Diagnosis

Review: screening tests are not as accurate as overnight polysomnography for the diagnosis of adult sleep apnoea

Ross SD, Allen IE, Harrison KJ, et al. *Systematic review of the literature regarding the diagnosis of sleep apnea. Evidence Report/Technology Assessment No 1. (Prepared by MetaWorks Inc. under contract no 290-97-0016.) AHCPR publication no. 99-E002. Rockville, MD: Agency for Health Care Policy and Research; February 1999.*

QUESTION: How do the accuracies of diagnostic and screening tests (radiological imaging, laboratory assays, partial night polysomnography [PSG], daytime PSG, reduced channel PSG, and clinical signs and symptoms) compare with overnight sleep laboratory PSG for identifying sleep apnoea in adults?

Data sources

Studies were identified by searching Medline (1980 to November 1997) and *Current Contents* (1997) using the terms sleep apnoea syndrome; monitoring, physiologic; airway resistance; and index. Bibliographies were scanned.

Study selection

English, French, German, Spanish, and Italian language studies were selected if a diagnostic test or intervention was used to support a diagnosis of sleep apnoea and ≥ 10 adults with any form of sleep apnoea were studied. Studies of patients with other potentially confounding diseases were excluded.

Data extraction

Data were extracted on study quality and description, patient and test characteristics, and results.

Main results

71 studies (7572 participants) compared overnight PSG (diagnostic standard) with portable monitoring devices (25 studies), reduced channel PSGs (3 studies), daytime PSGs (3 studies) partial night PSGs (4 studies), oximetry (12 studies), radiological tests (5 studies), clinical

measures (17 studies), chemical assay (1 study), questionnaires (3 studies), and multivariate models (8 studies). Sensitivity and specificity for the tests vary (table).

Conclusion

Screening tests are not as accurate as overnight polysomnography for diagnosing sleep apnoea in adults.

*Diagnostic and screening tests for sleep apnoea in adults using overnight laboratory polysomnography (PSG) as the diagnostic standard**

Test	Weighted sensitivity	Weighted specificity	+LR	-LR
Oximetry	87%	65%	2.5	0.2
Partial night PSG	42% to 93%†	70% to 100%†	—	—
Daytime PSG	66% to 100%†	50% to 100%†	—	—
Reduced-channel PSG	82% to 94%†	82% to 100%†	—	—
FEF ₅₀ /FIF ₅₀	20%	79%	1.0	1.0
Sawtooth sign	62%	63%	1.7	0.6
FEF ₅₀ /FIF ₅₀ and sawtooth sign	39%	61%	1.0	1.0
Global impression	59%	66%	1.7	0.6
Prediction equations	67%	89%	6.1	0.4

*FEF₅₀/FIF₅₀ = measure of extrathoracic airway obstruction. LR defined in glossary and calculated from data in article.

†Unweighted data.

COMMENTARY

The review by Ross and colleagues attempts to determine whether sleep studies without electrophysiological monitoring of sleep are clinically useful. It includes a serious methodological flaw: polysomnography is used as the diagnostic standard, but no evidence has shown that it is such. Polysomnography became accepted as the usual standard for diagnosing sleep apnoea in North America, but this conclusion was not evidence based. Studies that have attempted to determine whether electrophysiological monitoring adds to the accuracy of diagnosing sleep apnoea have found that it does not.¹ Further, electrophysiological variables are not the best predictors of improvement with therapy.²

Despite this flaw, the review is useful because it shows the lack of agreement between diagnostic techniques and highlights the need for more carefully done studies. If the major clinical conclusion of the review is reduced to the statement that no severely symptomatic patient should have the diagnosis excluded on the basis of a negative limited sleep study, then I believe this is a reasonable, although not evidence based, statement. The finding of a pristine sleep and breathing pattern in all postures in a patient who is known to be asleep remains the best excluder of sleep apnoea. This belief has been reinforced by evidence from randomised controlled trials of continuous positive airway pressure (CPAP) therapy showing that large placebo responses can be obtained in patients with sleep apnoea.³⁻⁴ Thus, a response to a trial of CPAP cannot be used as evidence of disease, despite recent trends in this direction.

Neil Douglas, MD
Royal Infirmary
Edinburgh, Scotland, UK

Source of funding:
Agency for Health Care
Policy and Research.

For correspondence:
Dr S D Ross,
MetaWorks, Inc., 470
Atlantic Avenue,
Boston, MA 02210,
USA. Fax +1 617 368
3590.

- 1 Douglas NJ, Thomas S, Jan MA. *Lancet* 1992;**339**:347-50.
- 2 Bennett LS, Langford BA, Stradling JR, et al. *Am J Respir Crit Care Med* 1998;**158**:778-86.
- 3 Engleman HM, Kingshott RN, Wraith PK, et al. *Am J Respir Crit Care Med* 1999;**159**:461-7.
- 4 Jenkinson C, Davies RJ, Mullins R, et al. *Lancet* 1999;**353**:2100-5.