Clinical and Laboratory Evaluation of Blunt Trauma Patients for the Early Diagnosis of Intra-Abdominal Injuries

(A Prospective Study in Ain Shams University Hospitals)

Thesis

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Yasmine Karam Zaki Sayed

List of Contents

List of Tables

List of Tables cont...

List of Figures

List of Figures cont...

List of Abbreviations

Abb.	Full term
AAST	*American Association for the Surgery of Trauma organ injury scale*
ABG	*Arterial blood gas*
ALT	*Alanine aminotransferase*
AST	*Aspartate aminotransferase*
ASUHs	*Ain Shams University Hospitals*
BAT	*Blunt Abdominal Trauma*
Bpm	*Beat per minute*
Brpm	*Breath per minute*
CBC	*Complete blood count*
CK	*Creatine Kinase*
CT	*Computed Tomography*
DBP	*Diastolic blood pressure*
DPL	*Diagnostic peritoneal lavage*
ED	*Emergency department*
ERCP	*Endoscopic retrograde cholangiopancreatography*
FAST	*Focused assessment of sonography for trauma*
GCS	*Glascow Coma Scale*
Hb.	*Hemoglobin*
Hge	*Haemorrhage*
HS	*Highly significant*
HVI	*Hollow viscus injury*
IA	*Intra_abdominal*

List of Abbreviations cont...

Abb.	Full term

IAIs.....*Intra-abdominal injuries*

IQR.....*InterQuartile range*

LDH.....*Lactate dehydrogenase*

MLC.....*Medico-legal case*

NPV.....*Negative predictive value*

NS.....*Non significant*

PCO2.....*Partial pressure of carbon dioxide*

PO2.....*Partial pressure of oxygen*

PPV.....*Positive predictive value*

PT.....*Prothrombin Time*

PTT.....*Partial Thromboplastin Time*

R.R.....*Respiratory rate*

ROC.....*Receiver operating characteristic curve*

S.....*Significant*

SaO2.....*Oxygen saturation*

SBP.....*Systolic Blood Pressure*

SD.....*Standard deviation*

U/S.....*Ultrasonography*

INTRODUCTION

Trauma is an injury or damage caused by physical harm from an external source (accidents, falls, hits, weapons, …. etc) ***(Meisler et al., 2011).***

In developing countries including Egypt, trauma is considered as a silent killer epidemic which is increasing day after day due to lack of statistical data and research in trauma field. Also, lack of available medical resources needed for management and treatment of trauma patients is another cause to be considered in developing countries ***(Mahran et al., 2016).***

Trauma is the commonest cause of death among people aged 1-34 years, a leading cause of disability and a major contributor to health costs. WHO data suggest that 1 in 10 deaths worldwide is the result of trauma. The majority of deaths from trauma occur in economically productive persons with male to female ratio 2:1. Deaths from trauma are predicted to rise to 65% by the year 2020 ***(Davis et al., 2006).***

Injuries are classified by either severity or location of the damage or a combination of both ***(Sharma et al., 2017).***

They may also be classified medically according to causative agent into blunt force injuries, sharp force injuries, thermal injuries, chemical injuries and blast injuries ***(Barek and Haque , 2013).***

For legal purposes injuries are classified as simple (those wounds that heal in less than 20 days without causing any disability), dangerous (those that heal in more than 20 days or create permanent infirmity), and fatal (those that cause death immediately or after short period) ***(Payne-James , 2003).***

Blunt abdominal trauma (BAT) is seen with increasing frequency in emergency rooms and is continuous to be associated with significant morbidity and mortality ***(Davis et al., 2006).***

Intra-abdominal injuries following blunt trauma present a great medico-legal importance to forensic experts. Sometimes there is no external abdominal injury but the patient dies of intra-abdominal haemorrhage. Exact injury may be not diagnosed except during operation by the surgeon or during autopsy by the autopsy surgeon ***(Singh et al., 2012).***

Abdominal organs are vulnerable to a variety of injuries due to lax compressible abdominal wall that transmits the force to abdominal viscera ***(Dimaio et al., 2001).***

Undetected intra-abdominal injuries (IAIs) can lead to late-stage mortality and morbidity and the treating surgeon may be a subject of medical negligence. So, diagnosing IAIs accurately and in a timely manner is crucial especially in blunt trauma patients ***(Meisler et al., 2011).***

Clinical examination may be unreliable in the evaluation of these patients especially in the presence of associated injuries. However, some studies reported that it plays an important role in early diagnosis of IAIs if used with other tools ***(Srivastava et al., 2017).***

The most important initial concern in the evaluation of a patient with blunt abdominal trauma is an assessment of hemodynamic stability. In recent years, some studies reported that the use of laboratory data is useful for the detection of IAIs in blunt abdominal trauma ***(Musalar et al., 2017).***

Hepatic Transaminases are useful hematological markers for the early diagnosis of the initial liver injury and may guide in decision making especially in medical centers with limited facilities ***(Zachariah et al., 2017).***

Serum amylase and lipase when coupled with other laboratory tests and imaging modalities may have significant role in predicting the site of injury as well as the surgical outcome in patients with IAIs ***(Singh et al., 2016).***

However another study demonstrates that serum amylase and lipase are not significant for detecting or excluding any pancreatic injury ***(Musalar et al., 2017).***

Jansen.,et al (2008), reported that the use of haemoglobin, creatine kinase and myoglobin is also important in early diagnosis of IAIs associated with BAT**.**

Radiographic and surgical interventions are indicated in patients with persistent high levels of biochemical parameters, conditions that suggest significant IAIs ***(Ritchie and Williscroft, 2006).***

Radiographic studies of the abdomen are indicated in stable patients when the physical examination findings are inconclusive ***(Jost et al., 2017).***

Although CT scan provides a rapid and reliable tool compared to biochemical tests for the diagnosis of IAIs in BAT patients, yet it has been reported to have some limitations. These limitations include an increase in treatment costs, the absence of a radiologist on call for 24 hours and limited use in selected patients due to the radiation load, and being unsuitable for hemodynamically unstable patients ***(Tintinalli et al., 2012).***

Therefore, under conditions in which abdominal CT screening is not currently possible, clinical picture and biochemical tests may be predictors for IAIs in blunt trauma patients and may be correlated with the injury level. Hence decreasing the risk of death as well as helping physicians to avoid any mal-judgment about their patients' condition ***(Majercik et al., 2014).***

AIM OF THE STUDY

The aim of the study is to:

Investigate the contribution of non-invasively and rapidly obtained clinical presentation and biochemical parameters in the early diagnosis of IAIs in blunt trauma patients. Then

Develop a scoring system and investigate its clinical applicability as pre-test to determine whether abdominal CT should be performed during the diagnosis or not. This may help to decrease number of malpractice claims due to medical negligence.