Establishment of a Focused Assessment Sonography for Trauma course

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ABSTRACT

Objectives: Focused Assessment Sonography for Trauma (FAST) is not widely practiced by Trauma Surgeons in the Middle East despite its international acceptance. A FAST course was established by the Trauma Group at the Faculty of Medicine and Health Sciences at United Arab Emirates (UAE) University aiming to introduce doctors who have limited experience of ultrasound to the basics of FAST. This article summarizes the content of the course; the evaluation of the participants and their recommendations.

Methods: An 8 hour FAST course was offered to 18 participants in May 2004 in the Faculty of Medicine and Health Sciences, UAE University, Al-Ain, UAE. Lectures with syllabus material were used to cover the following topics: basic ultrasound physics, knobology and sonographic orientation, the FAST scan, chest and cardiac trauma sonographic evaluation, training and credentialing issues. Each participant received 3 hours of hands-on ultrasound instruction. On completion of the course participants responded anonymously to an evaluation questionnaire.

Results: All participants responded to the questionnaire (100% response rate). Delegates found the course well organized, relevant, met their needs and encourages them to use FAST in their own practice. The course objectives were met. Participants suggested the use of animal or peritoneal dialysis models to improve the practical sessions.

Conclusions: Organizing a FAST course is an important step towards recognizing and implementing it in practice. Nevertheless, there is a need for appropriate quality assurance and credentialing guidelines before commencing.

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Blunt trauma due to motor vehicle collisions is a major cause of death in the Arabian Gulf Countries.[1] Diagnosing abdominal trauma remains a challenge even for experienced trauma surgeons. Focused Assessment Sonography for Trauma (FAST) is non invasive, portable and can be carried out at bedside in hemodynamically unstable patients without interfering in the resuscitation.[2-3] Despite the wide international acceptance of FAST, this useful screening tool is not widely used by doctors who are involved in the early management of multiple trauma patients in the Middle East. Recognizing the importance of starting FAST in the initial evaluation of multiple trauma patients in our region, a course on FAST was organized in May 2004 by the Trauma Group at Faculty of Medicine and Health Sciences, United Arab Emirates (UAE), University, Al-Ain, UAE. The course aimed to introduce to doctors who are involved in the early management of multiple trauma patients and who have limited experience of ultrasound to the basics of FAST and

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to allow hands on experience using human models. This article summarizes the content of the course; the evaluation of the participants and their recommendations.

Methods. This full day course (8 hours) was developed by one of the authors basing on his previous experience in this area.[4,5] Lectures were used to cover the following core topics: basic ultrasound physics, knobology and sonographic orientation, the FAST scan, chest and cardiac trauma sonographic evaluation (**Table 1**). Group discussion covered training and credentialing issues in depth and local experience and difficulties encountered in starting FAST in different hospitals of UAE.

The practical demonstration consisted of 3 skill stations of half hour each. The first station demonstrated basic physics, probe handling and orientation. On the second station the focused examination for blunt abdominal trauma was demonstrated and practiced. This included 4 views: the right and left upper quadrants views, the suprapubic view and the subcostal cardiac view. On the third station, chest and heart trauma sonographic evaluation was demonstrated. Echocardiography using the long axis parasternal, short axis parasternal, apical 4 chamber, and subcostal 4 chamber views was learned by each of the participants. In addition, each participant had an extra one and half hours of hands-on ultrasound practice. The participants had the chance to handle the probes and orient themselves to ultrasound imaging during the practical sessions. There were 3 diagnostic ultrasound imaging machines (FF Sonic, UF-750XT, Fukuda Denshi Co., Ltd, Tokyo, Japan). Three thin adult males acted as human models. Technical support was available for each workshop station.

On completion of the course the participants were requested to respond anonymously to a structured questionnaire. The questionnaire consisted of 13 statements covering different aspects of the course. The participants answered each question on a seven-point rating scale (1 = terrible, 2 = poor, 3 = mediocre, 4 = acceptable, 5 = good, 6 = very good, and 7 = outstanding). Finally, 3 questions with open comments were asked: What was good in the course?, how can we improve this course?, and will you recommend this course for your colleagues?

Participants' responses to open-ended questions were analyzed qualitatively to explore the content of commentaries, compare and contrast perceived teaching strengths and weaknesses, as well as attitudes towards the course.

Results. Eighteen participants attended the course and they represented the Emirates of UAE. Ten were emergency medicine physicians, 6 were surgeons, one was intensive care specialist and one was a trauma research fellow. All 18 participants responded to the questionnaire with a response rate of 100%. The participants have highly rated the course as seen by their responses (**Table 2**). Encouragement to use ultrasound in practice, organization, use of audiovisual material, relevancy and meeting the objectives were highly ranked. Areas that needed improvement were to increase the

Table 1 - Theoretical content of the FAST Course

Subject	Time (min)	Content	Speaker
Introduction	15	Objectives and general overview of the course	Trauma surgeon
Basic Physics	30	Basic physics of ultrasound, types of ultrasound probes, principles of scanning, artifacts.	Trauma surgeon
Knobology, sonographic anatomy and orientation	45	Explaining function of the basic knobs of the ultrasound machine, probe and anatomical orientation, sonographic identification of different abdominal organs.	Radiologist
FAST Scan	40	Indications, pitfalls, clinical pathways, technical aspects, sonographic appearance of intraperitoneal fluid using real cases with video clips	Emergency physician
Chest and cardiac trauma sonographic evaluation	30	Explaining the different cardiac views with anatomical and sonographic relations, pleural and pericardial fluid identification using real cases with video clips, differentiation between pleural and pericardial effusion	Cardiologist
Training and credentialing issues	45	Political issues and training requirements, how to start FAST in local hospitals, difficulties faced and auditing, recommendations of the group	Group discussion

FAST - Focused Assessment Sonography for Trauma

Table 2 - Participants' evaluation of the workshop

??????	Median	(range)	Mean	(SD)
Encouragement to use ultrasound in my practice	6	(3-7)	5.89	(1.18)
Organization (How was it run?)	6	(3-7)	5.83	(1.2)
Audiovisual Material	6	(3-7)	5.56	(1.38)
Time was adequate to reach objectives	6	(3-7)	5.44	(1.14)
Topics relevant to my needs	6	(2-7)	5.44	(1.82)
Objectives of the workshop were met	5.5	(3-7)	5.39	(1.29)
Amount of knowledge learned	5	(3-7)	5.33	(1.45)
Practical demonstration by faculty	5	(2-7)	5.17	(1.58)
Scheduling of the workshop (on Tuesday)	5	(3-7)	5.11	(1.23)
Hands on machine session by participant	5	(2-7)	5.06	(1.51)
Theory level was adequate	5	(2-7)	4.61	(1.46)
Handout reading material	4	(1-7)	4.24	(1.85)
When all aspects of the meeting are considered, the overall rating of this workshop is	6	(3-7)	5.39	(1.37)

Table 3 - Responses of 18 participants to the open question of "What was good in the workshop?"

Statement	Number
Practical demonstration	9
Organization of the course	8
Faculty of the course	4
Small number of the groups	3
Place of the course	3
New knowledge learned	3
Availability of ultrasound machines	2
Relevance to practice	1
Novel method of education	1
Audiovisual facilities	1

Table 4 - Responses of 18 participants to the open question of "How can we improve this workshop?"

Statement	Number
Be more focused on objectives	5
Increase practical time	3
Present more clinical scenarios	3
Increase number of ultrasound machines	2
Include actual patients	2
Increase video clips	1
Relate to ATLS guidelines	1
Have larger rooms	1
Use animal models	1
Improve handout quality	1
Give the handout before the course	1
Discuss pitfalls of FAST	1
Increase the theoretical background	1

FAST - Focused Assessment Sonography for Trauma
ATLS - Advance Trauma Life Support

practical time, theory and the handout reading material. The median overall assessment of the course was 6 on a 7-point scale (range 3-7). This correlated well with the open comments (**Table 3**). Participants acknowledged the practical nature of the course, organization, and a small number of the groups appreciated the delivery of the speakers. The participants thought that focusing on the objectives and increasing practical time could improve the course. Different modalities for training were suggested to improve the practical sessions. These included clinical scenarios, actual patients, video clips, and animal models (**Table 4**). All participants stated that they would recommend this course to their colleagues.

The group discussion was one of the most interesting sections of the course, as concerns on using ultrasound by emergency physicians or trauma surgeons were highlighted. These included taking care of the expensive probes, patients' safety, proper training, documentation and credentialing. It was agreed that during the introduction of FAST, there should be methods to review the ultrasound reports of the non-radiologist doctors. Supervision by a senior radiologist was recognized to be detrimental for patients' safety during the introduction of FAST, taking into consideration its emergency nature and effect on critical decisions.

Hard copies should be reviewed and compared with other diagnostic methods like repeat ultrasound by a radiologist, computed tomography (CT) scan, operative findings or clinical outcome.

This precaution is essential for FAST training so as to protect the safety of the patients.

Discussion. The use of bedside ultrasound by trauma and emergency physicians is debatable. It was met with Radiology opposition at different institutions when starting it.[6] Most Emergency Departments do not have access to 24-hour immediate ultrasound imaging.[7] Using ultrasound machine by trauma and emergency physicians is an effective and immediate service to multi-trauma patients.[8] It was shown repeatedly that results of FAST examinations are similar when performed by trained emergency physicians, surgeons, or radiologists.[9,10]

An international consensus conference has stressed the importance of a clear definition of FAST, and a format to measure and document its performance.[11] It is essential to clarify that FAST is a goal directed study and is different from detailed radiological studies. In other words FAST is used to answer a specific question: "is there free fluid in the peritoneum, pleura cavity or pericardium?" This question is relatively easy to answer after basic training. The answer to this question greatly influences the clinical management of hemodynamically unstable patients. Although, FAST evaluation includes the subcostal cardiac view, we have decided to introduce the participants to other cardiac views. This may be useful in clinical practice when difficulty is encountered to image the heart from the subcostal view.

The FAST should be utilized as part of a larger clinical scenario and help in taking clinical decisions so as to be useful.[12,13] It is not meant to replace the spiral CT scan examination in multiple trauma patients. We have to appreciate that results of ultrasound are operator dependable and is related to experience.[14,15] A recent systematic review has shown that ultrasound can miss up to 25% of the injuries if it was the only diagnostic tool used.[16]

The ATLS manual has included didactic material on ultrasound.[17] Furthermore, The American College of Surgeons has established a voluntary verification process to ensure that surgeons are properly trained when using ultrasound.[18] The present course aimed to introduce the participants to the basics of FAST and to allow hands on training using human models. This course was highly rated by the attending doctors and their interest indicated an eagerness to understand and use ultrasound in clinical practice.

We have used a 7-point rating scale to evaluate our course. Using this scale has different sources of error like generosity error (being more generous when in doubt) or error of central tendency (avoid the extremes and rate in the middle).[19] Using the qualitative analysis has supported the rating and gave us more confidence in the results. This training should precede the process of credentialing. As adult learners, participants of this course have to accept their own responsibility of continuous learning.[20]

For proper and responsible implementation of FAST in the Middle East, appropriate quality assurance and credentialing mechanisms should be established. Doctors who are considering the introduction of FAST in the emergency department should seek help from colleagues in Radiology and Cardiology to support their goal. We have involved both a cardiologist and a radiologist in our course. This would build bridges between different departments and facilitates the introduction of FAST. Furthermore, this shows a role model of interdisciplinary approach to solve a clinical problem. This was well appreciated at the end of this course. One important concern when involving comprehensive experts in sonography in FAST training (namely, radiologists and cardiologists) is to ensure that teaching is restricted to FAST objectives and not expanded beyond the course curriculum. This was clearly documented by the opinion of the participants that the speakers should be more focused on FAST. We think that involving other specialists has more advantages.

Ensuring that surgical residents get sufficient training in both performing and interpreting ultrasound examinations remains a major challenge to surgical educators. Earlier studies have shown that 38-50 FAST studies were needed to be trained in FAST.[15,21] Later, McCarter et al[22] and Shackford et al[23] have shown that even 10 cases of FAST examination will be enough to acquire the skills needed to detect free intraperitoneal fluid. These results support that limited training will be enough before FAST can be used clinically. Salen et al[24] developed an educational curriculum and credentialing criteria for FAST. They have recommended that 25-50 exams of FAST should be incorporated into practice before credentialing. Our participants have agreed in our group discussion that 50 studies are preferred.

There is no doubt that sonographic examinations with positive findings will facilitate the learning process. Participants have suggested that including actual patients and using an animal model can improve the practical sessions of the course. We have to consider these suggestions in the future. Computer–based simulation has been recently introduced as a method of teaching surgical skills.[25] The simulated ultrasound machine enables the instructor to repeatedly induce exactly the same image. Nevertheless, it does not exactly mimic real-life scanning. The rib artifacts that are encountered when visualizing the spleen are difficult to mimic by the simulator and the animal model is much superior to the simulator in this respect.[5] Using real video clips was highly appreciated by the participants and this can be used in an interactive approach.

The future FAST course. The recommended duration of FAST training ranged between 8-16 hours.[26] The American College of Emergency Physicians has an 8 hour course, while the Australasian Trauma Society has a 16-hour course. Increased practice time, clinical scenarios and including an animal model will increase the length of our course to 12 hours. Furthermore, a reading material with a pretest can be handled before the course and a post-test can enforce the learning process. Our course is in the development period and it is possible to standardize the teaching material so it can be offered in local regional countries. The teaching material should also circulate between the tutors, so that trauma surgeons, emergency physicians and radiologists are able to teach the theoretical material properly.

In summary, the FAST course that was held in Al-Ain City, UAE University (May 2004) was successful in achieving its objectives. The FAST can be taught to detect free intraperitoneal or pericardial fluid in trauma patients. There is a need for appropriate quality assurance and credentialing guidelines as more doctors in the Middle East consider the application of FAST.

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