

# Grading adenoid utilizing flexible nasopharyngoscopy

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**BACKGROUND AND OBJECTIVES:** To assess the possibility of adenoid size asymmetry in both nasal sides by nasopharyngoscopy.

**DESIGN AND SETTINGS:** This is a prospective study involving 100 children, with age ranging between 1 and 12 years, performed in Saudi Arabia between January 2010 and December 2011.

**METHODS:** Adenoid was examined and graded I-IV in relation to posterior choana bilaterally by flexible nasopharyngoscopy. The adenoid grade was compared with the other side in each child.

**RESULTS:** The findings from endoscopy were analyzed: there was a high degree of agreement in grading both sides, that was 92% with kappa=0.868. Moreover, there was grade asymmetry in 8% of the cases.

**CONCLUSION:** Adenoid grading using flexible nasopharyngoscopy through one side of the nose may not represent the adenoid grade of the other side in all cases.

Adenoid is a lymphoid tissue in the nasopharynx, which is part of Waldeyer ring, and it is considered as a normal phenomenon seen in young children.<sup>1</sup> Its enlargement is considered as one of the most common causes of nasal obstruction (snoring and mouth breathing) in pediatric age group. Also it may be associated with other consequences such as sleep disordered breathing and otitis media with effusion.<sup>2</sup> However, there is little consensus among surgeons about how to assess the adenoid size preoperatively.<sup>3,4</sup> Some consider a history of persistent upper airway obstruction to be important factor when deciding on adenoidectomy, while others believe that radiographic evaluation is more important in the preoperative assessment.<sup>3,5,6</sup> Hibbert<sup>7</sup> stated that there is no statistical relationship between the history of nasal obstruction and the size of adenoid after surgical removal. Symptoms and signs may not also be a good indicator of adenoid weight, but they could often be ascribed to allergic or chronic rhinosinusitis.<sup>3,8</sup> However, with practice the diagnosis can commonly be reached based on radiography or nasal endoscopy. It is known that plain radiography has a disadvantage of exposure to radiation and it has its limitations.<sup>9</sup> However, nasal endoscopy either rigid or flexible is considered to be more accurate,<sup>9</sup> though endoscopy may not be available everywhere. In 1901, Hirschmann performed the first nasal endoscopy in human beings.<sup>10</sup>

The examination was difficult to perform and uncomfortable for patients because a Hopkins rigid telescope was used. The development of flexible fiberscope made the inspection of the deepest nasal areas possible and provided a wealth of details.<sup>11,12</sup> Adenoid tissue can be visualized, and the patency of the upper airway can be evaluated.<sup>11,13,14</sup> Moreover, it can detect other obstructive factors, such as septal deviation, choanal atresia, polyps, and tumors.<sup>10,15</sup> Nasal endoscopy is a reliable, safe, well tolerated, and dynamic diagnostic method, it gives accurate and objective results.<sup>16</sup> Generally, the assessment of images acquired during endoscopy shows variances. However, the size of adenoid tissue in relation to posterior choana is determined visually and estimations are based on the subjective assessment of clinicians.<sup>16</sup> To the best of our knowledge, comparing the adenoid grade between both sides of the nose had never been described in the published reports.

The aim of this study is to compare the adenoid grade between each side of the nose and to explore the possibility of having faulty management of the adenoid based on inaccurate grade.

## METHODS

This study was performed in Saudi Arabia between January 2010 and December 2011. A total of 100 children were involved in this study, with the age ranged

between 1 and 12 years. Most of the children presented with the history of nasal obstruction, snoring, mouth breathing, and rhinorrhea. Obstructive sleep apnea was present in some of them. Children with the history of adenoidectomy were excluded from the study. All patients underwent postnasal space examination by flexible nasopharyngoscopy, which was done after preparing the nose with lidocaine and xylometazoline spray in both sides. All of the exams were done by the most senior author.

Adenoid grade through each nose was recorded and compared with the other side of the nose. Adenoids were categorized into the following 4 grades according to the percentage of the adenoid tissue that cause the blockage of posterior choana: Grade I – adenoid tissue obstructs 0% to 25% of posterior choana; Grade II – adenoid tissue obstructs 26% to 50% of posterior choana; Grade III – adenoid tissue obstructs 51% to 75% of posterior choana; and Grade IV – adenoid tissue obstructs 76% to 100% of posterior choana.<sup>2</sup>

Program 4F from BMDP 2007 statistical software was used for the statistical analysis. Significance was assumed for *P* value to be .05 or less.

### RESULTS

This study involves a total of 100 consecutive children who underwent bilateral adenoid grading by using flexible nasopharyngoscopy. Out of 100, children 92 (92%) had similar adenoid grade on both sides. Eight (8%) children had asymmetrical grade (Table 1).

In Table 1, the frequencies along the diagonal line represent the cases where the two sides of the nasal cavity confirmed similar adenoid grade. Therefore there were 92 out of 100 (92%) total agreement.

The reliability of the right side grading compared with the left side grading was further investigated by using the frequencies along the left to right diagonal to compute a value for kappa. The value obtained for kappa statistic was equal to 0.868, which indicates strong

agreement between results from the two sides, which is indicated by McNemar's in Table 1.

The pattern of frequencies above the diagonal line (all zeros) differed significantly from that below the diagonal line with *P*=.046. This reflected a higher grade in the left side for all asymmetrical cases.

### DISCUSSION

Nasal endoscopy is considered to be one of the best available tools to assess the adenoid size.<sup>17</sup> However, in the published reports there are various grading systems based on nasal endoscopy.

The means by which researchers evaluate nasal endoscopy images vary.<sup>14</sup> Clemens et al<sup>18</sup> developed a system in which a value from 0 to 100% was assigned to the choanal blockade, which is then staged from 1 to 4. Similarly, Cengel and Akyol<sup>19</sup> and Chisholm et al<sup>20</sup> obtained an estimated value for choanal blockade based on endoscopic images. Chien et al<sup>13</sup> determined the adenoid to choana ratio with computer software and digital images.

In this study we used flexible nasopharyngoscopy to grade the adenoid bilaterally. We compared the adenoid grade between both sides. Our result showed a high degree of agreement in grading both sides that was 92% with kappa=0.868. A total of 8% cases had asymmetrical grade. This asymmetry if not considered may reflect on the decision of adenoidectomy, especially if the child clinically presents with obstructive symptoms with low adenoid grade.

Despite the 1 grade difference, this grade still can create a faulty decision especially when it is grade 2 or less in symptomatic cases. If the grade is 2 or less in one side, it may not be the same in other side. However, it can be grade 3 or more in symptomatic children. Our recommendation is to grade adenoid bilaterally in children with obstructive symptoms who have grade 2 or less in one side.

However, to come up with more accurate conclu-

**Table 1.** Shows the adenoid grade based on nasopharyngoscopy. The diagonal line shows the symmetrical grades in both sides.

Side	Grade	Right side				Total
		I	II	III	IV	
Left side	I	1	0	0	0	1 (1.0%)
	II	1	9	0	0	10 (10.0%)
	III	0	4	36	0	40 (40.0%)
	IV	0	0	3	46	49 (49.0%)
	Total	2 (2.0%)	13 (13.0%)	39 (39.0%)	46 (46.0%)	100 (100%)

sions, comparing the adenoid grade between both sides of the nose need to be further studied with larger number of patients, as it has never been described previously in the published reports.

In conclusion, grading adenoid by using flexible nasopharyngoscopy through one side of the nose may not

represent the grade of adenoid on the other side in some cases, as observed in this study. Therefore, we recommend bilateral nasal endoscopy in symptomatic cases that show lower adenoid grades in one side. By applying this we can improve selection of cases for adenoidectomy.

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