

DIAGNOSTIC ACCURACY OF CHEST ABDOMINAL FOCUSED ASSESSMENT SONOGRAPHY FOR TRAUMA COMPARED TO COMPUTED TOMOGRAPHY FOR POLYTRAUMA PATIENTS ASSESSMENT

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Introduction

Poly-trauma patients are people who are suffering from two or more severe injuries in at least two body areas or, two or more severe injuries in one body area. Worldwide, about 1.2 million people die in Road Traffic Accidents (RTA) annually and about 50 million are injured. In Egypt, about 12000 deaths due to RTA annually with a road traffic fatality rate of 42 deaths per 100000 population. RTA is neither unpredictable nor unpreventable. Appropriate prevention and management strategy implementation can save many lives.

Ultrasound provides an important initial screening tool for assessment of poly-trauma patients. Ultrasound has considerable advantages as it is a non-invasive bedside tool, easy to use, inexpensive, time saver with real time imaging. And also employs no radiation or contrast agents. Since 2004, the E-FAST protocol was developed to detect pneumothorax, intrathoracic and intraperitoneal fluid with a high specificity and sensitivity. Lung contusion (LC) is a common clinical entity in blunt chest trauma and is associated with a 10–25 % mortality rate. Despite its relatively high incidence, it is difficult to identify LCs in the ED as traditional radiology will underestimate its prevalence. For this reason, a new protocol; Chest Abdominal FAST (CA-FAST) that integrates the detection of LCs in the E-FAST examination has been developed.

Aim of the work

The aim of this study was to evaluate the diagnostic accuracy of CA-FAST as initial assessment for poly-trauma patients as compared to the gold standard CA- CT scan.

Patients and Methods

PATIENTS:

All Poly-trauma patients above 18 years (n=110) presented to the Emergency Department of Alexandria Main University Hospital (AMUH) during working shifts who met the study criteria were enrolled. Pregnant females and patients who did not undergo CT examination either for not being stable for transportation or did not meet the indications of CT examination were excluded from the study.

METHODS:

Initial evaluation and resuscitative measures were carried out by the treating clinicians according to ATLS guidelines without blinding to the ultrasound protocol data and without interruption or delay in patient care. All patients were in supine position as recommended for all poly-trauma patients. Examination was done using convex probe in a real time 2D imaging. Results of CA-FAST was compared to results of CA-CT to detect sensitivity & specificity.

Results

Table 1: The diagnostic accuracy (sensitivity, specificity, and accuracy) of both Chest US and CT-chest in the diagnosis of hemothorax, pneumothorax and lung contusion (n=110)

Right side	Hemothorax		Sensitivity	Specificity	PPV	NPV	Accuracy
	US	CT					
	No. %	No. %					
	16 (14.5)	19 (17.3)					
Left side	10 (9.1)	11 (10.0)	90.91	100.0	100.0	99.0	99.8
Right side	Pneumothorax		Sensitivity	Specificity	PPV	NPV	Accuracy
	US	CT					
	No. %	No. %					
	12 (10.9)	14 (12.7)					
Left side	10 (9.1)	12 (10.9)	83.33	100.0	100.0	98.0	97.5
Right side	Lung contusion		Sensitivity	Specificity	PPV	NPV	Accuracy
	US	CT					
	No. %	No. %					
	36 (32.7)	45 (40.9)					
Left side	33 (30.0)	40 (36.4)	82.5	100.0	100.0	90.91	98.7

Table 2: The diagnostic accuracy (sensitivity, specificity, and accuracy) of both CT and Ultrasound of the abdomen and pelvis in the detection of intra-abdominal collection

Intraperitoneal collection		Sensitivity	Specificity	PPV	NPV	Accuracy
US	CT-scan	89.29	100.0	100.0	96.47	99.0
No. (%)	No. (%)					
25 (22.7)	28 (25.4)					

- PPV= Positive prediction value

- NPV= Negative prediction value

Conclusion

Ultrasound is a sensitive, specific and accurate technique for detecting hemothorax, pneumothorax, lung contusions, and abdominal collections in trauma patients. It is more readily attainable than CT-scan. Therefore, it can be used in patients who are not stable enough for transfer, and in resource-limited areas. It also has the advantage of being able to be performed in much less time, making it a reliable diagnostic tool for initial assessment of poly-trauma patients. Moreover, CA-FAST could be used as a complementary imaging modality to the gold standard CT scan rather than competing technologies.