GE Healthcare

Bedside echoscopy with Vscan: a rapid information gathering tool in the pocket of clinicians

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Bedside Ultrasound is often used in specific medical emergencies in order to help physicians make quicker and better decisions. This has happened also thanks to the progressive decrease in size of ultrasound scanners which have now become available.

The use of ultrasound in the department of internal medicine has been possible for more than three decades, however, not all internal medicine departments are ultrasound equipped and most still rely on the exams performed by radiologists. It is more and more accepted, however that point-of-care ultrasound, namely "ultrasonography performed and interpreted directly by the clinician at the bedside" (C. Moore, J. Copel, N Engl J Med 2011;364:749-57) has an added value, since it can lead to quicker diagnoses and support immediate therapeutic decisions. Furthermore, the growth of point-of-care ultrasonography has paralleled the process of developing more compact and portable devices that can be used at the bedside. Point-of-care ultrasonography is not aimed at replacing comprehensive ultrasonography, but at providing information to the physicians to rapidly diagnose and solve certain medical problems during rotations.

The solution to some of these problems may require basic ultrasound image. The answer to these problems may be a matter of "yes or no", like for instance: is there presence of pleural fluid? Pocket sized portable ultrasound scanners may provide desired information, based on the operator's expertise. The basic level ultrasound can be regarded as an extension of the physical examinations and, with the addition of visualization, the clinician can make a more informed decision. In order to better distinguish this very basic and focused approach from a conventional comprehensive ultrasound examination, the EFSUMB (European Federation of Societies for Ultrasound in Medicine and Biology) has defined a new name for this technique: EchoScopy.

For some of the following common clinical scenarios, important information can be obtained at the bedside with a basic knowledge of ultrasound (endorsed by EFSUMB: The Minimum Training Recommendations for the Practice of Medical Ultrasound were published under the EFSUMB Newsletter-section in the Ultraschall in der Medizin/European Journal of Ultrasound, Volume 27, issue 1 February 2006 page 79-105.):

CLINICAL SITUATION	CLINICAL QUESTION	ECHOSCOPIC ANSWER
Abdominal enlargement. Obesity or ascites?	Free abdominal fluid?	YES or NO
Area of Pulmonary dullness at percussion (CASE 1)	Presence of pleural effusion?	YES or NO
Tachycardia, low cardiac tones, low voltages on ECG	Pathological pericardial effusion?	YES or NO
Pulsating mass in epigastrium at palpation (CASE 2)	Is the abdominal aorta of normal size?	YES or NO
Marked decrease or lack of urinary bladder output	Bladder overdistension?	YES or NO
Worsening of renal function	Hydronephrosis?	YES or NO
Jaundice	Dilated intrahepatic biliary tree?	YES or NO
Suspected mass at abdominal palpation	Mass confirmed?	YES or NO
Fluid assessment needed in known fluid effusion (pleural, abdominal)	Liquid aspiration / drainage	Choice of the puncture site
Reduction of output in patients with urinary catheter (CASE 3)	Catheter displaced?	Location of urinary catheter inside the urinary bladder? Rule out bladder overdistension

Various other uses of bedside echoscopy are possible, requiring more extensive training and skill.

CASE 1

A patient with a history of COPD and smoking, visited as outpatient for worsening of cough and shortness of breath, with a suspicion of COPD exacerbation. On physical examination an area of pulmonary dullness with lack of murmur was noted. Completion of the physical examination with Vscan* enabled confirmation of suspicions of unilateral left pleural effusion (Fig.1). A chest XRay reading confirmed left pleural effusion and did not disclose any additional finding. Repeated ultrasound examination with Vscan was performed to identify the best puncture site to perform a thoracentesis, both to obtain quick symptom relief and to obtain a fluid sample to be analyzed, on the suspicion of malignant pleural effusion.

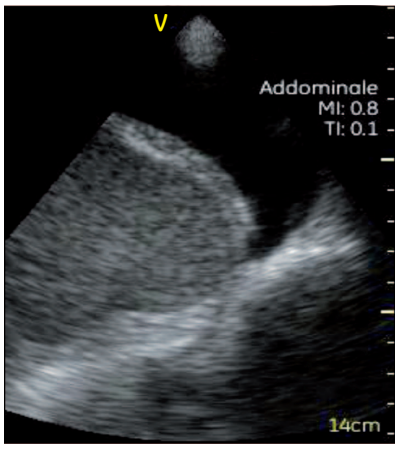

Figure 1: US scan of left hemithorax, visualizing the spleen, the diaphgram and the pleural effusion.

CASE 2

An overweight patient with hypertension, a family history of diabetes and cardiovascular diseases was referred to the clinic. During the physical examination a pulsating mass in epigastrium was barely felt on palpation. Bedside ultrasound examination with Vscan enabled immediate confirmation of the suspicion of abdominal aortic aneurysm (3.9cm in maximum antero-posterior diameter, Fig. 2) and the patient entered in a surveillance program.

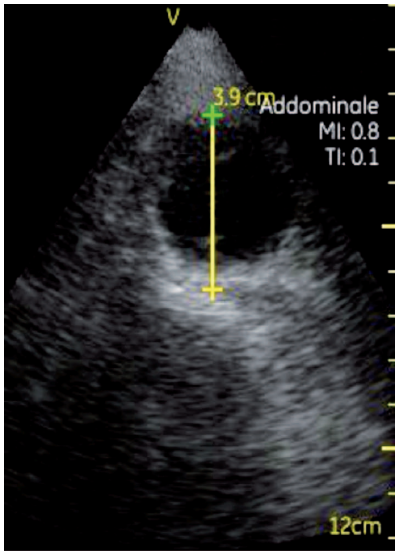

Fig. 2: Antero – posterior scan of the aneurysm, with a diameter of 3.9cm.

CASE 3

A patient with known bladder carcinoma and reduced urinary output had a vesical catheter placed. The next day, he complained of increasing lower abdominal and lumbar pain and there was a further reduction in urinary output. Ultrasound examination with Vscan enabled visualization that the Foley catheter was in place, but an over-distended bladder with echogenic mass (likely to be blood clots) in the lumen close the malignant mass (Fig. 3). Extension of the examination to the kidneys showed bilateral hydronephrosis (Fig. 4) most likely originating from the Foley catheter obstructed by clots. Prompt urological treatment was then provided.

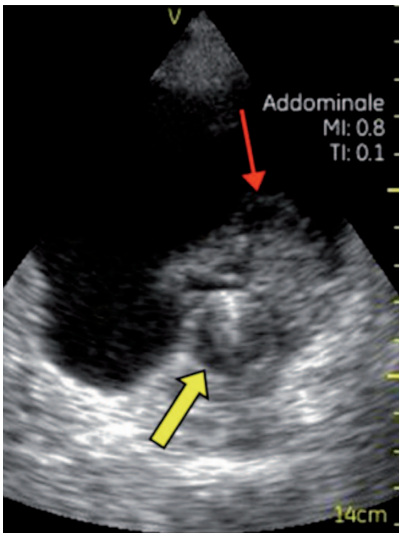

Figure 3: Foley catheter, indicated by the yellow large arrow, and clot superimposed (red thin arrow) over the malignant mass originating from bladder wall, encasing the Foley catheter balloon.

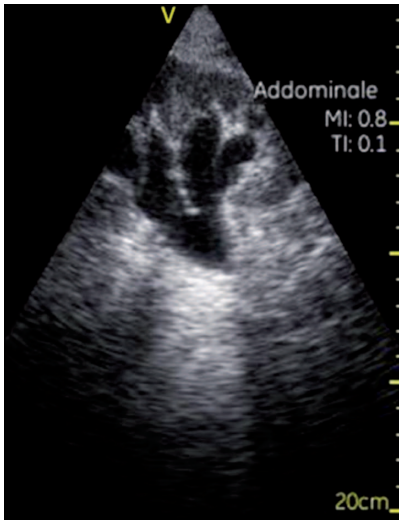

Figure 4: Bilateral hydronephrosis as a result of the Foley catheter obstruction.

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The case information and images discussed in this paper were acquired using Vscan v1.1.

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