The adenoid and snoring

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Background

The adenoid is of particular interest in childhood because adenoidectomy – with or without tonsillectomy – *cures snoring* in over 95% of infants and children, *even when the adenoid appears to be normal in size by radiography or by endoscopy*.

Snoring is of concern because it means that the airway is obstructed during sleep. Why and how this occurs is beyond the scope of this brief presentation. The sleep-associated airway obstruction disrupts the architecture of normal sleep and may cause asphyxia. Snoring almost every night can have severe effects, including death. The most easily recognised adverse effects include failure to thrive, cor pulmonale and systemic hypertension. But more common and more difficult to recognise are neurodevelopmental delay, behaviour disorders and school problems.

Of cardinal importance in the investigation of infants and children who snore is the fact that snoring occurs during sleep, whereas investigations are generally done in awake infants.

Thus, radiology has almost nothing to say about the severity of airway obstruction in children who snore. However, radiology can define the anatomical size of the airways and the degree to which the adenoid encroaches on the airway. The absolute size of the adenoid has little importance. If the adenoid can be identified by radiography it is resectable, and if the history is that the child snores, then the child suffers from airway obstruction when it sleeps – whether the airway appears to be patent when it is awake or not.

Radiology can also be helpful in those children in whom adenoidectomy has failed to cure the snoring or in whom snoring has recurred after adenoidectomy. Because adenoidectomy is often done "blind", some adenoid may be left behind.

So, what should a radiologist say when reporting on the adenoid?

Before reading on, try to formulate your own opinion on Figures 1 to 4.

Reports

The radiograph in Figure 1 was taken with the child awake. The nose

Figure 1: Soft tissue lateral neck radiograph. Eight-year-old boy. Snoring almost every night.

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and paranasal sinuses are patent. A well-defined adenoid (pharyngeal tonsil) is visible between the palate and the base of the skull. The adenoid occupies about 70% of the potential airway lumen in the area of the hard palate.

Even though the airway appears to be patent, removal of the adenoidal tissue can be expected to cure this child's snoring.

The radiograph in Figure 2 was also taken with the child awake. The nose, paranasal sinuses and pharyngeal airway are patent. The adenoid has been removed incompletely by previous surgery (almost certainly blind curettage) and there is a small pea-sized piece of adenoidal remnant at the superior pole of the adenoid – at the point of the internal nares.

Figure 2: Soft tissue lateral neck radiograph. Eleven-year-old girl. Three previous adenoidectomies for snoring. Relief of snoring after each procedure, but snoring recurred within months of each procedure.

Because of the critical position at the internal nares (see example, Figure 4), regrowth of this small adenoidal remnant is sufficient to explain the recurrence of snoring following previous adenoidectomies in this child.

[Note: Permanent curing of the snoring followed endoscopic removal of the adenoidal remnant: fourth time lucky!]

Figure 3 shows a double-contrast barium study of the nasopharynx. The previous adenoidectomy (presumably blind curettage) has failed to remove the superior pole of the adenoid. In this view it appears to occlude the airway completely. This residual adenoidal tissue is sufficient to account for the failure of adenoidectomy to cure the snoring.

[Note: A cure followed endoscopic removal. Adenoids are often said to have regrown, but organs do not regrow after removal. "Regrowth" of an adenoid signifies incomplete prior removal.]

The CT in Figure 4 shows homogeneous soft tissue mass (adenoid) between the base of the skull and the posterior margin of the nasal septum – the internal nares. Occlusion of the internal nares by this residual adenoidal tissue almost certainly accounts for the failure of the adenoidectomy (blind curettage) to cure this child's symptoms.

[Note: CTs are rarely required to confirm the presence of adenoidal tissue! In this instance the surgeon was reluctant to consider that a "small piece" of adenoid could account for the failure of the operation. The CT was supplied courtesy of Prof SD Delport, University of Pretoria. The case was reported in the South African Medical Journal.]

Figure 3: Soft tissue lateral neck radiograph after instillation of dilute barium to outline airway.

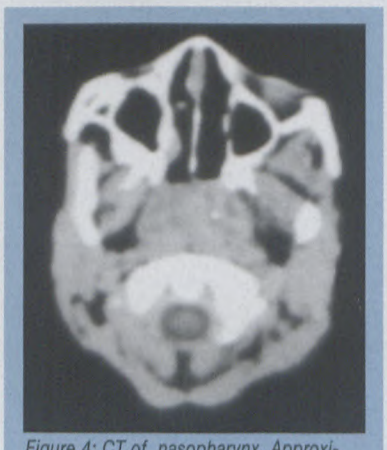

Figure 4: CT of nasopharynx. Approximately five-year-old child. Previous adenoidectomy failed to cure snoring. Conventional radiograph similar to Figure 2.

Reference:

Delport SD, Mulder AA. Obstructive sleep apnoea persisting after adenoidectomy. *S Afr Med J.* 1987;71:194-5.