

The Unknown Unknowns

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"...There are known knowns; there are things we know that we know. There are known unknowns; that is to say, there are things that we now know we don't know. But there are also unknown unknowns—there are things we do not know we don't know."

—Donald Rumsfeld, United States Secretary of Defense, February 12, 2002

These astute words were delivered during a news briefing with regard to the absence of evidence going into the Iraq wars. Nearly 12 years later, I listened to an infectious disease specialist reiterate these words regarding our struggles with super-bugs and antibacterial resistance—and nearly 12 years and thirty seconds later, I realized how perfectly these words captured the essence of my clinical practice.

I started practicing peri-operative medicine serendipitously almost five years ago. A clinical opportunity presented itself. The solo hospitalist in our Pre-Operative Medicine Clinic (PMC) needed a back up and a colleague. I threw myself in, hopped along for the ride, and hoped for the best.

I was hooked. The hospital had transitioned from an anesthesiologist-led to a hospitalist-led perioperative clinic just a few years prior. Here it was—internal medicine in its purest form! Every organ system to be considered, with the cardiac system on its golden pedestal. Here was the Revised Cardiac Risk Index and the 2007 American College of Cardiology/American Heart Association algorithm nobly helping us ford the great river of "pre-op clearance." Here was the pulmonary system on its ever-slightly-shorter silver pedestal, but-tressed by the Arozullah Respiratory Failure Index. But there was so much more! Here was diabetes, chronic liver disease, substance abuse, and poorly controlled skin and dental infections. Here was chronic anticoagulation, bleeding diatheses, chronic

kidney disease, immunosuppressants, and chronic steroid therapy masking underlying secondary adrenal insufficiency. And then there is rheumatology and rheumatoid arthritis, with the risk of cervical spine instability and subluxation with intubation.

Here was systems-based practice and multidisciplinary care. Patient education. Communication skills. Good old-fashioned bread-and-butter history-taking and physical diagnosis skills combined with sophisticated testing modalities. I was board-certified in internal medicine but learning tomes about anesthesiology and surgery by the day.

It was invigorating to meet patients at such an excitedly vulnerable and vulnerably exciting juncture in their lives. I have been able to look a patient in the eye and say, "Your last A1C was 6.4, which is excellent in general and certainly reassuring going into a major surgery." To another I have said, "I hear your concerns that your father died of a post-op MI, but you've never smoked, you exercise regularly without concerning symptoms, and your EKG is normal. I don't have any indications to perform a stress test." But I am also comfortable saying, "I know that your aortic valve area is 0.6 cm² and you've been feeling more short of breath climbing stairs lately. I know that surgery will be very risky for you, and it is something that I need to advise against."

The known knowns.

There have been countless opportunities to use my brain and my diagnostic skills to drive patient care forward. There have been chances

to engage with a patient and say, "You've been on insulin for 40 years with an A1C never less than 8. I hear abnormal blood flow when I listen to the carotid arteries in your neck. I am very concerned that you have significant blockage, but I can't tell you how bad it might be, which is why I'm ordering more tests for you." I may also say, "You appeared floridly winded walking into clinic, you can't lie flat, and your last CXR showed an enlarged heart and fluid on your lungs. I am very concerned that you have some degree of heart failure, but I don't know how extensive or what type." When a good, juicy, sink-your-teeth-into-it history raises my pre-test probability of underlying disease, it makes my decision to test immediate.

The known unknowns.

I like to think that I am a cost-conscious, less-is-more physician. I like the known unknowns. They make it easier to decide to test and justify my recommendations to delay or cancel surgery.

But even the known unknowns can be stress-inducing and grueling. The frantic 11th hour search for the long-forgotten coronary angiogram. Where was it done? Why? What clinical concerns might have prompted a catheterization, let alone non-invasive cardiac testing? What did it show? What do you mean, "It was fine"? Do you mean fine as in "diffuse multivessel disease not amenable to revascularization" or fine as in "normal coronaries"? Both results seem to get transmitted

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down to patients the same way. These are the times I just don't know—but at least I know it.

And then there is the giant gray zone. The things that make me wrangle, hem-and-haw, and teeter back and forth for hours over whether or not further testing will change management. The times when the level of evidence is C and the strength of the recommendation is a class IIb. The times when the elegantly crafted and oft recited guidelines say it "might be considered" or "it is reasonable" or "it is probably recommended." Thanks, that was helpful.

Those of us in pre-operative medicine shudder whenever we hear the term "clearance." No patient is ever cleared for surgery. To use the term implies that risk is reduced to zero, is cleared away, and removed entirely. Risk is never eliminated. How far is it reduced even when we can state that a patient is optimized or stable? But how far can it be reduced when we do not even know what baseline pathophysiology we are up against?

I think of the seemingly healthy 50-year-old patient awaiting a 10-hour long complex spine surgery who tells me she has a history of a murmur, frequent palpitations with a

prior event monitor revealing a large burden of PVCs, and an EKG with diffuse T wave inversions. I have no idea what degree of potential structural heart disease I'm up against. Turns out her ECHO and stress are completely normal. I think of the elderly woman with stage IV chronic kidney disease and poorly controlled hypertension—and the potential for her hemodynamic instability during surgery to push her more quickly toward dialysis. I wish for that crystal ball, but it does not exist.

The unknown unknowns.

They make my job harder, my clinic days more harried, and my life generally more stressful. The rush to test or the insistence that surgery be postponed or canceled—sometimes even when the testing ends up being negative or normal. The dreaded weapons of mass destruction (or in this case obstructive coronary disease) did not exist, thankfully. But how much uncertainty did I throw into the mix? How much fear about significant underlying pathology did I generate in a patient prior to getting the test results back? Did I violate patient trust, violate *primum non nocere*, in my search to decrease uncertainty?

But the unknown unknowns are also what make my job a fulfilling and exciting career. They are also what make me a more consummate physician, a more invested clinician. These are the things that have fueled me to be a better patient educator and patient advocate. They have mandated that I be better at interdisciplinary care. I have learned an approach to clinical medicine that I never expected. I'm on a first name basis with surgeons and anesthesiologists with whom I would not have collaborated otherwise.

Where risk persists, we must rally as a patient care team. When we have to manage a large burden of unknown risk, we cannot practice medicine in isolation. I'd like to think that being a peri-operative specialist has taught me to be a better non-partisan clinician. I have learned to reach across the aisle and make co-management decisions with my colleagues in anesthesiology and multiple surgical subspecialties.

How much risk can we live with? How much unknown can we handle? I don't know, but I also know that practicing medicine without the unknown unknowns would be a lot less interesting.

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