

Transcript Details

This is a transcript of an educational program. Details about the program and additional media formats for the program are accessible by visiting: <https://reachmd.com/programs/advances-in-medical-imaging/revolutionizing-the-doctors-black-bag/3617/>

ReachMD

www.reachmd.com
info@reachmd.com
(866) 423-7849

Revolutionizing the Doctor's Black Bag

ULTRA-PORTABLE ULTRASOUND

Something new for the primary care physician that fits right into one's black bag, something that improves history taking, expands a physical exam and strengthens the patient-physician relationship. What is it? We are about to find out.

You are listening to ReachMD, The Channel for Medical Professionals. Welcome to Advances In Medical Imaging. I am Dr. Jason Birnholz, your host and with me today is Dr. David Hellman. Dr. Hellman is the Aliko Perroti Professor of Medicine, the Vice Dean and the Chairman of the Department of Medicine at the Johns Hopkins Bay Medical Center in Baltimore. Today, we are discussing ultra-portable ultrasound.

DR. JASON BIRNHOLZ:

Dr. Hellman, thank you very much for joining us today.

DR. DAVID HELLMAN:

Very pleased to be here.

DR. JASON BIRNHOLZ:

When you started your work with portable ultrasound or may be I should say bedside ultrasound some years ago, what did you perceive of as the clinical need?

DR. DAVID HELLMAN:

I thought that it was ridiculous that the average physician was going to the bedside with the same tools that Osler had 130 years earlier, but without any evidence that we could use those tools, any better than he did.

DR. JASON BIRNHOLZ:

How did you go about trying to establish that there are ways to change this?

DR. DAVID HELLMAN:

We looked at the information on how people currently were doing with the tools that we have. So, the stethoscope was invented in 1819 and the abdominoscope was invented in 1851. So, this meant that the most recently invented tool that the average doctor was using at the bedside was nearly a 150 years older or more than that, and it is, one thing if it is old, but it is, the other issue is how well they work and the evidence is that unfortunately in the hands of the, even experts, these tools venerable as they are, just don't perform very well. So, there are number of studies that show even in the hands of cardiologist that the typical physical exam with the stethoscope of the heart will miss about half of the findings that are viewed to be important and that are identifiable by echocardiogram and we also found similar results with examinations of other parts of the body. So, the physical exam turns out not to be very good at picking up ascites or enlargement of the spleen or liver, and yet these are tasks, which ultrasound does exceedingly well.

DR. JASON BIRNHOLZ:

You mentioned that the classic stethoscope, of course phonocardiography has been around for a long time, but nobody seems to make very much use of it. Is that because there is not enough information in that way of looking at things or is it simply in a nurture of moving into something a little more technical?

DR. DAVID HELLMAN:

Part of the problem is that sound itself is of limited value. So, for example, heart sounds may not tell you very well how effectively the ventricle is contracting and yet imaging through ultrasound provides that answer easily and quickly.

DR. JASON BIRNHOLZ:

Well, how did you go about trying to establish this?

DR. DAVID HELLMAN:

It's a bit of a story and I initially began talking with scientist at the Johns Hopkins Applied Physics Laboratory, a large laboratory that is largely dedicated to highly technical work, and they were interested and began focusing on ultrasound as a way of modernizing the doctor's black bag, but I quickly discovered that there were other people who had been looking at this and had developed machines that did the job that we were trying to invent and so instead of I was never interested in trying to invent a device, I wanted to try to apply it and so, once I realized there were some devices that were available, we began to focus on the question, could the average doctor learn how to use this piece of equipment. You can list a whole bunch of things that a general physician would want to do. You could think that it could be used diagnostically to examine the heart that it could be used to determine if someone has a pleural effusion, if someone has ascites. Why have the patient wait for a day in the hospital to answer a question that turns out to be answered by frequently high school graduates, and don't get me wrong, I have nothing against high school graduates, but if I go to school until I am 30, why can't I answer the question, is there pleural effusion or is there ascites and how well does the heart contract. So, we began focusing on general internist and in our case, we particularly have looked at hospitalist, hospitalists or doctors who work only in the hospital, and we thought that this was a group that would love to be able to bring rapid diagnostic test to the bedside, and so we specifically have been asking the question, can hospitalist learn how to acquire and interpret correctly echocardiograms, that has been the focus of our work.

DR. JASON BIRNHOLZ:

If you are just joining us, you are listening to **Advances in Medical Imaging on ReachMD, The Channel For Medical Professionals**. I am Dr. Jason Birnholz and I am speaking with Dr. David Hellman. We are discussing ultra-portable ultrasound.

DR. JASON BIRNHOLZ:

Okay, while ultrasound is actually a technically advanced form of percussion, which is a pretty basic physical exam technique. When you had your hospitalist start to use this, were they able to go beyond the screen image to apply their knowledge of pathology and pathophysiology that the problems of the patients are looking at or did they have problems with cross-sectional imaging or imaging or other practice.

DR. DAVID HELLMAN:

So, what we found is that there are 2 parts to doing echocardiography correctly, one is acquiring the image and the other is interpreting the image. It turns out interpreting the image is not very hard to learn and perhaps that is because in medical school, everyone is exposed to echocardiograms and their interpretation, but acquiring the image is not so easy, and it takes a good deal of training to be able to acquire a high quality image that can be interpreted. So, what we found is that with moderate training, you can train hospitalists to do a pretty good job in acquiring the image, but they don't do this well as an echo technician. When it comes to interpreting the image, our hospitalists came pretty down close to cardiology fellows, not quite, but close and so there was much less of a gap in their ability to interpret the image than acquire and ultimately what we have learned is that we need to focus on teaching a very limited examination and we are now working on focusing simply on being able to measure left ventricular function and the reason that we have focussed on that is that it is an important clinical outcome. It frequently determines prognosis and poor left ventricular function has a known treatment, which is also known to work. So, we are now doing studies to try to see if we can teach hospitalists to do echocardiography to detect and measure accurately of left ventricular function.

DR. JASON BIRNHOLZ:

Well, heart failure is certainly one of the primary reasons patients come into internist's office and are followed afterwards. Is this ready now for office use?

DR. DAVID HELLMAN:

Some people are using it in offices for a variety of different things. So, there are studies, for example, showing that ultrasound picks up many more fibroid nodules than is possible by physical examination. What's not clear is whether the detection of all these nodules is cost effective. So, it's also clear that ultrasound can be used to determine if there is any carotid artery disease. So, I think in my view, I am a great fan of ultrasound and a great fan of trying to revolutionize the doctors' black bag and it is inconceivable to me that we can't bring better technology to the bedside for the benefit of our patients, but I think, in my conservative view, the jury is still out as to exactly where this can be taught, where it can be taught well, and where it makes a big difference for patients in general medical care.

DR. JASON BIRNHOLZ:

Well, it really makes a difference, the certainly the important thing, isn't it? I am thinking that there is a difference between a kind of a primary diagnostic exam, where anything is possible and you got to consider everything and sort of a surveillance or followup exam, where you are looking at something that's already been identified and you are just trying to decide is it getting better, or worse, or staying the same and that would have been a lot easier to introduce into practice, I would think.

DR. DAVID HELLMAN:

Jason, I think you are absolutely correct and I believe that most of the people who are working in this field, they have come to that conclusion that the examinations with ultrasound need to be focused. There are a number of other potential applications, so the preventive task force is recommended, for example, that every male smoker over the age of 65 who can live, who is likely lived in here should have the screening ultrasound of the abdomen for an abdominal aortic aneurysm. That would be something that ultrasound could eminently answer and could be done in a primary care physician's office and in the hospital, we haven't touched on all the procedures that could be done. It sounds like much more safely with guided ultrasound than placing needles and to veins and arteries blindly. So, I think there are many, many potential applications our studies have just focused on the cardiac aspect.

DR. JASON BIRNHOLZ:

Actually I am wondering if any of your hospitalists have been to share any observations they made about their interactions with patients while they were doing their scanning.

DR. DAVID HELLMAN:

I think that one could fear that introducing this technology would distance you from the patient and the perception has been the exact opposite. To do a cardiac ultrasound requires hands on. You have to spend time with the patient, you are positioning the patient, and so, there is a sense that from the hospitalists that the bond between them and the patient has increased and furthermore that to be able to show the patient the image and describe the image, our hospitalists have the sense that this has further increased the bond between them and has heightened the sense of competency that the patient feels the physician has.

DR. JASON BIRNHOLZ:

Well, very likely because of your work, even though you have tended to concentrate very specifically on cardiac applications, most of the major ultrasound manufacturers are now producing portable equipment and promoting it directly or they will be promoting it directly to primary care physicians, the latest device is a handheld one that has a high definition screen, lots of electronics for splitting up the image, and I am wondering if you think these improvements will provide an extra impetus for this or is this a generational thing, do we need to have some years of medical student and resident exposure in training before this will come to pass?

DR. DAVID HELLMAN:

I think it's probably going to take a little while that it will be accepted by the generations to come. I know some medical schools are now using ultrasound as part of teaching anatomy or as part of teaching cardiac physiology, and this difficulty that we are finding of acquiring the image is likely not to be such a problem for the physicians in the future who may grow up with this from day #1 of anatomy class.

DR. JASON BIRNHOLZ:

My thanks to Dr. David Hellman who has been our guest. We have been discussing ultra-portable ultrasound. Dr. Hellman, I really applaud your work and I hope you will keep us all updated on your progress.

DR. DAVID HELLMAN:

Would love to. Thank you.

DR. JASON BIRNHOLZ:

I am Dr. Jason Birnholz and you have been listening to Advances in Medical imaging on ReachMD, The Channel for Medical Professionals. Be sure to visit our website at www.reachmd.com, now featuring pod casts of this and other featured series. Thank you for listening.