

# EVIDENCE BASED RELEVANCE OF PHYSICAL EXAM FINDINGS

Matt Zimmerman OMS-III

# Why Talk About This

- With increasing costs of health care, it is important to be confident in our exam findings.
- We are taught several exam techniques for various organ systems, but we are never taught which ones really make a difference.
- We are constantly reminded that 70-80% of our diagnosis comes from history and physical exam, if that is accurate then we need to evaluate the techniques that help us make the diagnosis most efficiently.

# Problems We Face

- ❑ Not enough research
- ❑ Is the research we have reliable?
- ❑ Decreased teachings of reliable exam procedures
- ❑ Agreeing with our superiors (or lack of questioning)
- ❑ Less experience
- ❑ Hubris

# Things to Remember

- ❑ Do we know what we are doing?
- ❑ Are we doing it correctly?
- ❑ Do we know how to interpret the results?
- ❑ What do we do with the results?

# Accuracy of PE Findings

- Specificity
- Sensitivity
- Likelihood Ratios
  - ▣ Positive
  - ▣ Negative
- Kappa

# Specificity

- SPPIN

- Specific if the exam is Positive to help Rule In
- Often used to confirm a diagnosis

# Sensitivity

- SNNOUT

- Sensitive if the exam is Negative to Rule Out
- Often result in screening tests

# Likelihood Ratios

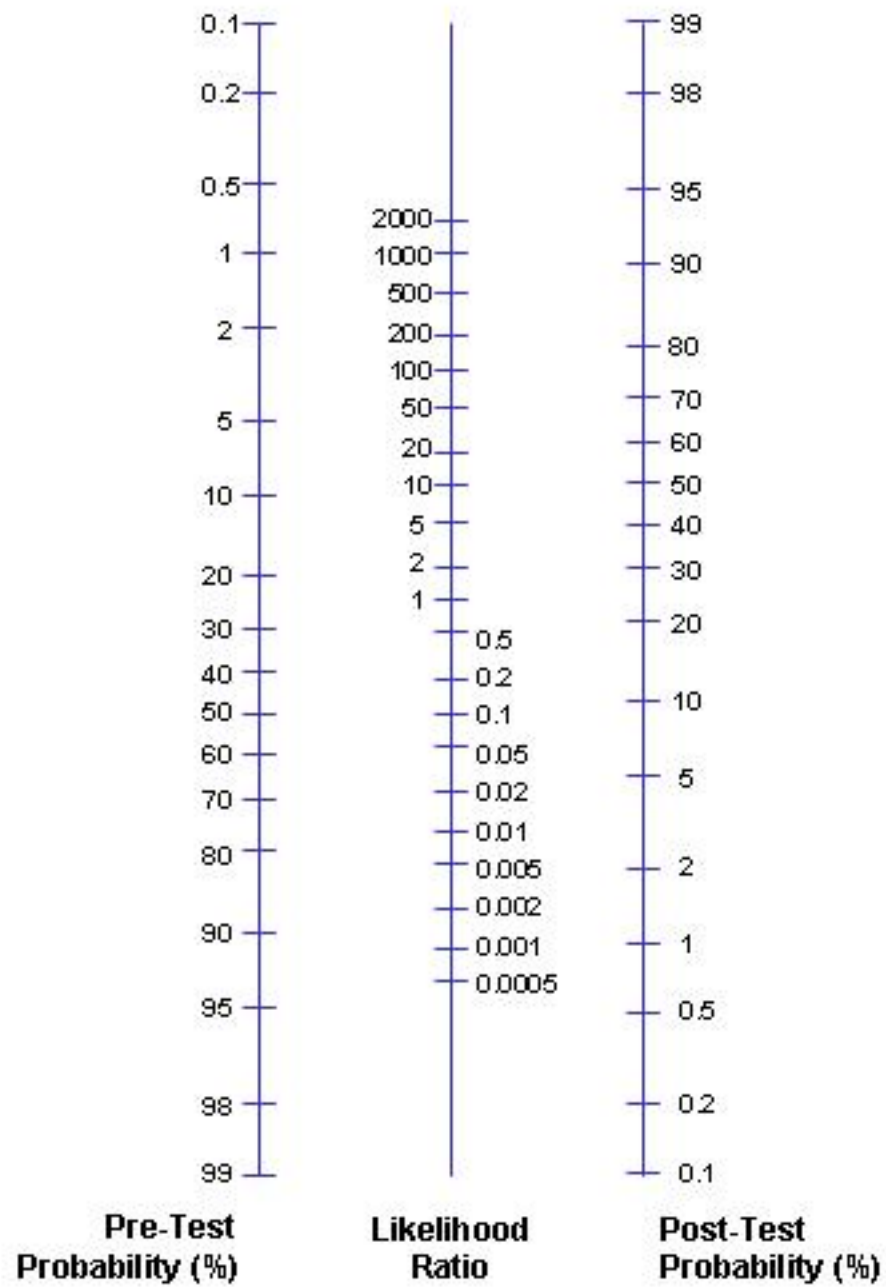
- The likelihood ratio describes how much a positive or negative result changes the likelihood that a patient would have the disease.
- Positive
  - ▣ How much the odds of the disease **increase** when a test is **positive**
- Negative
  - ▣ How much the odds of the disease **decrease** when a test is **negative**

$$LR^+ = \frac{\textit{sensitivity}}{1 - \textit{specificity}}$$

$$LR^- = \frac{1 - \textit{sensitivity}}{\textit{specificity}}$$

# Likelihood Ratios cont...

LR	Interpretation
>10	Large increase in the likelihood of disease
5-10	Moderate increase
2-5	Small increase
1-2	Minimal Increase
1	No change in likelihood
0.5-1.0	Minimal Decrease
0.2-0.5	Small Decrease
0.1-0.2	Moderate Decrease
<0.1	Large decrease in the likelihood of disease



# Kappa

- An index that describes the level of agreement beyond that expected by chance alone between two or more.
- Values range from +1 to -1
  - ▣ +1 perfect agreement
  - ▣ 0 no better than agreeing by chance
  - ▣ -1 complete disagreement

# Kappa Ranges

Kappa value	Definition
.81-1	Almost perfect
.61-.8	Substantial
.41-.6	Moderate
.21-.4	Fair
0-.2	Slight

# Patient Example

- Presents with:
  - Dyspnea
  - Lower extremity edema
- What is your pre-test probability for Congestive Heart Failure?
- What would you think if you heard a S3 heart sound on exam?
- How would a S3 sound affect your posttest probability?

# S3 Heart sound

- S3 when EF is less than 50% has a
  - 51% Sensitivity
  - 90% Specificity
  - +LR of 5.1
  - -LR of .54
  - A strong predictor in terms of specificity to help rule in the diagnosis along with a moderate +LR, but only a small to minimal -LR
- Crackles on auscultation
  - +LR of 1
  - A much weaker exam finding that doesn't help your posttest probability or you in making the diagnosis

# DVT

- Name some symptoms and exam findings
  - Lower leg edema
  - Leg pain
  - Tenderness
  - + Homan's sign
  - Swelling
  - Erythema
- Combined what is the chance that the patient has a DVT?
  - Sensitivity 60-88%
  - Specificity 30-72%
  - +LR of .85 - 3.14
  - -LR of .16 - 1.3

# iClicker Question 1

- How many of you use Homan's Sign to help diagnose a DVT?
  - A: Yes
  - B: No

# Homan's Sign

- ❑ Discomfort in the calf with passive dorsiflexion of the foot and the knee extended.
- ❑ A positive sign is only been proven to be correct anywhere from 8-56%
- ❑ But it is also present in greater than 50% of symptomatic people without a DVT

# Appendicitis pt

- Appendicitis signs/ symptoms
  - Abdominal pain – Umbilical → RLQ
  - Anorexia
  - Nausea
  - Vomiting
  - Rebound Tenderness
  - Psoas, Obturator, Rovsing Sign

# iclicker Question 2

- What do you think is the biggest predictor to aid in your diagnosis?
  - A: RLQ pain
  - B: Pain migration
  - C: Anorexia, nausea, vomiting
  - D: Psoas sign

# Appendicitis

Sign/ Symptom	+LR	-LR
<b>RLQ pain</b>	<b>8.0</b>	<b>0 - .28</b>
Pain migration	3.2	0.5
Pain before vomiting	2.8	
Anorexia/nausea/ vomiting	Much lower than above	
Rigidity	3.76	Higher
Psoas Sign	2.38	Higher
Rebound Tenderness	1.1 – 3.6	<b>0 – 0.86</b>
Fever	1.9	Higher
Guarding and rectal tenderness	Much lower than above	<b>0 – 0.54</b>

# Likelihood Ratios Chart

LR	Interpretation
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# Acute Appendicitis

- ❑ RLQ pain is the most significant finding and other findings help to confirm the diagnosis
- ❑ The absence of RLQ pain, rebound tenderness and guarding help to rule out the diagnosis
- ❑ The location of the appendix can cause the findings to differ (hence the reason for different lower extremity tests)
- ❑ Confirm diagnosis with US or CT
- ❑ Proper diagnosis and treatment in a timely manner allow for prevention of complications

# Cholecystitis

- Signs/ Symptoms

- RUQ abdominal pain (worse after meals)
- Fever
- Nausea
- Vomiting
- Anorexia
- + Murphy's Sign

# iClicker Question 3

- What is Murphy's Sign?
  - A. Anything that can go wrong will wrong
  - B. Arresting inspiration with palpation of the gallbladder
  - C. Tenderness between the ASIS and the Umbilicus
  - D. Tenderness to palpation at the right mid-clavicular line just below the costal margin

# Cholecystitis

- What is the sensitivity and specificity of Murphy's sign?
  - ▣ Sensitivity – 50-97%
  - ▣ Specificity – 80%
- This lets us know that while a good screening exam, this technique is not diagnostic
- After discussion with attendings and reading up, with presenting symptoms and a positive Murphy's think cholecystitis and still get an US

# Cholecystitis

## □ Clinical and lab findings

Findings	+LR	-LR
Fever	1.5	0.9
Nausea	1.5	0.9
Emesis	1.5	0.6
RUQ pain	1.5	0.7
RUQ tenderness	1.6	<b>0.4</b>
Murphy's sign	<b>2.8</b>	0.5
Increased WBC	1.5	0.6
AlkPhos > 120	0.8	1.1
Increased AST/ALT	1.0	1.0
TB > 2	1.3	0.9
Increased AP, AST, or TB	1.2	0.7

# Cholecystitis

- ❑ No single finding is strong enough to confirm the presence or absence of acute cholecystitis.
- ❑ Murphy's sign and RUQ pain/tenderness appear to be the best of the findings to help rule in a diagnosis and the absence of RUQ pain/tenderness aid in ruling out.
- ❑ However there have been few if any studies done that measure the combination of various findings that would account for a more accurate diagnosis.

# Otitis Media

- What are the signs and symptoms we know to diagnose AOM?
  - Ear pain
  - Ear rubbing
  - URI
  - Fever
  - Sore throat
  - Poor appetite
  - Color – cloudy, distinctly red, slightly red, normal
  - Position – bulging, retracted, normal
  - Mobility – distinctly impaired, slightly impaired, normal

Sign/ Symptom	LR's
Ear Pain	+ 3.4, -0.4
Ear Rubbing	+3-7.3, -0.4-0.6
URI	+1.4, -0.3
Fever	+0.8-2.6, -0.3-1.4
Sore throat	+0.5, -1.2
Poor appetite	+1.1, - 1.0
<b>Cloudy</b>	<b>+34</b>
<b>Distinctly red</b>	<b>+8.4</b>
Slightly red	+1.4
Normal	+0.2
<b>Bulging</b>	<b>+51</b>
Retracted	+3.5
Normal	+0.5
<b>Distinctly impaired</b>	<b>+31</b>
Slightly impaired	+4
Normal	+0.2

# Otitis Media

- Cloudiness, distinct redness, bulging or distinctly immobile tympanic membrane were helpful in diagnosing otitis media.
- Normal color and normal mobility of the tympanic membrane help to refute the diagnosis of otitis media.

# Fun Stats

## □ Aortic Stenosis

- Slow rate of rise of carotid pulse (pulsus parvus et tardus) - +LR = 130
- Late peak murmur intensity - +LR = 101
- Decreased intensity of 2<sup>nd</sup> heart sound - +LR = 50
- Radiation to right carotid - +LR = 1.5/ -LR = .05

# Fun Stats cont...

- The agreement of listening to and detecting systolic murmurs
  - ▣ Clinicians agree more often when they listen to murmurs on tape than in a live situation
    - Kappa – tape = .48
    - Kappa – live = .3
  - ▣ For loud systolic and late-peaking murmurs
    - Tapes = .74
    - Wards = .29

# Kappa Ranges

Kappa value	Definition
.81-1	Almost perfect
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# Fun Stats still going....

## □ Carotid Pulse

- It is easy to find a bruit if you look for one
  - Kappa of .67
- But the character of the bruit is harder to agree upon
  - Kappa of <.40
- 1/3 of high grade carotid stenosis (70-99% occluded) had no detectable bruits
- Having an ipsilateral carotid bruit has a sensitivity of 63% and a specificity of 61% in the presence of a high grade stenosis.

# More

- Abnormal foot pulses for diagnosing peripheral vascular disease
  - +LR of 45

# Ahhhhh.....

Sign	Kappa
Dull to percussion	.52
Wheezes	.43-.93
Chest expansion	.38
Bronchial breath sounds	.32
Crackles	.3-.63
Cough	.29
Tachypnea	.25
Breath sound intensity	.23-.46
Tactile fremitus	.01

# DO

- Cardio
  - Try to elicit a hepatojugular reflex. Useful sign in cardiac failure when other signs are equivocal
  - Listen for an S3 to confirm your suspicion of cardiac failure
  - Do ventilatory maneuvers to confirm suspicion about the nature of cardiac murmurs
- GI
  - Percuss the spleen before palpating for splenomegaly
  - Do be reasonably confident that a pt with a positive Murphy's sign has cholecystitis
- Resp
  - Don't count the RR carefully because clinicians often disagree about tachypnea

# DON'T

- Cardio
  - Rely on the clinical assessment of carotid pulse characteristic character of carotid bruits (go for imaging)
  - Don't rely on common quoted signs of severity for aortic incompetence
- GI
  - Don't waste time screening for ascites with shifting dullness; bulging flanks is just as accurate
  - Don't decide a liver is enlarged on the basis of palpation alone
- Resp
  - Don't depend on tactile fremitus – not well agreed upon
- Other
  - Don't hesitate to repeat your exam or get a colleague to repeat it if you are unsure

# Things to Remember

- ❑ Do we know what we are doing?
- ❑ Are we doing it correctly?
- ❑ Do we know how to interpret the results?
- ❑ What do we do with the results?

# Thank You to:

- Dr. Darryll Patterson, MD
- Dr. R. Taylor Scott, DO

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