Edinburgh International Conference of Medicine

Past, Present & Future

#PPFEd16

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Does the Physical Examination have a Future?

Andrew Elder
This talk

- Why we need to think about this
- A brief history
- The current situation
- Some thoughts about the future
Why we need to think about this

Competency in Cardiac Examination Skills: A Multicenter Study

"The mean score for full-time faculty (FAC) was not significantly different from that of medical students."

Vukanovic Arch Intern Med. 2006
Why PE has declined

The way we practice

The way we teach

The way we assess
Making Physicians: UK and USA

- Medical Degree: 5 years
- Undergrad Degree: 4 years
- Medical Degree: 4 years
- Intern/Resident: 3 yrs
- Fellowship: 1-5 yrs
- Specialty Training: 4-5 years
- Core Medical Training
- Summative High Stakes Examinations
  - MRCP
  - USMLE
- Formative Workplace Based Assessments
- Board Examinations
  - SCE
- Formative Workplace Based Assessments
A (very) brief history
The Edwin-Smith Papyrus

- Written c. 1600 BC
- Found in 1812
- Translated in 1872
- Series of “surgical” cases
- Photograph from US National library of Medicine.
If thou examinest a man having a gaping wound in his head, penetrating to the bone, smashing his skull, (and) rending open the brain of his skull, thou shouldst palpate his wound.......
Vesalius 1543
Systematic and Meticulous Human Dissection
Observation and Description of normal structures
Thomas Sydenham and Nosology

- What constitutes a disease, the features that make it distinct from others – a classification
- “Hypotheses and philosophical speculations should be eschewed in favour of an objective description of each disease with same accuracy as when an artist paints a portrait”

c. 1666
Morgagni 1761

- Pathological anatomy
- Again..... observation and description
  - Concept of a whole organ being diseased
  - That a disease could be clearly ascribed to pathological change of an organ
The PE at this time was
- general observation
- pulse
- scrutinising urine and faeces

**Percussion**
- Concept.....anatomic localisation of disease

Auenbrugger gave physicians the chance to localise internal disease in life, for the first time.
Laennec 1816

• "Laennec did more than discover auscultation, much more. It was he who first sought and found the confirmation of the clinical diagnosis at the autopsy table and united pathological anatomy by an inseparable bond"
Laennec 1816

• “Morgagni had raised the question, what changes are produced by the disease? Laennec went further and asked by what symptoms or signs are these changes to be recognized during life?”

• Pratt 1935
Sir William Osler

- Looking, listening and thinking by the bedside
- The physician as the information gatherer, information analyst, information synthesizer
What I take from that short story

• Disease classification, and therefore diagnosis, is based upon careful (anatomical, pathological and clinical) observation by the physician

• The physical examination (and history taking too) is as much about a way of thinking, as a method, or a set of “hands on” skills
Is Physical Examination important now?

“Off hand, I'd say you're suffering from an arrow through your head, but just to play it safe, I'm ordering a bunch of tests.”
The diagnostic evidence base

- An elevated JVP has a +LR of 10 for an elevated right atrial pressure.
- That is, it increases probability of elevated RAP by about 45% from the pre-test level.
PE and Acute Diagnosis

N=442
Setting = ER in the USA

Paley Arch Int Med 2011

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Medical Error and the PE

- 208 vignettes where problems with PE had contributed to error (Verghese Am Med J 2015)
- Causes: 63% no PE
- Consequences
  - 76% delayed/no diagnosis
  - 27% incorrect diagnosis
  - 18% unnecessary treatment
  - 42% no or delayed treatment
  - 25% unnecessary cost
  - 17% unnecessary exposure to radiation or contrast

Patients value physical examination

Do you value physical examination?

Value: 83%

Don't value: 17%

N=150 patients with cancer

Kadakia Cancer 2014
Justification in itself

Physical Examination takes you to the bedside

That’s where the patient is
Does the PE have a future?
The new Nosology?

Imaging

The genome
“The stethoscope is dead”

- Takes you to the bedside
- Physician gathers and interprets information
- But
  - Cost
  - Incidentalomas
  - Training and practice

The handheld bedside ultrasound
We need all these aids to diagnosis

- History
- Physical Examination
- Labs
- Imaging
- Scoping
- Genetics
- Presentation

The Diagnosis?
Elements of value of the PE

- Diagnosis
- Care beyond Dx
- Patient Safety
- Patient contact
- Cost
- Ease of Access
- Pedagogy

Elder et al BMJ 2016
Gatherers and Interpreters?

The Physician’s substrate

- “Nutshell” histories
- Limited/no PE
- Automated ECG reports
- Echo reports
- Plain x-ray reports
- CT reports
- MR reports
Conclusion

• PE still needed until all diagnoses can be made by other diagnostic tools
• Physicians may already be becoming less skilled at gathering and interpreting diagnostic information
• We should revitalize efforts to ensure basic bedside skills are taught and learned
One view of the future
This Talk

• Physical Examination - Why bother?

• Teaching Physical Examination
  – What?
  – How?
  – When?
What practising clinicians think

What % of acute medical referrals require physical examination?

- Most patients (>50%)
- Some patients (1-50%)
- None

% of doctors

Targeted

- 99
- 1

Topto Toe

- 83
- 11
- 6

n = 3760 physicians, all ages, not USA

Elder et al: Physical Examination in Practice Unpublished

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Pixels or People?

The iPatient

The real patient

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Disease X

- Has features a, b and c

To diagnose disease x

- I need to find features a, b and c

A patient who presents with features a, b and c

- Has disease X
Detecting Effusions
# Ranking elements of the PE

<table>
<thead>
<tr>
<th></th>
<th>Infrequent and Not Useful (%) respondents</th>
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<tbody>
<tr>
<td>Character of the jugular venous waveform (37.9)</td>
<td>Conjunctival pallor (21.6)</td>
<td>Visual acuity (54.8)</td>
<td>Auscultation for pulmonary wheezes (95)</td>
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<tr>
<td>Abdominal palpation and percussion to assess the size of the kidneys (34.9)</td>
<td>Auscultation to determine the cause of a cardiac murmur (15.6)</td>
<td>Evaluation of the optic disc (54.7)</td>
<td>Auscultation for presence of pulmonary crackles (94.1)</td>
<td></td>
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<tr>
<td>Hearing (33.1)</td>
<td>Abdominal palpation and percussion to assess the size of the kidneys (15.1)</td>
<td>Evaluation of the knee joint (54.1)</td>
<td>Palpation of the abdomen for tenderness (90.9)</td>
<td></td>
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<tr>
<td>Chest expansion (31.5)</td>
<td>Abdominal auscultation to assess the character of bowel sounds (12.7)</td>
<td>Evaluation of the retinae (53.1)</td>
<td>Auscultation of pulmonary air entry (88.0)</td>
<td></td>
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<tr>
<td>Praecordial palpation to detect thrills or heaves (27.5)</td>
<td>Skin turgor (12.5)</td>
<td>Evaluation of joints for synovitis (52.3)</td>
<td>Auscultation to determine if a cardiac murmur is present (87.5)</td>
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Elder et al: Physical Examination in Practice Unpublished, USA

n = 3760 physicians, all ages, not USA
Corvisart
Hippocrates

- establishing medicine as a profession and by declaring that it has a rational basis.
- Disease is not divine but has a natural cause that can be studied and whose course can be predicted.
- However—no human dissection, disease imbalance of four humours.
- Galen’s ideas wrong for 1500 years.
If thou examinest a man having a gaping wound in his head, penetrating to the bone, smashing his skull, (and) rending open the brain of his skull, thou shouldst palpate his wound. Shouldst thou find that smash which is in his skull [like] those corrugations which form in molten copper, (and) something therein throbbing (and) fluttering under thy fingers, like the weak place of an infant’s crown before it becomes whole – when it has happened that there is no throbbing (and) fluttering under thy fingers until the brain of his (the patient’s) skull is rent open – (and) he discharges blood from both his nostrils, (and) he suffers with stiffness in his neck [Thou shouldst say]: “An ailment not to be treated”

*But the surgeon does not abandon the patient, he instructs:*

Thou shouldst anoint that wound with grease. Thou shalt not bind it; thou shalt not apply two strips upon it; until thou knowest that he has reached a decisive point.

*A later scribe added glosses to explain sections of the original text.*

**Gloss A**
As for ‘Smashing his skull (and) rending open the brain of his skull’ (it means) the smash is large, opening to the interior of the skull, (to) the membrane enveloping his brain, so that it breaks open his fluid in the interior of his head.

*Breasted (1930) op. cit. Vol 1 p. 164 ff.*