

# The value of radiological examination in the management of adenoidal hypertrophy in a pediatric population

*Sami A. Al-Kindy, OTO, FRCSEd, Abdulmunem O. Obaideen, D.I.S Radio diagnostic.*

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## ABSTRACT

**Objectives:** The objective of this study is to evaluate the role of radiological examination in the management of adenoidal hypertrophy.

**Method:** A retrospective study was carried out in the North West Armed Forces Hospital, Tabuk, Kingdom of Saudi Arabia on pediatric patients who had x-ray of lateral naso pharynx to exclude adenoidal hypertrophy, January 2001 to December 2001. The study included; age of the patient, sex and reason for radiology examination and the management rendered.

**Results:** A total of two hundred and ninety-seven pediatric patients were involved. Two hundred and thirteen males (71.7%) and 84 (28.3%) females, age ranged between 2 months and 12 years. The reason given for radiological examination was one or more of the following symptoms, snoring, mouth breathing, recurrent tonsillitis, runny nose,

deafness and obstructive sleep apnea. Small adenoids reported in 63 patients (21.2%) and were treated for their complaints by their primary physician. Two hundred and thirty-four patients (78.8%) with large adenoids were referred to the otolaryngology department of these 33 patients lost follow up. One hundred and nineteen referred (40.1%) patients were treated conservatively, while 82 patients (27.6%) who showed resistance to medical treatment under went adenoidectomy with or without other related surgical procedures.

**Conclusion:** It was concluded that radiological examination in the management of adenoidal hypertrophy had a limited role, increased Radiological Department workload, wastage of resources in addition to unnecessary radiation exposure.

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Adenoids are normal lymphoidal tissue in the postnasal space; they tend to reach its maximum size in school-aged children<sup>1</sup> that may cause snoring, mouth breathing, runny nose and glue ears. However, small adenoids can also be associated with some of these symptoms, warranting treatment. It is a common practice to request for a lateral naso pharyngeal x-ray when adenoidal hypertrophy is suspected in a child. A number of objectives investigating tools have been suggested to diagnose adenoidal hypertrophy in children including posterior rhinoscopy, transnasal fibro optic

examination<sup>2,3</sup> acoustical rhinometry<sup>4,5,6</sup> rhinomanometry, polysomnography studies and lateral cephalometric radiograph.<sup>1,7-11</sup> Although these investigations are helpful, clinical assessment alone can be sufficient.

**Methods.** A retrospective study was carried out in the North West Armed Forces Hospital, Tabuk, Kingdom of Saudi Arabia (KSA) of pediatric patients who underwent radiological examination to diagnose adenoidal hypertrophy, during the period 1 January 2001

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From the Department of Ear, Nose and Throat, North West Armed Forces Hospital, Tabuk, *Kingdom of Saudi Arabia.*

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Address correspondence and reprint request to: Dr. Sami A. Al-Kindy, ENT Snr Registrar, North West Armed Forces Hospital, PO Box 100, Tabuk, *Kingdom of Saudi Arabia.* Tel/Fax. +966 (4) 4411412. E-mail: sami\_kindy@yahoo.com

to 31 December 2001. The study-included age of the patient, sex and reason for radiological examination as noted from the requisition forms, interpretation of the x-ray reports and treatment rendered.

**Results.** A total number of 297 patients were included in the study; 213 (71.7%) males and 84 (28.3%) were females. Age ranged between 2-months and 12-years. The reasons given for radiological examination as noted from the requisition forms were one or more of the following symptoms: snoring, mouth breathing, recurrent tonsillitis, runny nose, deafness, and obstructive sleep apnea in that order. Sixty-three patients (21.2%) were reported to have normal adenoidal size and were treated for their symptoms by their primary physician; 18 patients (6.1%) had to repeat the radiological examination due to improper positioning of the child or misplacement of the x-ray films. Two hundred and thirty-four patients (78.8%) with reported large adenoids causing narrowing or obstruction of the naso pharynx were referred to the Otolaryngology Department for further management; of these 33 (11.1%) patients lost follow up, 119 (40.1%) were managed conservatively, while 82 (27.6%) who showed resistance to medical treatment, underwent adenoidectomy with or without other surgical procedures such as tonsillectomy, grommets insertion, sub mucous diathermy of inferior turbinates or antral wash out depending on the presence of other otolaryngological manifestations.

**Discussion.** Adenoids are part of Weldeyer's ring<sup>12</sup> in the naso pharynx and considered to be an active immunological organ.<sup>13</sup> The increase in its size leading to mechanical obstruction of the nose may cause many otolaryngological symptoms in pediatric population such as snoring, mouth breathing, hyponasal speech, runny nose and sneezing.<sup>12</sup> Further more, it may act as a nidus for viral and bacterial pathogens, regardless of its size, causing their migration to adjacent structures including the paranasal sinuses and the middle ear. The cause of adenoidal hypertrophy is not clear. Chronic infection and allergy has been suggested as well as age, in which it is largest in the 6-8-year olds<sup>14</sup> followed by involution, however, sometimes this may not occur leading to what is termed adult adenoids.<sup>15</sup> On the contrary, a new concept now explains that large adenoids are likely to be immunologically competent,<sup>16</sup> whereas the small adenoid may be the end result of lymphocyte depletion secondary to chronic infection.<sup>17</sup> Assessment of the adenoids size clinically is sometimes difficult, owing to its awkward anatomical position, especially in the uncooperative child. Indeed, many objective investigating tools have been suggested and are in practice with variable results including roentgenography.

The large number of patients, who were assessed radiologically for complaints of snoring, mouth breathing, runny nose, deafness and recurrent tonsillitis to exclude large adenoids, proved to add little or no

information that helped in the management. Furthermore, 21.2% of these patients were reported to have normal adenoids size. All the patients with reported large adenoids were treated medically initially and the resistant cases (27.6%) had operation. In total, 35% only with reported hypertrophied adenoids under went surgical management, which is considered to be a natural out come regardless of their size. The 33 patients (11.1%), who lost follow-up, could have been due to transfer of residency or symptoms were not severe enough to compel his/her parents to seek further medical attention. Whatever the reason, it is difficult to explain how helpful was this investigation for these children?

The fact remains that radiation is a form of energy and whenever energy encounters a biologic system, there exists the potential for some type of biologic effect.<sup>18</sup> The absorbed radiation by the active bone marrow and thyroid gland are 0.2 mGy and 0.4 mGy,<sup>19</sup> this is considered to be a negligible dose and a low risk level if it over weights the great benefits it derives from an accurate medical diagnoses.<sup>18</sup> This is equivocal for adenoidal sizing in children; moreover, these figures will double and the risks may rise due to repetition of the investigation for the difficulty sometimes faced in positioning the child during the procedure as seen here in our study. Eighteen children (6.1%) had to repeat the radiological examination twice or more. Moreover, the lateral plain films for assessing adenoids size are approximate, as the films are in one plane only and cannot possibly take account of the very variable horizontal curvature of the post-superior naso pharyngeal wall.<sup>20</sup> These are enough reasons to compel us to review our practice and guidance towards evidence-based medicine.

The estimated cost of a plain x-ray in our hospital is 30 Saudi Riyals not including the radiological department set up, the specialist/consultant expertise as well as technician and other staff expenses. Although it seems to be a meager amount, we feel this could be one of the many debatable issues when compulsory health insurance bill is introduced.

Finally, this is not the first paper to discuss the issue, Paradise et al<sup>21</sup> stated that negative clinical findings can suffice to rule out adenoidal hypertrophy with a high degree of confidence, while Gates<sup>22</sup> queried that as long as there is evidence demonstrating the effectiveness of adenoidectomy, regardless of its size, why are we still interested in sizing up the adenoids?

## References

1. Fujioka M, Young LW, Girdany BR. Radiographic evaluation of adenoidal size in children: adenoidal-nasopharyngeal ratio. *Am J Roentgenol* 1979; 133: 401-404.
2. Wormald PJ, Prescott CAJ. Adenoids: comparison of radiological assessment methods with clinical and endoscopic findings. *J Laryngol Otol* 1992; 106: 342-344.
3. Wang D, Clement P, Kaufman L, Derde MP. Fib optic examination of the nasal cavity and nasopharynx in children. *Int J Pediatr Otorhinolaryngol* 1992; 24: 35-44.

4. Jin-Hee Cho, Dong-Hee Lee, Nam-Soo Lee, Yu-sung Won, He-ro Yoon, Byung-do Suh. Size assessment of adenoid and nasopharyngeal airway by acoustic rhinometry in children *J Laryngol Otol* 1999; 133: 899-905.
5. Kim YK, Kang JH, Yoo YS. The change of the cross section area and the volume of the nasal cavity and the nasopharynx after tonsillectomy and adenoidectomy. *Korean Journal of Otolaryngology- Head and Neck Journal* 1995; 38: 105-109.
6. Woo HY, Cheong HS, Kang JH, Kim JT. Changes in nasal airway after adenotonsillectomy using acoustic rhinometry and Wright mini flow meter. *Otolaryngol Head Neck Surg* 1995; 38: 1988-1992.
7. Sorensen H, Solow B, Greve E. Assessment of the nasopharyngeal airway: a rhinomanometric and radiographic study in children with adenoid. *Acta Otolaryngologica* 1980; 89: 227-232.
8. Crepeau J, Patriquin HB, Poliquin JF, Tetrault L. Radiographic evaluation of the symptom-producing adenoid. *Otolaryngol Head Neck Surg* 1982; 90: 548-554.
9. Cohen D, Konak S. The evaluation of radiographs of the nasopharynx. *Clinical Otolaryngology* 1985; 10: 73-78.
10. Warmald PJ, Prescott CAJ. Adenoid: comparison of radiological assessment methods with clinical and endoscopic findings. *J Laryngol Otol* 1992; 106: 342-344.
11. Lim YK, Cheong HS. Assessment of nasopharyngeal airway by MRI in children. *Korean Journal of Otolaryngology-Head and Neck Surgery* 1994; 37: 776-782.
12. Dolen WK, Spofford B, Selner JC. The hidden tonsils of Waldeyer's ring. *Ann Allergy* 1990; 65: 244-250.
13. Karchev T, Kabachiev PM. Cells in the epithelium of the nasopharyngeal tonsil. *Rhinology* 1984; 22: 201-210.
14. Jeans WD, Fernando DCJ, Maw AR. How should adenoidal enlargement be measured? A radiological study based on interobserver agreement. *Clin Radiol* 1981; 32: 337-340.
15. Bennett J, Kersebaum M, Heckrodt H. Adult adenoids. *Br J Hosp Med* 1993; 49: 289.
16. Brodsky L, Koch RJ. Bacteriology and immunology of normal and diseased adenoids in children. *Arch Otolaryngol Head Neck Surg* 1993; 119: 821-829.
17. Bernstein J. The tonsils and adenoids. In: Johnson J, editor. American Academy of Otolaryngology Head and Neck Surgery Instruction Courses. St. Louis (MO): CV Mosby Co; 1990. p. 24-32.
18. Thompson MA. Maintaining a Proper Perspective of Risk Associated with Radiation Exposure. *J Nucl Med Technol* 2001; 29: 137-142.
19. A National Survey of Doses to Patients Undergoing a Selection of Routine X-ray Examinations in English Hospitals. NR PB-R200 National Radiological Protection Board, Chilton, Didcot, Oxon (UK); 1986.
20. Phelps PD, Stansbie JM. Imaging of the neck: Clinical ENT Radiology. 1st ed. Avon (UK): Bath Press; 1993. p. 134.
21. Paradise JL, Beverly S, Bernard D, Colborn K, Janosky JE. Assessment of adenoidal obstruction in children: clinical signs versus roentgen graphic findings. *Pediatric* 1998; 101: 979-986.
22. Gates GA. Sizing up the adenoids. *Arch Otolaryngol Head Neck Surg* 1996; 122: 239-240.