

Ultrasonography performed by a Surgeon

Surgeon by training have a very detailed knowledge of anatomy and can also appreciate the pathological changes taking place in a normal anatomical organ. Ultrasonographic investigation reveals images of the anatomical structures of the viscus and pathological changes which may have taken place in the organ due to disease process. The surgeon, with little training, can perform ultrasound on their own patients, can read and interpret the images and make a diagnosis on the very first visit.

A patient walking into the consulting room of the surgeon, is first interrogated, a detailed history taken and clinical examination done. By the time the surgeon concludes the whole process, he has a number of possible diagnosis in his mind. For instance a patient presenting with jaundice, he may have obstructive(surgical) or non obstructive(medical) jaundice as differential diagnosis. The surgeon can use the probe of the ultrasound to visualize the images of liver, Gallbladder, pancreas, stones, common bile duct and make an immediate diagnosis, prior to laboratory investigations. Similarly in a patient presenting with a lump in the breast, ultrasound images can be extremely useful to differentiate between cystic(usually benign) or solid(may be malignant) lump. If cystic, ultrasound guided aspiration can be done and fluid sent for cytology. A patient walking to the surgeon consulting room with a lump in the breast ,may walk out after the consultation with no lump in the breast.. in case. The probe of the ultrasound is like a stethoscope to a cardiologist and gives an added armamentarium to the surgeon, besides using his all other senses. The concept of an 'ultrasound stethoscope' is rapidly moving from theoretical to reality.(American Institute of Ultrasound in Medicine)¹⁻³.

Over the past two decades, ultrasound equip-

ment has become more compact, portable, of higher quality and less expensive. The surgeons have not to be familiar with technological intricacies of the machine; each machine basically has a monitor, a keyboard for data input, a processing unit, a probe or transducer that receives and send sound waves, and a recorder to copy the images. These machines are very user friendly. The surgeon sees are the images of the viscus taken in different planes- longitudinal, transverse, coronal or some combination like oblique. The plane is chosen by placing the probe in the direction selected for the image. Gynecologists Colleagues are pioneers in using ultrasound particularly on foetus. The gynecologists' colleague seems to be more adventurous- they are not only the first one to perform ultrasound themselves in their clinic but also the first one to perform laparoscopic cholecystectomy and showing the way to surgeons.

Some medical schools are now beginning to provide their students with hand-carried ultrasound equipment for use during their clinical rotations.⁴

FAST Examination

FAST stands for Focused Assessment with Sonography for Trauma-to detect fluid, which is likely to be haemorrhage, in cases of trauma.⁵ It's a rapid bedside ultrasound examination performed by surgeons and emergency physicians to detect blood in the abdomen and around the heart. A FAST examination can be completed in less than 5 minutes and has been shown to have a sensitivity of 73 to 99%, a specificity of 94 to 98% , and overall accuracy of 90-98% for clinical significant intra abdominal injury in trauma.⁶ The extended FAST(e-FAST) also includes examination of chest for pneumothorax. Five focused examination are detection of free intraperitoneal fluid, free fluid in the pelvis, pericar-

dial fluid, pleural effusion and pneumothorax. Fluid is easy to pickup ultrasonographically as it is black in colour and anechoic, fluid in cases of trauma being blood.

Point-Of-Care Ultrasonography

Point-of-care ultrasound is defined as Ultrasonography brought to the patient and performed by the provider in real time. Point-of-care ultrasound images can be obtained nearly immediately and the clinicians/surgeons can use real-time dynamic images (rather than images recorded by an ultrasonographer and interpreted later), allowing findings directly correlated with the patient's presenting signs and symptoms.⁵ Point-of-care Ultrasonography is repeatable if the patient conditions changes. It is used by various specialties in diverse situation.

In developing countries and even in more advance countries, it is important to keep the cost of the investigations and its hazards in mind. CT Scan, MRI, Angiography, Nuclear Medicine are expensive, can give radiations and may be invasive. The WHO states that Plain Radiography and Ultrasonography, singly or in combination, will meet two thirds of all imaging needs in developing countries.⁷ The use of hand-carried ultrasonographic devices has been described in prehospital setting, including in ambulance and disaster setting, as well as in battlefield medicine (the scenario for which hand-carried ultrasonographic device was first developed).⁸⁻¹⁰

For well-established surgeon, the desire to learn ultrasonographic skills may not be on the high priority. The young surgeons, trainee surgeons, residents and medical students after acquiring ultrasonographic skills, will find themselves at much greater advantage in the management of their patients, with early diagnosis and minimally invasive therapeutic options.

Training for Surgical Residents¹¹

The ultrasound training process must include theoretical lectures and practical sessions. The residents may be offered lecture materials, with emphasis on essential principles of ultrasound physics, a description of of the ultrasound ex-

aminations with sample images. Videos may be shown to emphasise principles in normal and abnormal condition. The residents then perform ultrasound examinations on patients with benign pericardial effusions, pleural effusions, ascites, breast and thyroid masses, abdominal and pelvic ultrasound and vascular lesions. Surgeons should teach the trainee surgeon, with good instructor- student contract. It also permits repetition of the examination, until residents produce a good quality image. All hard copies are retained in the residents log book. At the conclusion of the practical session, the student completes MCQ tests that cover the principles of physics and imaging. Competence in performing and reading ultrasonography will be an added skill to the trainee surgeons. Correct application will be very helpful in reaching the diagnosis in the middle of the night.

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Pakistan Journal of Surgery

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