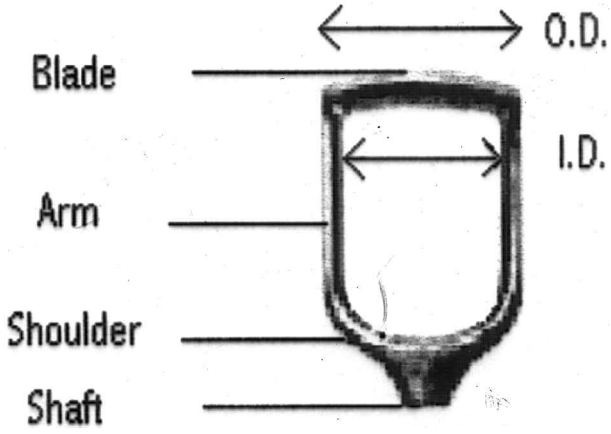

FIG. 1

Structure and dimensions of the adenoid curette. OD = Outer dimension, ID = Inner dimension.

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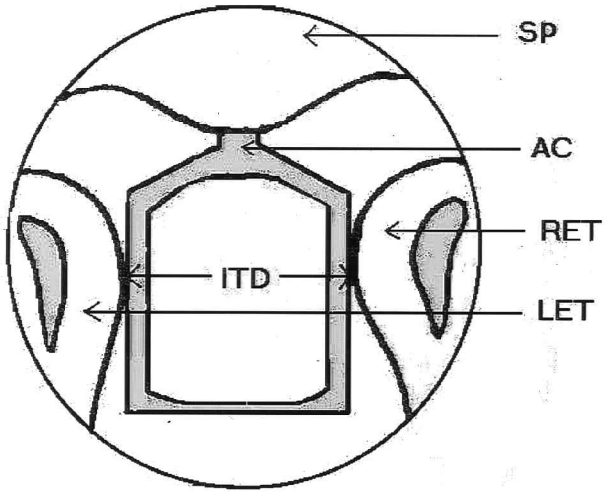

FIG. 2

Diagrammatic illustration demonstrating the position of the adenoid curette within the inter-tubal space (ITS) in the nasopharynx as seen through the laryngeal mirror during adenoidectomy. The curette is used here as a measurement tool for the inter-tubal dimension (ITD).
SP = Soft palate, AC = adenoid curette; ITD = inter-tubal distance; RET = torus tubarius of the right eustachian tube; LET = torus tubarius of the left eustachian tube.

sex, age in months and ITD in mm. Graphs were reproduced from the results to allow visual interpretation (Figures 3(a) and (b)). Elements of the graphs are age in months *versus* ITD in mm (Figure 3(a)), and number of patients *versus* age in months (Figure 3(b)).

The values of ITD for all patients ranged from 17–21 mm. The average ITD is 19.06 mm for the female patients and 19.44 mm for the male patients.

Figure 3(a) demonstrates two sharp (step-like) elevations in ITD value. One at age five years (60M) and another at age seven years (84M). According to this finding, the patients were divided into three age groups: Group I (ages from 36 to 59 M, n = 31), Group II (ages from 60 to 83 M, n = 23) and Group III (ages from 84 to 119 M, n = 18).

The calculated average ITD measurements in each group were as follows: Group I = 18 mm, Group II = 19.95 mm and Group III = 20.7 mm (Table I).

For each age group, the recommended adenoid curette sizes are selected according to the average ITD (Table I). Thus the recommended adenoid curette sizes are OD 18 mm for group I, OD 19–20 mm for group II, and OD 20–21 mm for Group III. Two curette sizes are selected in groups II and III because variations in ITD were found to exist within each of the above groups due to variable sizes of the nasopharynx and thickness of ET cartilage. The adenoid curette is tested for comfortable placement within the ITS prior to curettage, and the largest curette that comfortably fits within the ITS is selected. Due to the pliability of the eustachian tube cartilage, an adenoid curette up to 1 mm larger than the ITD may still be safely placed within the ITS.

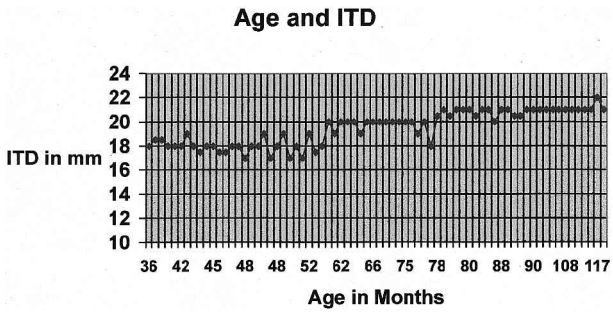

FIG. 3 (a)

Graphic presentation of the relation between age of child in months ('x' axis) and the inter-tubal dimension (ITD) in millimeters ('y' axis). Note the step ladder elevation of ITD value at 60 months and 84 months of age.

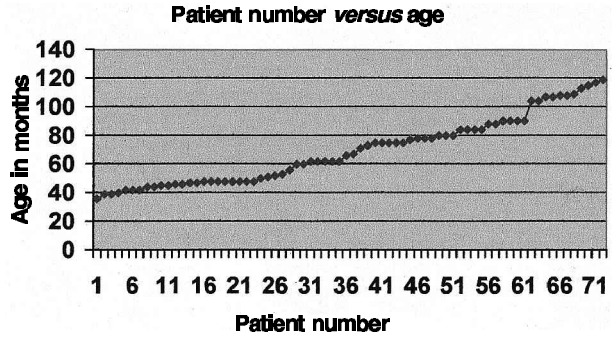

FIG. 3 (b)

Graphic presentation of the number of patients ('x' axis) versus age in months ('y' axis). Each square dot represents one patient.

In our series, we had no cases of post-operative bleeding or aural complications such as acute otitis media or effusion. No cases had post-operative persistent nasal tone or nasal obstruction due to residual adenoid tissue.

Discussion

Evolution of sophisticated surgical equipment has resulted in the development of new methods for adenoidectomy, which provide more precise removal of the adenoids. Examples are endoscopic adenoidectomy, electrocautery and laser vaporization, and the use of powered instrumentation for adenoidectomy.[2–4,12] Such methods can be of much use in selected cases with submucous cleft palate or velopharyngeal insufficiency, where a partial adenoidectomy is required.[13] However, other reports shed light on more aggressive complications such as extensive fibrosis and stenosis of the nasopharynx and eustachian tubes with laser adenoidectomy.[14]

In children, adenoidectomy using the curette under indirect vision seems to have passed the test of time due to its gratifying results, simplicity, low cost and limited complications.[6,11] Adenoid curettage is thus expected by the author to continue being a widely used method, particularly in developing countries, due to the high number of adenoidectomy

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operations and the variability of patients and operative settings, most of whom cannot afford the expense of alternative sophisticated equipment.

The inter-tubal space (ITS) is identified in this study as the most vital nasopharyngeal dimension to be considered in selecting the appropriate adenoid curette.

It has been well recognized that the size of the nasopharyngeal cavity in children increases with age.[15] This has been demonstrated in this study, where an increase of the ITD was observed with age (see Table I).

Maw,[16] in his study on the effect of adenoidectomy on OME in relation to age, reports that there was a trend for improved clearance of effusions in children more than six years of age, compared with those less than six years. Another study identifies the age of four as the pivotal age above which adenoidectomy becomes more effective for treatment of OME.[9] This observation may have a relation to the smaller size of the ITD in the younger patients, putting them at a higher risk of residual adenoid remnants or even trauma to the ET structure caused by the use of a larger curette than the ITD dimension. In our study the average ITD dimensions at ages three and four was calculated to be 18 mm, while most adenoid curettes encountered in instrument sets at different hospital settings had an OD of 19–21 mm.

Standardization of the size of the adenoid curette according to the age of the patient may be necessary for a safe and thorough adenoidectomy due to several reasons. In addition to being one of the most performed operations in otolaryngology, adenoidectomy by curettage is commonly performed by junior otolaryngologists. Junior surgeons may not have developed the skill of excessive caution and meticulous removal of adenoid remnants following curettage compared to their more experienced colleagues. A guide to the right curette size is hoped to improve the outcome by reducing the incidence of adenoid remnants and their sequelae, as well as by reducing the risk of ET injury.

Pre-operative selection and preparation of the required curette sizes according to the patient's age, as mentioned previously, provides the right instrument in the right time during the operation.

Research on the effect of adenoidectomy on OME may give more valuable result if there was adherence to a standardized method for selection of adenoid curette size according to patient age. This will reasonably exclude flaws in results due to potential residual eustachian tube dysfunction resulting from pressure by adenoid remnants or from ET trauma inflicted by a large curette.

Knowing the right sizes and specifications of the adenoid curettes required in adenoidectomy instrument sets is hoped to save effort and money during the purchase order of these sets for new operating theatre settings.

Conclusion

Adenoid curettes of sizes 18, 19, 20 and 21 mm OD are recommended to be available in the adenoidectomy surgical instrument setting for patients of ages three to nine years in both sexes. For each age group, three to four years, five to six years and seven to nine years it is recommended to prepare curette sizes 18 mm for the first group, 19 and 20 mm for the second group and 20 and 21 mm for the third group (see Table I). During adenoidectomy, a 1 mm larger or smaller curette is tested and the largest curette that comfortably fits within the ITS is chosen.

- **This paper looks at the size of the nasopharynx in the inter-tubal region and correlates this to the optimum size of adenoid curette required to effectively remove an adenoidal mass**
- **The right size of curette will reduce the risk of adenoidal remnants developing as well as reducing the risk of injury to the eustachian tube**
- **The authors also argue, less successfully, that reporting of the results of the effects of adenoidectomy will be facilitated if a uniform approach to removal is adopted**

In addition to the above sizes, a small (15–16 mm OD) curette may be helpful for the final removal of adenoid remnants adjacent to the eustachian tubes under indirect vision.

In selection of adenoid curettes, it is recommended that the arms be as thin as possible (1–1.5 mm) to provide a higher capacity of the fenestrum, thus allowing better encroachment and more complete removal of the adenoid tissue.

Finally, the curette blade should be kept sharp at all times.

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