Introduction to Evidence-Based Physical Diagnosis

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creativentechno.wordpress.com
Disclosures

• None
Objectives

- Rational for Performing Physical exam
- Interesting Historical Facts about Physical Examination
- Understanding Concept of Evidence Based Physical Diagnosis & its Reasoning
- How to measure Diagnostic Accuracy of Clinical Findings?
- Reliability of Physical Signs
- Useful Resources for Learning Physical Exam/Evidence Based Exam and Utilize
Rational For Performing Physical Exam

- Decline in physical examination skills (1)

- Physical examination inadequacies are a preventable source of medical error, and adverse events are caused mostly by failure to perform the relevant examination (1)

- Physical examination can be of substantial value in hospitalized patient (2)

1- Inadequacies of Physical Examination as a Cause of Medical Errors and Adverse Events: A Collection of Vignettes, Varghese, Abraham et al. The American Journal of Medicine, Volume 128, Issue 12, 1322 - 1324.e3
Rational For Performing Physical Exam

- Studies indicate that approximately 85% of diagnoses are correctly made simply by performing a detailed history and physical examination (1).

- Diagnostic testing beyond the history and physical examination should be used in an intentional, logical, and stepwise fashion; nearly 30% of all health care costs are spent on unnecessary tests and treatments (1).

- Reasonable quality evidence refutes the commonly held belief that ordering additional, unnecessary diagnostic testing alleviates patient fears and concerns (1).
Clinical Observations vs Technology

Medicine of Id Era

- Bedside Observations
- Technologic Tests

McGee, Steven (2012). Evidence Based Physical Diagnosis. 3rd ed.
Clinical Observations vs Technology

Modern Medicine

- Bedside Observation
- Technological Tests

McGee, Steven (2012). Evidence Based Physical Diagnosis. 3rd ed.
Reliance on Technology raises few questions?

- What is the diagnostic value of the traditional physical exam?
- Is it outdated & best discarded?
- Is it completely accurate and underutilized?
- Is the truth somewhere between these two extremes?
Evidence Based Physical Diagnosis

- Using the diagnostic accuracy of clinical findings according to the existing evidence in order to determine the clinical probability of disease in question.

- Increases the clinician’s confidence on clinical diagnosis

- Helps in deciding when to pursue technology, how quickly to do the investigations and prudent use of sequence

- For certain diseases clinical diagnosis is of paramount importance
Invention of Percussion- Greatest of all Times

Leopold Auenbrugger
1722- 1809
Invention of Stethoscope-The Cylinder

Rene Laennec
1781-1826
Power of Close Observation-The Method of Dr Joseph Bell

- Observe Closely
- Deduce Shrewdly
- Confirm with hard evidence

1837-1911
Story of Dr Jo Bell

• Short Video
Resources for Learning Evidence Based Physical Diagnosis

• JAMA Evidence – Rational Clinical Exam

• Dr Steven McGee
Resources for Learning Evidence Based Physical Diagnosis

Dr Scott DC Stern An Evidence-Based Guide
Learning Physical Exam Skills: Resources

Physical Examination
10 videos • 7,757 views • Last updated on Jun 17, 2015

1. Neurological Examination of the Limbs - Demonstration
   University of Leicester
   9:33

2. Respiratory Examination - Explanation
   University of Leicester
   10:09

3. Examination of the Cranial Nerves - Demonstration
   University of Leicester
   7:02

4. Examination of the Cranial Nerves - Explanation
   University of Leicester
   16:15

5. Cardiovascular Examination - Explanation
   University of Leicester
   12:49
Learning Physical Exam Skills: Resources
Learning Physical Exam Skills: Resources

- Bates’s Guide to Physical Examination
- MacLeod's Clinical Examination
- Hutichson’s Clinical Methods
- Talley & O Connors’ Clinical Examination, A Systematic Guide to Physical Diagnosis
Smart Phone Application: Diagnose

Evidence-based medicine, at your fingertips.

available for Android & iPhone / iPad

Pretest: 27%

<table>
<thead>
<tr>
<th>History</th>
<th>+LR</th>
<th>-LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>1.1</td>
<td>0.43</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td>1.3</td>
<td>0.64</td>
</tr>
<tr>
<td>Neck stiffness</td>
<td>1.1</td>
<td>0.95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical</th>
<th>+LR</th>
<th>-LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Jolt Accentuation</td>
<td>2.4</td>
<td>0.05</td>
</tr>
</tbody>
</table>

2%
Smart Phone Application: **snapdx**

- Abdominal Aortic Aneurysm
- Acute Myocardial Infarction
- Anterior Cruciate Ligament (ACL) Injury
- Aortic Stenosis (Detection of)
- Aortic Stenosis (Severe AS)
- Ascites
- Benign Paroxysmal Positional Vertigo (BPPV)
- Carotid Stenosis, Asymptomatic
- Carotid Stenosis, Symptomatic

**Rules In**
- Fluid wave (PLR 6.00)
- Hx of increased girth (PLR 4.16)
- Peripheral edema (PLR 3.80)
- Shifting dullness (PLR 2.70)

**Rules Out**
- No hx of increased girth (NLR 0.17)
- No ankle edema (NLR 0.20)
- No shifting dullness (NLR 0.30)
- No bulging flanks (NLR 0.30)
- No flank dullness (NLR 0.30)

**For 86%**
How to Measure Diagnostic Accuracy?

• **Pretest Probability**: Prevalence before applying the results of a clinical finding

• **Sensitivity**: SnNout ( - ) PID = Positivity in Disease, Helpful when negative

• **Specificity**: SpPin ( + ) NIH = Negativity in Health, Helpful when positive

• **Likelihood Ratios**: Positive LR or Negative LR, These are diagnostic weights of clinical findings

• **Post Test Probability**:
## Likelihood Ratios

**Positive LR** = \( \frac{(sens)}{(1 - spec)} \)

**Negative LR** = \( \frac{(1 - sens)}{(spec)} \)

<table>
<thead>
<tr>
<th>Likelihood Ratio</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No effect</td>
</tr>
<tr>
<td>3-10</td>
<td>Disease more likely</td>
</tr>
<tr>
<td>0.3-0.1</td>
<td>Disease less likely</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>Disease more likely</td>
</tr>
<tr>
<td>&lt; 0.1</td>
<td>Disease less likely</td>
</tr>
</tbody>
</table>
Relationship between Likelihood Ratio & Post Test Probability

McGee, Steven (2012). Evidence Based Physical Diagnosis. 3rd ed
Reliability of Physical Signs

- Refers to how often multiple clinicians, examining the same patients, agree that a particular physical sign is present or absent.

<table>
<thead>
<tr>
<th>K-Statistic</th>
<th>Degree of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.2</td>
<td>Slight Agreement</td>
</tr>
<tr>
<td>0.2-0.4</td>
<td>Fair Agreement</td>
</tr>
<tr>
<td>0.4-0.6</td>
<td>Moderate Agreement</td>
</tr>
<tr>
<td>0.6-0.8</td>
<td>Substantial Agreement</td>
</tr>
<tr>
<td>0.8-1</td>
<td>Almost perfect Agreement</td>
</tr>
</tbody>
</table>
k- Statistics--Examples

• Clubbing (Schramroth sign) 0.64
• Clubbing (IP depth ratio) 0.98
• Displaced Trachea 0.01
• Intra-retinal Hemorrhages 0.89
• Neck Veins Elevated or Normal 0.08-0.71
• Abdominojugular Test 0.92

### Quick Example: Detecting Anemia

<table>
<thead>
<tr>
<th>Finding (Reference)</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Likelihood Ratio$^\dagger$ if Finding Is Present</th>
<th>Likelihood Ratio$^\dagger$ if Finding Is Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pallor at any site</td>
<td>22-77</td>
<td>66-92</td>
<td>3.8</td>
<td>0.5</td>
</tr>
<tr>
<td>Facial pallor</td>
<td>46</td>
<td>88</td>
<td>3.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Nailbed pallor</td>
<td>59-60</td>
<td>66-93</td>
<td>NS</td>
<td>0.5</td>
</tr>
<tr>
<td>Palmar pallor</td>
<td>58-64</td>
<td>74-96</td>
<td>5.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Palmar crease pallor</td>
<td>8</td>
<td>99</td>
<td>7.9</td>
<td>NS</td>
</tr>
<tr>
<td>Conjunctival pallor</td>
<td>31-62</td>
<td>82-97</td>
<td>4.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Tongue pallor</td>
<td>48</td>
<td>87</td>
<td>3.7</td>
<td>0.6</td>
</tr>
</tbody>
</table>

**Conjunctival Rim Pallor**

| Pallor present                | 10             | 99             | 16.7                                          | —                                             |
| Pallor borderline             | 36             | —              | 2.3                                           | —                                             |
| Pallor absent                 | 53             | 16             | 0.6                                           | —                                             |

$^\dagger$ Likelihood Ratio: The ratio of the probability of the finding being present in an individual with anemia to the probability of the finding being present in an individual without anemia.
Quick Example: Detecting Anemia

• Questions