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The Evidence-Based Physical Examination as a Patient Safety Practice

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Perspective

Near the end of his shift, a hospitalist receives a call from the emergency department (ED). A 47-year-old man is being admitted, for the third time in 6 weeks, because of recurrent swelling of his legs and abdomen from what has been called end-stage cirrhosis. The hospitalist walks to the ED and introduces himself to the patient, a weather-beaten man seated on a stretcher and appearing exhausted. The hospitalist looks the patient over: There are the expected signs of liver disease—spidery blood vessels on his face and neck, distended abdomen, and swollen legs—but one finding is completely unexpected. Just beneath the patient's right ear, quick inward pulsations of the soft tissues are conspicuous, beating twice per heartbeat. In an instant—what seasoned clinicians call the "Augenblick" or "blink-of-an-eye" diagnosis (1)—the physician knows the patient's problem is *not* cirrhosis. The venous pulsations in the patient's neck indicate the diagnosis is constrictive pericarditis, a disorder in which the heart has become encased in scar tissue, causing the patient to retain fluid. The patient needs surgical removal of his diseased pericardium.

Without recognition of the elevated neck veins and their characteristic movements, the diagnosis of constrictive pericarditis is difficult and often delayed.(2) Why was it missed for so long in this patient? There are many reasons but, sadly, the most important is the decline of physical diagnosis skills among modern clinicians, a loss that reflects, at least in part, the success of modern technology. One hundred years ago, all diagnosis was based on empiric observation: the clinician's own senses of hearing, sight, touch, and sometimes, smell. Today, there are countless ways to categorize disease—telemetry printouts, laboratory tests, electrocardiograms, cross-sectional body images, endoscopic findings, microscopic reports, and pathologic summaries. Because clinicians must devote time to mastering all of these technologic metrics, there is less time to study traditional physical signs. Consequently, many clinicians conclude that physical diagnosis is a relic of the past, one that is inaccurate, unreliable, and unscientific, and one that cannot hope to compete with the glitter and perceived objectiveness of modern technology.

Nonetheless, this view ignores the facts. As the new field of evidence-based physical diagnosis (3,4) has emphasized, many physical examination findings are very accurate. By reviewing 2 centuries of traditional physical signs, evidence-based physical diagnosis sorts the wheat from the chaff, specifically identifying those signs with proven accuracy, thereby streamlining the physical examination for busy modern clinicians. In patients with suspected pneumonia, for example, one evidence-based approach filters through scores of traditional chest signs and focuses on just 5: fever (temperature > 37.8°C), tachycardia (heart rate > 100 beats per minute), crackles, diminished breath sounds, and absence of asthma.(5) The presence of 4 or 5 of these findings increases probability of pneumonia (likelihood ratio [LR] = 8.2; "LR" measures diagnostic accuracy). Conversely, the presence of 0 or 1 of the findings decreases the probability of pneumonia decisively (LR = 0.3). Because the evidence for these 5 signs rests on careful study of hundreds of patients with suspected pneumonia (3,5,6), clinicians can have high degrees of confidence that these algorithms provide accurate guidance.

Pneumonia is far from the only example of situations in which physical findings have stunning accuracy. While benign disorders of the inner ear are the most common cause of acute dizziness, a few patients are experiencing serious strokes, usually of the brainstem or cerebellum. The clinician versed in evidence-based examination will search for three specific abnormalities of eye movements (i.e., "saccadic pursuit," "bidirectional nystagmus," "normal head impulse test without corrective saccades").(3,7) Stroke is excluded if all three findings are absent (LR = 0.01); stroke is likely if any of the three findings are present (LR = 17.2). In two studies of 185 acutely dizzy patients, these three physical signs were *more accurate* in excluding stroke than the initial diffusion-weighted magnetic resonance imaging scan of the brain.(8,9)

Will evidence-based physical diagnosis improve patient safety and cut the costs of care? Absolutely. Prompt, accurate diagnosis reduces the number of procedures and invasive tests, decreases the number of complications, and shortens hospital stays. In a study of 635 patients with "cellulitis" referred by physicians, examination by expert physical diagnosticians revealed that 33% had alternative diagnoses such as eczema or lymphedema, thus avoiding unnecessary hospitalization and antibiotics.(10) In patients with ankle or knee trauma, validated "stop rules" (known as Ottawa rules), based just on bedside observation, accurately detect all important orthopedic injuries yet reduce the need for radiographs by one-third.(11-13) In patients hospitalized with pneumonia, decisions to discharge the patient, based just on vital signs, shorten duration of intravenous antibiotics and hospital stay by 2–3 days, when compared with usual care.(14) In patients evaluated in EDs for chest pain, just three bedside findings (combined with the patient's electrocardiogram) (15) identify the risk of subsequent life-threatening complications as accurately as measurement of serum troponin.(3,16)

The evidence also shows, in contrast to common belief, that physical diagnosis is as reliable or scientific as our modern technologic standards. For example, the interobserver agreement for most physical examination findings is no different than the interobserver agreement between two radiologists looking at the same head computed tomography for "mass effect" or two pathologists looking at the same liver biopsy for "alcoholic liver disease."(17) Subjectivity and interobserver disagreement are simply part of clinical medicine, and physical diagnosis is no different in this regard than any of the technologic ways we categorize disease.

The evidence-based approach to physical diagnosis has one additional benefit. Clinicians using it become more confident examining patients and, as a consequence, become adept at recognizing the many clinical disorders that still lack technologic diagnostic standards, e.g., shingles, drug rashes, seronegative rheumatoid arthritis, pericarditis, Parkinson disease, and amyotrophic lateral sclerosis, among many others. For a surprising number of diseases, diagnosis still rests entirely on empiric observation at the bedside, and the attentive physical examination is the only path to a correct diagnosis.

Restoring physical diagnosis to its proper place in clinical medicine requires two types of changes. Clinicians need to change because only the individual physicians can muster the energy it takes to master physical diagnosis. But, systemic changes are also required, because we now live in a medical culture that allows clinicians to make clinical decisions based largely on technologic tests, often after only cursory physical examination. Until this culture changes, constrictive pericarditis will continue to be misdiagnosed as liver disease, and patients will suffer as a consequence. It is up to our teaching programs, clinical leaders, and, perhaps, the patient safety movement to change this climate and restore physical diagnosis to its fundamental role in the care of patients.

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References

1. Campbell WW. Augenblickdiagnose. Semin Neurol. 1998;18:169-176. [go to PubMed]

2. Lowe MD, Harombe AA, Grace AA, Petch MC. A breathless woman with hepatosplenomegaly for 12 years. Lancet. 1997;350:1000. [go to PubMed]

3. McGee S, ed. Evidence-Based Physical Diagnosis. 3rd ed. Philadelphia, PA: Elsevier Saunders; 2012. ISBN: 9781437722079.

4. Simel D, Rennie D, eds. The Rational Clinical Examination: Evidence-Based Clinical Diagnosis. New York, NY: McGraw-Hill Professional; 2008. ISBN: 9780071590303.

5. Heckerling PS, Tape TG, Wigton RS, et al. Clinical prediction rule for pulmonary infiltrates. Ann Intern Med. 1990;113:664-670. [go to PubMed]

6. Emerman CL, Dawson N, Speroff T, et al. Comparison of physician judgment and decision aids for ordering chest radiographs for pneumonia in outpatients. Ann Emerg Med. 1991;20:1215-1219. [go to PubMed]

7. Newman-Toker DE. 3-Component H.I.N.T.S. battery. Salt Lake City, UT: The David Newman-Toker Neuro-Ophthalmology Collection, The Neuro-Ophthalmology Virtual Education Library. [Available at]

8. Cnyrim CD, Newman-Toker D, Karch C, Brandt T, Strupp M. Bedside differentiation of vestibular neuritis from central "vestibular pseudoneuritis." J Neurol Neurosurg Psychiatry. 2008;79:458-460. [go to PubMed]

9. Kattah JC, Talkad AV, Wang DZ, Hsieh YH, Newman-Toker DE. HINTS to diagnose stroke in the acute vestibular syndrome: three-step bedside oculomotor examination more sensitive than early MRI diffusion-weighted imaging. Stroke. 2009;40:3504-3510. [go to PubMed]

10. Levell NJ, Wingfield CG, Garioch JJ. Severe lower limb cellulitis is best diagnosed by dermatologists and managed with shared care between primary and secondary care. Br J Dermatol. 2011;164:1326-1328. [go to PubMed]

11. Stiell IG, Greenberg GH, Wells GA, et al. Derivation of a decision rule for the use of radiography in acute knee injuries. Ann Emerg Med. 1995;26:405-413. [go to PubMed]

12. Stiell IG, Greenberg GH, McKnight RD, et al. Decision rules for the use of radiography in acute ankle injuries: refinement and prospective validation. JAMA. 1993;269:1127-1132. [go to PubMed]

13. Auleley GR, Kerboull L, Durieux P, Cosquer M, Courpied JP, Ravaud P. Validation of the Ottawa ankle rules in France: a study in the surgical emergency department of a teaching hospital. Ann Emerg Med. 1998;32:14-18. [go to PubMed]

14. Oosterheert JJ, Bonten MJ, Schneider MM, et al. Effectiveness of early switch from intravenous to oral antibiotics in severe community acquired pneumonia: multicentre randomised trial. BMJ. 2006;333:1193. [go to PubMed]

15. Goldman L, Cook EF, Johnson PA, Brand DA, Rouan GW, Lee TH. Prediction of the need for intensive care in patients who come to emergency departments with acute chest pain. N Engl J Med. 1996;334:1498-1504. [go to PubMed]

16. Hamm CW, Goldmann BU, Heeschen C, Kreymann G, Berger J, Meinertz T. Emergency room triage of patients with acute chest pain by means of rapid testing for cardiac troponin T or troponin I. N Engl J Med. 1997;337:1648-1653. [go to PubMed]

17. McGee S. Reliability of physical findings. In: McGee S, ed. Evidence-Based Physical Diagnosis. 3rd ed. Philadelphia, PA: Elsevier Saunders; 2012:29-39. ISBN: 9781437722079.