Role of Multi Detector CT in Imaging Of chest Trauma

Essay

Submitted for Partial Fulfillment of Master Degree in

Radio Diagnosis

Presented By

Mohamed Shehata Goda

M.B., B.Ch.

Under Supervision Of

Dr. Mohamed Abdel Aziz Ali

Professor of Radiodiagnosis

Faculty of Medicine – Ain Shams University

Dr.Hossam Moussa Sakr

Lecturer of Radiodiagnosis

Faculty of Medicine – Ain Shams University

Faculty of Medicine

Ain Shams University

Acknowledgement

A word of thanks to ALLAH, the source of on knowledge, by whose abundant grace this work has come to fruition.

I would like to extend my deep gratitude and cordial thanks to everyone that helped, encouraged and believed in the value of this piece of work.

*Foremost, I would like to express my appreciation for **Prof. Dr. Mohamed Abdel Aziz Ali ,** Professor of Diagnostic Radiology, Faculty of Medicine, Ain Shams University, for choosing this valuable topic and for his encouragement, support and kind advice that were of great value throughout the work.*

*I am grateful to Dr.Hossam Moussa Sakr**,** Lecturer of Diagnostic Radiology, Faculty of Medicine, Ain Shams University, for his endless effort, continuous supervision and kind help.*

At last, but definitely not the least, I would like to dedicate my work to the soul of my parents ,my wife and my sohila

Table of content

List of Abbreviations

٢D, ٣D	Two dimension, Three dimension
ARDS	Adult respiratory distress syndrome
BDR	blunt diaphragmatic rupture
CC	Costochondral cartilage
CAT	Computed axial tomography
CT	Computed tomography
CPR	Curved planner reformatting
DCT	number of detector computed tomography
FB	Foreign body
FOV	Field of view
HU	Hounsfield unite
IA	intercostal artery
IVC	inferior vena cava
LCC	left common carotid
LSC	left sub clavian
MDCT	multi detector computed tomography
MIP	Maximum intensity projection
MPR	multi planner reformatting
MRI	Magnetic resonant imaging
MSCT	multi slice computed tomography
STD	Scapula thoracic dissociation
STC	Shock Trauma Center
TIB	Tracheobroncheal injury
VB	Virtual bronchoscopy
VR	volume rendering
VRT	volume rendering technique

List of Figures

List of tables

Introduction

Trauma causes an estimated ١٠٪ of deaths world wide and is the third common cause of death after malignancy and vascular diseases. Blunt thoracic trauma causes ٢٠٪ of trauma related deaths. Thoracic injures caused by motor vehicles as crush ٦٣٪ to ٧٨٪ while only ١٠٪ to١٧٪ are fall from a height ***(Wong et al.,)***

Trauma is responsible for considerable morbidity and has a major socio-economic impact ***(Wintermark , Schnyder,).***

Radiologic imaging plays an important role in the diagnosis and management of blunt chest trauma ***(Kaewlai et al ., .)***

In recent years, multidetector computed tomogram (MDCT) has begun to change the imaging approach in patient sustaining blunt or penetrating thoracic injury ***(Magu et al., d)***

The speed and accuracy of CT in detecting multisystem injury has proven to be invaluable in the prompt diagnosis and triage of trauma patients ***(Magu et al., d)***

The introduction of multi–detector row CT has offered a number of advantages in the work-up strategy of emergency patients when compared with single-section CT . The shorter scanning time permits better opacification of the blood vessels and improved contrast material enhancement of parenchymal organs. Furthermore, faster data acquisitions allow multiple consecutive CT examinations in the same patient in a shorter period of time ***(Alkadhi et al.,)***

Studies have shown that CT may demonstrate significant disease (eg, thoracic aortic injury) in patients with normal initial radiographs.

Furthermore, CT has been credited with changing management in up to ٢٠٪ of chest trauma patients with abnormal initial radiographs CT is more accurate than radiography for the evaluation of pulmonary contusion, thereby allowing early prediction of respiratory compromise . It is also valuable in the diagnosis of fractures of the thoracic spine, especially at the cervicothoracic junction, which is difficult to evaluate with conventional radiography. ***(Kaewlai et al ., .)***

Computed tomography (CT) is the imaging modality of choice in the assessment of patients with clinical or radiographic findings suggestive of aortic injury, bone fracture, or diaphragmatic tear following blunt chest trauma. Contrast material-enhanced spiral CT allows detection of both subtle and more obvious aortic tears***(Hise et al., .)***

Optimal CT assessment require careful attention to technique including the use of intravenous contrast material and multi-planner reconstruction images, as well as awareness of potential pitfalls.

Introduction

Trauma causes an estimated ١٠٪ of deaths world wide and is the third common cause of death after malignancy and vascular diseases. Blunt thoracic trauma causes ٢٠٪ of trauma related deaths. Thoracic injures caused by motor vehicles as crush ٦٣٪ to ٧٨٪ while only ١٠٪ to١٧٪ are fall from a height ***(Wong et al., ٢٠٠٤)***

Trauma is responsible for considerable morbidity and has a major socio-economic impact ***(Wintermark , Schnyder, ٢٠٠٠).***

Radiologic imaging plays an important role in the diagnosis and management of blunt chest trauma ***(Kaewlai et al ., ٢٠٠٨)***

In recent years, multidetector computed tomogram (MDCT) has begun to change the imaging approach in patient sustaining blunt or penetrating thoracic injury ***(Magu et al., ٢٠٠٩)***

The speed and accuracy of CT in detecting multisystem injury has proven to be invaluable in the prompt diagnosis and triage of trauma patients ***(Magu et al., ٢٠٠٩)***

The introduction of multi–detector row CT has offered a number of advantages in the work-up strategy of emergency patients when compared with single-section CT . The shorter scanning time permits better opacification of the blood vessels and improved contrast material enhancement of parenchymal organs. Furthermore, faster data acquisitions allow multiple consecutive CT examinations in the same patient in a shorter period of time ***(Alkadhi et al., ٢٠٠٤)***

Studies have shown that CT may demonstrate significant disease (eg, thoracic aortic injury) in patients with normal initial radiographs. Furthermore, CT has been credited with changing management in up to ٢٠٪ of chest trauma patients with abnormal initial radiographs CT is more accurate than radiography for the evaluation of pulmonary contusion, thereby allowing early prediction of respiratory compromise . It is also valuable in the diagnosis of fractures of the thoracic spine, especially at the cervicothoracic junction, which is difficult to evaluate with conventional radiography. ***(Kaewlai et al ., ٢٠٠٨)***

Computed tomography (CT) is the imaging modality of choice in the assessment of patients with clinical or radiographic findings suggestive of aortic injury, bone fracture, or diaphragmatic tear following blunt chest trauma. Contrast material-enhanced spiral CT allows detection of both subtle and more obvious aortic tears***(Hise et al., ١٩٩٨)***

Optimal CT assessment require careful attention to technique including the use of intravenous contrast material and multi-planner reconstruction images, as well as awareness of potential pitfalls.

Chapter I