

Adenoid enlargement assessment by plain X-ray & Nasoendoscopy

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Abstract

Background: The adenoid is a mass of lymphoid tissue embedded in the mucosal membrane of the nasopharynx.

The aim: The aim of the study was to clarify the accuracy of both lateral post nasal space X - ray and nasoendoscope in evaluation of the adenoid size.

Patients and Methods: This study included (150) patients with symptoms of upper airway obstruction. All of them evaluated clinically, by lateral plain X-ray of the soft tissue of nasopharynx and nasoendoscope to determine the size of the adenoid, All patients were seen and examined in the outpatient clinic of E.N.T Department of Al-Yarmouk Teaching Hospital from January 2009-January 2010.

Results: The highest incidence of large adenoid was seen in 3-5 years old patients (60%) while the lowest incidence was seen in 9-12 years old patients (18%) with male: female ratio as 1.1:1.

Conclusions and Recommendations: Evaluation by endoscope was highly accurate than evaluation by X – ray. Hence, children with classical symptoms of upper respiratory tract obstruction, even without adenoid hypertrophy revealed by X - ray, suggested to be submitted to nasoendoscope for diagnostic accuracy, which is greatly relevant especially for more secure indication of adenoidectomy and help in avoiding unnecessary operation.

Key words: Adenoid hypertrophy. X-ray of the nasopharynx. Nasoendoscope.

Introduction

The adenoid is a mass of lymphoid tissue embedded in the mucosal membrane of the nasopharynx. It is a normal structure with definite function. The size of adenoid varies from child to child and also in the same individual as he grows. In general, the normal adenoids attain their maximum size between the ages of 3 and 7 years and then regress. ⁽¹⁾

By the age of 2 years hypertrophy and hyperplasia of the adenoid occurs from 3-5 years with a consequent decrease in the nasopharyngeal airway. After that the size of adenoid remains relatively constant while the nasopharynx increases in size. Involution of the adenoid occurs after puberty; however, the lymphoid tissue persists into all ages. ⁽²⁾

Hypertrophy usually follows upper respiratory tract infection with multiplication of lymphoid follicles. ⁽³⁾ However, it has been suggested that allergic episodes also result in adenoidal enlargement. ⁽¹⁾ It is the size of the adenoids relative to the nasopharynx that may be important, rather than the actual size.

Hypertrophic adenoids block the posterior choanae, interfering with nasal airflow and the drainage of secretions. They harbour pathogenic bacteria which proliferate rapidly after viral infection. ⁽⁴⁾

Aim of the study

The aim of the study was to clarify the accuracy of both lateral post nasal space X - ray and nasoendoscope in evaluation of the adenoid size.

Patients and Method

This study included (150) patients with symptoms of upper airway obstruction. All of them evaluated clinically, by lateral plain X-ray of the soft

tissue of nasopharynx and nasoendoscope to determine the size of the adenoid.

All of these patients were seen and examined in the outpatient clinic of E.N.T Department of Al-Yarmouk Teaching Hospital from January 2009-January 2010.

Assessment of the patients:

- 1- Clinical assessment: full history and examination was conducted in a routine way.
- 2- Radiological assessment: lateral plain X – ray of the nasopharynx was done to have an idea about the size of adenoid and its relation to the size of the nasopharynx. The adenoid was considered small if it takes nearly 25% of the nasopharynx, moderate if takes nearly 50% and large if takes more than 75% of the nasopharynx.
- 3- Endoscopic assessment.

The size of adenoid was determined according to Clemens et al classification ⁽⁵⁾ as shown in Table (1).

Table 1: Clinical endoscopic grading of adenoid size

Grade	Description
Grade I	Adenoid tissue filling one-third of the vertical portion of the choanae
Grade II	Adenoid tissue filling from one-third to two-thirds of the choanae
Grade III	From two-thirds to nearly complete obstruction of the choanae
Grade IV	Complete choanal obstruction

Results

The study revealed that the age range of our patients was between 3 & 12 years with 6 years as

mean age (6 ± 2.33). The highest incidence of large adenoid was seen in 3-5 years old patients (60%) while the lowest incidence was seen in 9-12 years old patients (18%).

Gender distribution revealed that 81 patients (54%) were males and 69 patients (46%) were females with male: female ratio as 1.1:1.

There was seasonal variation in the incidence of presentation between winter months and other months, 89 patients presented in winter months (59.33%) and 61 patients in other months (40.66%).

Table 2: Adenoid size (based on lateral plain radiograph of post nasal space):

Adenoid size	Patients with adenoid hypertrophy (n=150)	
	No.	%
Large	74	49.3
Moderate	51	34.0
Small	25	16.7

According to plain X – ray of the nasopharynx large size adenoid was seen in 74 patients (49.3%), moderate size in 51 patients (34%) and small size seen in 25 patients (16.7%) as shown in table 2.

According to endoscopic assessment, the commonest grade of adenoid size was grade III seen in 50 patients (33.3%) and the least common grade of adenoid size was grade I seen in 20 patients (13.3%). As shown in table 3.

The relationship of between adenoid size by X – ray and by endoscope is shown in table no. 4.

Table 3: Adenoid grading according to endoscope:

Adenoid grade	Patients with adenoid hypertrophy (n=150)	
	No.	%
IV	37	24.6
III	50	33.3
II	43	28.6
I	20	13.3

Table 4: The relationship between adenoid sizes assessed by lateral X-ray and endoscope:

Adenoid size based on lateral x-ray	Adenoid grade based on nasoendoscope			Total
	I	II	III and IV	
Small	12 (48.0%)	11 (44.0%)	2 (8.0%)	25
Medium	7 (13.7%)	30 (58.8%)	14 (27.5%)	51
Large	1 (1.4%)	2 (2.7%)	71 (95.9%)	74
Total	20	43	87	150

$P=0.0001^*$ (Highly significant using Pearson chi-squared test at 0.05 level of significance)

Discussion

The results revealed that the age range of the studied patients was between 3 & 12 years with 6 years as mean age (6 ± 2.33). The highest incidence of large adenoid was seen in 3-5 years old patients (60%) while the lowest incidence was seen in 9-12 years old patients (18%).

These findings were probably due to rapid growth of lymphoid tissue and relative decrease in post nasal space in addition to highest incidence of upper respiratory tract infection (viral or bacterial) due to low immunity during childhood period. ⁽⁶⁾

Different results were reported by others. Pruzansky reported that large adenoids were most frequently observed between the ages of 6-8 years. ⁽⁷⁾ Fujioko and Young reported that adenoidal-nasopharyngeal ratio reached its highest value at age 4 years and then decreased in 1398 referred patients. ⁽⁸⁾

Another study by Bercin and his colleagues reported that adenoids reach a maximum size at the age of 3-7 years, and then start to regress. ⁽⁹⁾ These differences in the current study probably suggests that our patients exposed to recurrent URTI infection

earlier in their life due to their lower immunity than the patients in the other study.

A study by E.S. Kolo and his colleagues revealed that 22 (64.7%) were males and 12 (35.3%) were females in their study of 34 children with obstructive adenoids. ⁽¹⁰⁾ While the results of this study revealed that 81 patients (54%) were males and 69 patients (40%) were females, with male to female ratio as 1.1:1. Differences probably were due to the larger sample studied in our study.

There was seasonal variation in the incidence of adenoid hypertrophy, 89 patients (59.3%) presented in winters' months and 61 patients (40.6%) presented in other months. This is mostly due to increased incidence of upper respiratory tract infection during winters' months which might leads to adenoid hypertrophy.

Ziel huis, Rach and Van Den Broek stated that 39% of adenoid hypertrophy were presented in winters' months compared with 29% in summer months. ⁽¹¹⁾

In order to compare the results obtained by X-ray with endoscopic findings, we consider grade I equal to small size adenoid, Grade II equal to moderate

size adenoid and summation of Grade III and IV equal to large size adenoid.

The differences between the results of endoscopy and the results of X-ray as shown in table no. 4 which revealed that endoscope was higher than X – ray in determining the size of adenoid.

These differences were probably due to many factors which may included the lack of standardization of X - ray, the 2 dimensional views by X - ray rather than the 3 dimensional views by endoscope ⁽¹²⁾, and the effects of positional changes and respiration movement of the patient, all these are examples of factors that may influence the findings and evaluation of the adenoid size by plain x-ray. ⁽¹³⁾

Cohen, Koltai and Scott found also support the inaccurate assessment of the adenoid size by plain X – ray, since they found that X – ray examination of the postnasal space to determine the adenoid size and the postnasal airway was poorly correlated with the size of adenoids at operation. ⁽¹⁴⁾

On the other hand nasal endoscope was a reliable, safe, easily tolerated with 3 dimensional view and probably play an important role in differentiation of adenoids from other masses which have the same appearance on plain X – ray as tumors, cysts and aneurysm.

Evaluation by endoscope was more accurate than evaluation by X – ray. [P=0.0001* (Highly significant using Pearson chi-squared test at 0.05 level of significance)].

These results are supported by Yilmas and Kindermann and their colleagues in their assessment of the adenoid size. ^(15,16)

Another important fact in the adenoid enlargement that the growth can be in lateral directions which will be missed by lateral plain X-ray of the postnasal space.

This fact was stressed on by Wright and his colleagues in their study on the importance of endoscope in the assessment of adenoid enlargement in lateral direction rather than anterior direction which will be missed by routine X – ray of the postnasal space. ⁽¹⁷⁾

The current findings were in agreement with Lourenco et al who found that the mouth breather children who showed small adenoid by X-ray were mostly had moderate size adenoid when examined by endoscopy, those with moderate size adenoid by the X-ray were mostly considered large by endoscope and lastly those with large adenoid seen by X-ray were seen also large by endoscope. ⁽¹²⁾

This is why made Wormald and Prescott to indicate in doubtful cases nasal endoscopy under local anesthesia to provide definitive evaluation of nasal cavity and the state of post nasal space. ⁽¹⁸⁾

Conclusions and Recommendations:

1. Maximum age incidence of adenoid hypertrophy in children was in 3-5 years, which

reflect the importance of the screening program in preschool and first year school children for early diagnosis and management.

2. Children with classical symptoms of upper respiratory tract obstruction, even without adenoid hypertrophy revealed by X – ray, suggested to be submitted to endoscope for diagnostic accuracy, which is greatly relevant especially for more secure indication of adenoidectomy and help in avoiding unnecessary operation surgery.

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