AUSCULTATORY PERCUSSION

Trevor Lutz
CEC – Advanced Physical Diagnosis
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OBJECTIVES

Describe the auscultatory percussion technique
Uses of AP and the relative statistics for each
AUSCULTATORY PERCUSSION

Auscultation + Percussion
- Listening with stethoscope while percussing
- Involves the effects on the passage of sound vibrations through different media and upon their difference in acoustic impedance (Z)
  - Velocity (c) and density (ρ) dependent \( Z = c\rho \)

Usefulness
- Pleural effusion, and other chest abnormalities
- Bone fractures (including long bone, hip)
- Head
- Detection of ascites
- Bladder distention
Typical Exam findings

- Dullness to percussion, decreased to absent breath sounds, decreased to absent tactile fremitus (but may be increased at the top of a large effusion)
- However, these physical signs are not all as sensitive or sufficiently specific for detecting a pleural effusion
  - Ex: obesity, pneumonia, lung masses, etc.
AP PLEURAL EFFUSION TECHNIQUE

Patient sitting upright for 5 mins, place diaphragm of stethoscope 3cm below 12th rib in midclavicular line

Direct percussion (finger flick) applied along line from apex to base (three lines)

Dullness → loud noise

Triangle of Grocco

AP FOR PLEURAL EFFUSION

Guarino
- Can detect small, or too thin pleural effusions to small to see on lateral decubitus radiographs
- Detected 113/118 pleural effusions (Sens = 95.8%)
- 0/175 control patients had a positive test (Spec = 100%)

Kalantri et al.
- Sens = 0.58 (0.44 – 0.71)
- Spec = 0.85 (0.8 – 0.89)
- PPV = 0.5 (0.37 – 0.63)
- NPV = 0.89 (0.84 – 0.93)
- LR+ = 3.88 (2.62 – 5.67)
- LR- = 0.49 (0.35 – 0.65)
“DOES THIS PATIENT HAVE A PLEURAL EFFUSION?”

Table 3 – Accuracy of Physical Examination Maneuvers in Diagnosing Pleural Effusion

<table>
<thead>
<tr>
<th>Source</th>
<th>Sensitivity % (95% CI)</th>
<th>Specificity % (95% CI)</th>
<th>Positive LR (95% CI)</th>
<th>Negative LR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymmetric chest expansion</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Kalantri et al, 56 2007</td>
<td>74 (60-85)</td>
<td>91 (86-94)</td>
<td>8.1 (5.2-12.7)</td>
<td>0.29 (0.19-0.45)</td>
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<tr>
<td>Auscultatory percussion</td>
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<tr>
<td>Bohadana et al, 54 1986</td>
<td>30 (13-53)</td>
<td>95 (92-98)</td>
<td>6.5 (2.9-15.0)</td>
<td>0.73 (0.56-0.96)</td>
</tr>
<tr>
<td>Guarino and Guarino, 35 1994</td>
<td>96 (90-99)</td>
<td>95 (91-98)</td>
<td>19 (9.8-35.2)</td>
<td>0.05 (0.02-0.11)</td>
</tr>
<tr>
<td>Kalantri et al, 56 2007</td>
<td>58 (44-71)</td>
<td>85 (80-90)</td>
<td>3.9 (2.6-5.7)</td>
<td>0.50 (0.36-0.67)</td>
</tr>
<tr>
<td>Bourke et al, 55 1989a</td>
<td>0 (0-84)</td>
<td>84 (75-90)</td>
<td>1.0 (0.08-13.0)</td>
<td>1.0 (0.60-1.7)</td>
</tr>
<tr>
<td>Pooled</td>
<td>77 (71-83)</td>
<td>92 (89-94)</td>
<td>7.7 (2.4-25.1)</td>
<td>0.27 (0.07-1.0)</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td></td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>I² index</td>
<td></td>
<td></td>
<td>91%</td>
<td>97%</td>
</tr>
</tbody>
</table>

Table adapted from JAMA 2009; 301(3): 309-317
AP FOR LONG BONE FRACTURES

Use bell of stethoscope and percuss over bony prominences

Listen for changes in pitch and quality

Decreased sound intensity indicates poor conduction and reflects loss of end-to-end contact

Can also be used to assess for degree of fracture healing

For accompanying image, please see figure from J Athl Train. 2009 May-Jun; 44(3): 272–274. [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2681212/]
Patellar Pubic Percussion Test

- Percuss Patella, auscultate with bell over pubic symphysis
- Compare to contralateral side
- Diminished sound when compared to other side is a positive test

https://www.youtube.com/watch?v=4bzobJHrRkQ
AP FOR HIP FRACTURES

As a screening test
- Sn = 0.96 (0.87 – 0.99)
- Sp = 0.86 (0.49 – 0.98)
- PPV = 0.98
- NPV = 0.75
- LR+ = 6.73
- LR- = 0.75

<table>
<thead>
<tr>
<th></th>
<th>Fracture Present (%)</th>
<th>Fracture Absent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Test</td>
<td>245 (84.5)</td>
<td>5 (1.7)</td>
</tr>
<tr>
<td>Negative Test</td>
<td>10 (3.4)</td>
<td>30 (10.3)</td>
</tr>
</tbody>
</table>

Pre-test odds = 4
Post-test odds = 26.9
Post-test probability = 0.96
CRANIAL AP

July 1840 – tap midline just above frontal sinuses.

Auscultate bilaterally
  • Prone to error

Guarino (1982) – to examine for intracranial lesions
  • 44 out of 51 patients with CT-scan determined intracranial masses detected
  • 86% sensitivity
AP appears to be useful to help in identify and diagnose several different conditions

Appears to have a user bias

Useful techniques to know in case of emergencies or lack of medical equipment

Of historical note to remember


Wong CL, Holroyd-Leduc J, Straus SE. “Does this Patient Have a Pleural Effusion?” *JAMA.* 2009 Jan; 301(2): 309-317


Tiru M, Goh SH, Low BY. “Use of Percussion as a Screening Tool in the Diagnosis of Occult Hip Fractures.” *Singapore Med J.* 2002; 43(9): 467-469

Pearce JMS. “Cranial Percussion.” *European Neurology.* 2008; 59: 280-282