CLINICAL VIGNETTE

A Minimalist Approach to Laboratory Testing in the Outpatient Setting

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Case Report

A 41-year-old man presents for a "complete physical exam." He has a history of hyperlipidemia and a father who had coronary artery disease in his 60's. He has no complaints and is on no medication, although he was previously on a statin. He has exercised in the past and neither smokes nor drinks alcohol. His review of systems is entirely negative. His examination is normal with a blood pressure of 122/80 mmHg and a BMI of 21.6 kg/m^2. The following tests are ordered: Complete Blood Count (CBC) with differential, comprehensive metabolic panel, lipid panel, free and total prostate-specific antigen (PSA), thyroid-stimulating hormone (TSH), 25-hydroxy Vitamin D, urine for albumin/creatinine, urinalysis, Electrocardiogram, cardiac CT, screening audiogram and pulmonary function tests.

As this article will focus primarily on judicious and appropriate test ordering in the outpatient setting, take a few moments to review the list of tests ordered and evaluate the merits of each test in the context of the history provided.

Admittedly, this was a patient seen in an executive physical examination program. While extensive testing in this setting may be rationalized compared with standard care, there are principles we can learn from such a scenario.

We might start by asking ourselves what patients expect at the time of the "physical" in terms of testing and what clinicians hope to look for when ordering such tests. It is important to frame the discussion within the context of a visit with a patient without complaints. Test ordering serves a different purpose in patients with specific complaints or past medical history.

It is not uncommon for clinicians to order various blood tests as a "baseline." CBCs and chemistry panels commonly come up as examples. Is there any evidence supporting such "baseline" testing and what are the downsides of ordering tests unnecessarily?

First, unnecessary tests may yield "abnormalities" that merely reflect a healthy individual falling outside the normal range (normal ranges being set up to encompass 95% of the healthy population, with 5% of that still healthy population being outside that range). In some cases, the clinician may be able to discuss the "abnormality" without further workup, for example in the case of a slightly elevated alkaline phosphatase. The finding raises the question of what level of alkaline phosphatase on one of these "baseline" panels would trigger the clinician to embark on a workup? Another scenario is a healthy young woman with no complaints who has a hemoglobin of 10.8 g/dl on routine testing. She can be clearly defined as anemic, but does she need to be worked up or treated with iron supplements until menopause if it is presumed to be from menstruation? Clearly, unnecessary testing can lead to anxiety (on the part of physician and patient) and additional testing, which in an ongoing cascade can lead to further anxiety, not to mention additional health care costs.

Many of my patients, especially those who previously were in community-based practices, come with preconceived ideas that laboratory testing-in some cases extensive testing-is a reflection of good care. Patients may think a physician who orders lots of tests is more thorough than one who does not. The situation is somewhat analogous to that of the patient who has an expectation that their upper respiratory infection, having all the earmarks of a virus, should be treated with antibiotics. Again, this expectation often gets transferred to the clinician in such a way that the clinician feeds into that expectation. And just how it is often easier for the physician to prescribe an antibiotic than it is to explain why it is not warranted, so the clinician succumbs to ordering unwarranted lab tests as part of the physical.

What blood tests are appropriate in the physical examination setting for the asymptomatic patient? There are tests one could agree upon to be appropriate based on consensus guidelines, although what constitutes a consensus in part depends on which sources one wants to draw from. For example, it is commonly accepted that glucose testing every 3 years in the average-risk individual be initiated beginning at age

45.[1,2] A lower age threshold is applicable to those with risk factors for diabetes. Lipid testing is also an accepted screening test in healthy individuals, although there are differing guidelines. For example, the National Cholesterol Education Program (ATP III) recommends screening every 5 years over age 20.[3] The USPSTF in 2008 issued new recommendations, that of screening men 35 and older, men 20 to 35 if increased risk for coronary artery disease (CAD), and women 20 or older if increased risk of CAD.[4] PSA screening has its own controversy and it is still something best decided upon between patient and clinician with an informed discussion, in otherwise low-risk men.

Some tests fall in the gray zone in that there are not as well-established evidence-based guidelines to support them. With regards to screening for thyroid disease in asymptomatic patients, the USPSTF could not determine the balance of harms and benefits[5]; the American Thyroid Association recommends everyone over 35 be screened every 5 years with women of particular concern[6]; and the American Association of Clinical Endocrinologists recommends all women be tested by age 50.[7] A position paper from the American College of Physicians concluded that office-based screening "may be indicated in women older than 50 years of age."[8] Disparate recommendations can be found with Vitamin D testing as well, with the Agency for Health Care Research and Quality consensus guidelines in 2008 recommending screening only for those over 50 with osteoporosis[9], while in clinical practice, clinicians are generally screening anywhere from a certain subpopulation to everyone in their practice. Indeed, Dr. Michael Holick, considered a "vanguard of the pro-D forces" and the author of a 2007 NEJM review, recently reported that he is not an advocate of routine screening for vitamin D deficiency.[10] Clinicians can be easily overwhelmed in terms of knowing what to order for the healthy patient. No good evidence exists for the ordering of complete blood counts or chemistry panels as part of routine testing, yet they continue to be ordered by many physicians.[11,12]

In the past, there was an argument for cost-effectiveness in ordering only the minimal tests indicated. With the advent of extensive automation in the laboratory, there is little difference when ordering multiple tests or a few tests out of a panel. Since most insurance carriers follow Medicare rules, it makes little difference from that point of view, one exception being HMO patients, whose carriers pay a set monthly fee up-front for lab costs.[13] Nevertheless, there is a requirement for proper ordering of tests according to federal law and regulations, meaning one should order tests based on medical necessity.

There are many opportunities to practice a minimalist approach to test ordering. As an example, if I have a patient on a statin who has a normal liver test intially and am following liver tests annually, I will order a simple alanine aminotransferase test (ALT) as opposed to a hepatic panel. This is because the ALT is the most sensitive indicator of drug-induced liver damage, at least as it relates to statins. Thus, if I have a normal ALT, I will feel comfortable with this result and can avoid having to look at other numbers whose values may fluctuate slightly from time to time. I do this knowing also that the chance of developing liver problems after having no problems initially on a statin, barring any increase in dosage, is quite rare. Another example of minimalist ordering includes getting a total and HDL cholesterol in a low to average-risk patient who has not had high readings in the past. For patients that are not fasting, this also avoids them having to come back a second time if the total and HDL readings are in the normal range.

Admittedly, not all patients are content with this approach to test ordering. Many patients may feel that there is some cost-cutting or an incomplete evaluation. Some patients have become accustomed to getting lipid levels checked every 3 or 6 months, despite normal or stable readings over time. I try to explain my rationale including the downside of overtesting. Much of the time that suffices, but not always.

So, going back to the case presented initially, what tests would I have ordered on this patient coming in for a (non-executive) physical? Probably not much more than a lipid panel. I like to point out to residents and students that if one can become comfortable with a minimalist approach, meaning practicing good medicine without relying on extraneous testing to do so, one reaps the benefits of having to review many less numbers. Over time, this can lead to less anxiety and, I believe, better patient care.

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