Does this patient have a pleural effusion?
Wong C L, Holroyd-Leduc J, Straus S E

CRD summary
The authors concluded that a dullness to percussion examination makes the probability of a pleural effusion much more likely, but that a chest radiograph should be obtained to confirm the diagnosis. There was considerable clinical variation between the few included studies, so the authors’ conclusions should be interpreted with caution.

Authors' objectives
To systematically review the evidence regarding the accuracy of the physical examination in assessing the probability of a pleural effusion.

Searching
MEDLINE (1950 to October 2008) and EMBASE (1980 to October 2008) were searched for studies published in English. Search terms were reported. Reference lists of retrieved articles were also searched.

Study selection
Diagnostic accuracy studies of physical examination compared to a radiographic reference standard in participants with and without pleural effusion, which applied the same diagnostic and reference tests to all patients, were eligible for inclusion in the review. Primary data or appropriate summary statistics also had to be reported. Studies of physical examinations which needed special equipment or could not feasibly be done in a clinical setting were excluded.

The included studies were of hospitalised patients examined with intervention tests which included conventional percussion, auscultatory percussion, breath sounds, and chest expansion and crackles. Reference tests included chest radiographs interpreted by a radiologist, or by a physician who was not a radiologist, or thoracic computed tomography scans interpreted by a radiologist.

Two reviewers independently selected studies for inclusion, with disagreements resolved by discussion with a third reviewer.

Assessment of study quality
Study quality was assessed using a qualitative checklist, which examined numerous criteria including blinding, consistency of test application, details of recruitment and attrition rates.

Three authors independently assessed study quality, with disagreements resolved by consensus.

Data extraction
Sensitivity, specificity, diagnostic odds ratios (DORs), positive likelihood ratios (LR+) and negative likelihood ratios (LR-) with 95% confidence intervals (CIs) were extracted or calculated for each study. If one or more studies contained zeros in their 2x2 table giving likelihood ratios of 0 or infinity, 0.5 was added to all the counts for those studies. Additional data were obtained by contacting study authors when necessary.

Three authors independently extracted data, with disagreements resolved by consensus.

Methods of synthesis
Pooled estimates for likelihood ratios or diagnostic odds ratios were calculated using a random-effects model (the methods used for sensitivity and specificity were not stated). Heterogeneity was assessed using I².

Results of the review
Five diagnostic accuracy studies were included in the review (n=934 patients). Sample sizes ranged from 32 to 293 participants. All studies described the use of independent, blinded assessment of reference and diagnostic tests, with application of the diagnostic test being consistent and complete in four studies. Patient selection was either consecutive (two studies), random (one study), consecutive for cases and random for controls (one study) or not specified (one
Presence of dullness to conventional percussion (LR+ 8.7, 95% CI 2.2 to 33.8; I²=82%; three studies) and asymmetric chest expansion (LR+ 8.1, 95% CI 5.2 to 12.7; one study) were most accurate in diagnosing pleural effusion. The two studies which compared conventional percussion (OR 34, 95% CI 16 to 72) with auscultatory percussion (OR 8.1, 95% CI 4.7 to 14) found auscultatory percussion to be the better test. Further results were reported.

Authors' conclusions
Dullness to percussion makes the probability of a pleural effusion much more likely, but a chest radiograph should be obtained to confirm the diagnosis.

CRD commentary
The review addressed a clear question and was supported by appropriate eligibility criteria. Two electronic databases were searched, but the restriction to include only studies published in English means some relevant studies may have been missed. Appropriate methods were used to minimise the risks of reviewer error and bias at all stages of the review. Study quality was adequately assessed and sufficient study details were provided. Few studies were included in the review, some with small sample sizes. This meant that most outcomes were informed by only one or two studies, and few participants. Where pooled estimates were calculated, there was a large degree of clinical and statistical heterogeneity, making the appropriateness of pooling the results uncertain. These limitations, coupled with the probability that relevant studies may have been missed during the somewhat limited search, means the authors' conclusions should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors stated that mastering the skill of conventional percussion may be particularly useful for localising an effusion for a thoracentesis or monitoring patients who develop recurrent effusions.

Research: The authors did not state any implications for research.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.