

# The ABCs of Cardiothoracic Trauma



Blunt cardiac trauma



Penetrating cardiac trauma



## Pathophysiology

Three primary physiological disturbances associated with cardiac trauma:

- **Haemorrhage**
  - Commonly seen in penetrating injuries
- **Pericardial tamponade**
  - Progressive fall in cardiac output as intrapericardial pressure rises with expanding cardiac tamponade. Ultimate restriction of cardiac output results from external compression to prevent diastolic filling of ventricle
- **Cardiac failure**
  - Trauma to a heart valve, the conduction bundle or a major coronary artery

### Blunt Cardiac Injury (BCI)

- May cause compression of the heart between the sternum and spine
- Blunt injury from a penetrating projectile passing adjacent to but not into the heart can also result in blunt cardiac injury
- can lead to myocardial contusion
  - Valvular or septal abnormalities
  - Acute coronary syndrome
  - Rhythm disturbances
  - Cardiac rupture (less common)

### Penetrating Cardiac Injury

- Extent of cardiac injury directly related to size, speed, and trajectory of the projectile or implement
- Other cardiac injuries include
  - Coronary artery lacerations (most often the left anterior descending and diagonal branches)
  - Valve injury
  - Ventricular septal defects
  - Bullet injuries may produce through-and-through injuries resulting in haemorrhage, tamponade, and shock.

Cardiac trauma can be grouped by method of injury as either blunt or penetrating with outcomes ranging from lethal injuries to spontaneously resolving arrhythmias. Those with lethal injuries often succumb quickly with some documenting over 90% of individuals expiring before arriving at a hospital, and only a 20-75% survival rate of those that make it to the hospital

## Aetiology

### Blunt cardiac trauma

- direct impact to the anterior chest
- high-speed sudden deceleration
- compression of the chest
- a combination of the above
- Examples:
  - Motor vehicle accidents
  - Falls
  - Crush injuries
  - Sports-related (baseball hitting chest)
  - Animal-related (kick)



Causes of blunt cardiac trauma

### Penetrating cardiac trauma

- Stab wounds
- Gunshot wounds
- Non-firearm related blast injuries and impalements
- Penetration into the heart from a fractured rib



Causes of penetrating cardiac trauma

# Cardiothoracic Trauma

**Manju N Gandhi, Anila D Malde, Amala  
G Kudalkar, Hemangi S Karnik**

## **Cardiothoracic Trauma:**

*Cardiothoracic Trauma* Panagiotis N. Symbas, 1989 This book based on the author's 24 years of experience as a director at a major trauma center covers all aspects of mechanical trauma to the thoracic regions Both blunt and penetrating trauma are discussed The comprehensive nature of the book is especially valuable because trauma victims often sustain injury to more than one thoracic organ Each chapter includes a diagnostic algorithm for quick reference Core Topics in Cardiothoracic Critical Care Kamen Valchanov, Nicola Jones, Charles W. Hogue, 2018-05-31 Most patients with critical cardiac or thoracic conditions will at some stage pass through the cardiothoracic critical care unit Critical care presents more complex clinical data than any other area of medicine The new edition of Core Topics in Cardiothoracic Critical Care focuses on the latest practice in the management of patients in cardiothoracic intensive care The practice of cardiothoracic critical care medicine is constantly evolving and this new edition reflects the modernized learning styles for trainees Each chapter includes key learning points as well as sample multiple choice questions and answers to assist in exam preparation This edition also features updated chapters on ECMO perioperative management of patients undergoing emergency cardiothoracic surgery and advanced modes of organ support for patients This text provides key knowledge in a concise and accessible manner for trainees clinicians and consultants from specialties and disciplines such as cardiology and anaesthesia and nursing and physiotherapy Trauma William C. Wilson, Christopher M. Grande, David B. Hoyt, 2007-02-05 Produced by a world renowned team of trauma specialists this source reviews initial management considerations beginning in the pre hospital phase continues through the primary and secondary surveys of the hospital based evaluation process and proceeds to the perioperative management of trauma burns and associated conditions This reference pro *Cardiac Surgery A.C.* Cernaianu, A.J. DelRossi, 1995-11-30 The topics in this book represent the presentations given at the Seventh Annual Meeting entitled Cardiac Surgery Current Issues held at the Frenchman's Reef Beach Resort St Thomas U S Virgin Islands November 9 12 1994 This symposium was sponsored by the American College of Chest Physicians in conjunction with the Division of Cardiothoracic Surgery of Cooper Hospital University Medical Center the University of Medicine and Dentistry of New Jersey Robert Wood Johnson Medical School Camden New Jersey Chapter authors were charged with the task of writing brief overviews of major issues related to the field of cardiac surgery The book is specifically tailored to the needs of cardiothoracic surgeons cardiovascular perfusionists allied health professionals and nursing personnel involved in all phases of caring for the cardiac surgical patient Although intended as a reference source with emphasis on updated approaches applied in cardiac surgery it is hoped that the discussion of these topics will compliment other texts and manuscripts Obviously a book of this length cannot cover the whole multidisciplinary and complex field of cardiac surgery However co editors are certain that the annual appearance of this text will highlight comprehensive new and interesting approaches to the field of cardiac surgery The co editors are greatly thankful to the contributors for their efforts in providing

comprehensive chapters Without their expertise this work may not have been possible We would also like to thank Ms Eileen Birmingham and the staff at Plenum Publishing Corporation for their tremendous help in completing this work

Management of Cardiothoracic Trauma Stephen Z. Turney,Aurelio Rodriguez,R Adams Cowley,1990 *Cardiothoracic Trauma* Stephen Westaby,John Odell,1999-04-30 Owing to the severe life threatening nature of many of the injuries it is not always possible to transfer patients to a specialized cardiac centre This book is the definitive account of current practice in cardiothoracic trauma covering the injuries caused in both penetrative and non penetrative trauma to the heart itself and the major arteries and veins which lead to and from it Unique features include numerous high quality line drawings photographs X rays flow charts and lists of key points Each chapter concentrates on the practical managing aspects of chest trauma with authors presenting their wealth of practical experience and sharing techniques developed after many years of dealing with cardiothoracic trauma

**A Practical Approach to Anesthesia for Emergency Surgery** Manju N Gandhi,Anila D Malde,Amala G Kudalkar,Hemangi S Karnik,2011-07 There is a large influx of trauma general surgical pediatric neurosurgical and obstetric emergencies as the hospital is one of the major public hospitals located in a densely populated region sitting amidst major routes in the city It also provides services for emergency cardiovascular cerebrovascular interventions and cadaver transplants Daily lessons from this tremendous emergency work inspired us to bring out this book There is plethora of reference material available in basic sciences related to anesthesiology namely physiology pharmacology physics and anatomy Similarly a large number of textbooks are on techniques such as general regional monitored anesthesia care as well as super specialties like cardiac neurosurgical and pediatric anesthesia etc But there is a limited availability of books and references for emergency anesthesia One has to scan and integrate parts from various sources This book is an attempt to assimilate the scattered information and add clinical expertise Contents of this book have been divided into nine sections to cover majority of the emergencies General considerations for adults obstetric and pediatric sections have been written separately to avoid duplication An additional challenge is cases with various medical disorders for emergency surgeries Efforts have been taken to accommodate them in first section and obstetric section The contributors of this book work together at LTMMC and LTMGH and have a well balanced team with fresh talent bringing the latest technological knowledge and tenured practitioners supplementing it with applied experience Part of the team worked on collection of the matter from different sources for an ideal scenario while the senior faculty members used their vast clinical experience for a more practical and realistic application These combined efforts have been truly beneficial to achieve our goal to rationally mix latest technology with clinical experience and identify potential ways to conduct anesthesia with best results at least costs and minimum risk

Thoracic Trauma and Critical Care Riyad Karmy-Jones,Avery Nathens,Eric Stern,2002-12-31 This text contains state of the art reviews covering the management of thoracic trauma for intensive care critical care physicians trauma surgeons chest surgeons and other professionals in this field Thoracic Trauma and Critical Care is a comprehensive

reference that covers this subject in the following sections Thoracic Trauma Underlying Principles Thoracostomy Thorascopy and Thoracotomy Pulmonary and Airway Emergencies Chest Wall Trauma Esophageal Emergencies Cardiovascular Emergencies Infections in the Critical Care Setting This volume covers the current and future trends in resuscitation ventilator management treatment of chest infections chest trauma and other surgical emergencies and take a multidisciplinary approach Textbook of Cardiovascular Medicine Eric J. Topol, Robert M. Califf, 2007 The Topol Solution gives you a complete print and multimedia package consisting of Textbook of Cardiovascular Medicine Third Edition a DVD and access to a wealth of online resources Updated throughout by renowned international authorities Dr Topol's best selling text provides a comprehensive contemporary view of every area of cardiovascular medicine preventive cardiology clinical cardiology cardiovascular imaging electrophysiology and pacing invasive cardiology and surgical techniques heart failure and transplantation molecular cardiology and vascular biology and medicine The bound in DVD contains the full text plus heart sounds an image chart table bank and videos of procedures catheterization CT MRI echocardiography electrophysiology and pacing intravascular ultrasonography nuclear cardiology and surgery The Topol Solution Website includes the fully searchable text heart sounds and an image chart table bank downloadable to PowerPoint plus questions and answers from The Cleveland Clinic Cardiology Board Review a PDA download of cardiology drug facts quarterly articles from Critical Pathways in Cardiology and links to other cardiology Websites FEATURES Thoroughly updated Third Edition of best selling Textbook of Cardiovascular Medicine plus DVD and instant access to a wealth of online resources THE TEXT Renowned international contributors A comprehensive contemporary view of every area of cardiovascular medicine preventive cardiology clinical cardiology cardiovascular imaging electrophysiology and pacing invasive cardiology and surgical techniques heart failure and transplantation molecular cardiology and vascular biology and medicine Focus on clinical material particularly the application of clinical research to practice Each chapter includes comments on current controversies and pioneering insights into future developments THE BOUND IN DVD Full content of book Heart sounds a

**CARDIOTHORACIC BLUNT TRAUMA: A COMPREHENSIVE REVIEW** Paula Patiu, 2017 LEARNING OBJECTIVES 1 To illustrate how to detect describe and interpret blunt traumatic injuries to the chest 2 Understand various mechanisms of blunt traumatic injuries to the chest 3 To recognize potential pitfalls during interpretation of patients with cardiothoracic trauma BACKGROUND Cardiothoracic injuries commonly occur in the context of blunt trauma It is the third most common injury in blunt trauma following head and extremities injuries The majority of cases occur in the setting of vehicle collisions Due to the overall high fatality rate in cardiothoracic injuries 10% rapid detection proper interpretation and timely management of these injuries is important Radiology plays an important role in the management of such injuries Conventional radiography can be used initially and can direct management of several injuries of the chest wall lungs and pleura Computed tomography improves visualization of injuries detected by conventional radiography and is superior in the

detection of mediastinal injuries CT can show traumatic injuries even in the setting of a normal radiograph and it can change management in up to 20% of cardiothoracic traumas in patients with an abnormal initial radiograph CONCLUSION

Familiarity with the various mechanisms of injury the different types of cardiac and thoracic injuries and the ability to differentiate anatomical variants from true injuries allows better patient care in the setting of cardiothoracic blunt trauma

**Cardiothoracic Surgical Nursing** Betsy A. Finkelmeier,1995 Imaging in Trauma and Critical Care Stuart E. Mirvis,Kathirkamanthan Shanmuganathan,2003 Encompasses today's full range of modalities and techniques including conventional radiology multislice CT including multiplanar reformation MPR and volume rendered imaging CT angiography conventional angiography and vascular intervention MRI and MR angiography Assesses the advantages and limitations of various modalities presents imaging decision making algorithms for a variety of scenarios and discusses the clinical aspects of major injuries and critical care complications in conjunction with imaging findings to foster a multidisciplinary understanding of each problem Complications in Surgery and Trauma Stephen M. Cohn,2007 The only in depth source to focus specifically on surgical complications this reference provides practical information on the incidence management and avoidance of complications encountered during and after surgical procedures Spanning the vast array of complications related to a wide variety of preoperative intraoperative and postoperative events such as organ transplant amputations nerve and fracture repair wound repair and skin grafting this guide offers detailed guidance and techniques to recognize and control complications in the operating room emergency ward and intensive care unit *Thoracic Trauma* Raleigh Maurice Hood,Arthur Boyd,Alfred T. Culliford,1989 This authoritative clinical reference focuses on the perioperative diagnostic and management procedures in thoracic trauma surgery Includes the combined expertise of a radiologist internist and anesthesiologist as well as general and cardiovascular thoracic surgeons Features beautiful surgical renderings **Johns Hopkins Manual of Cardiothoracic Surgery** David Daiho Yuh,Luca A. Vricella,William Baumgartner,2012-09-01 The most up to date comprehensive single volume guide to adult congenital and general cardiothoracic surgery from many of the foremost experts in the field Developed by authorities from leading edge cardiothoracic surgical training programs this much needed reference succinctly reviews a wide range of important topics in cardiothoracic surgery The Johns Hopkins Manual of Cardiothoracic Surgery is especially timely given the recent development of many new scientific findings and emerging technologies You'll find it filled with precise information on surgical techniques and pre and postoperative strategies for managing cardiothoracic disease In this time saving sourcebook you'll get an in depth look at the full spectrum of disorders and their surgical and medical management options including congenital acquired and neoplastic diseases Supporting this detailed coverage is an easy to navigate format featuring focused tables and outline formatted bullets along with step by step explanations of the most complex operations Features Thorough coverage of all major areas of cardiothoracic surgery perfect for cardiothoracic surgery fellows getting ready for Board review exams oral and written and cardiothoracic surgeons

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**Minimal Access Cardiothoracic Surgery** Anthony P. C. Yim, 2000 A team of over 150 leading contributors provides state of the art coverage of minimally invasive surgery using videoscopic guidance Delivers up to date discussions of pleural and lung diseases mediastinum esophageal disease pediatric surgery coronary artery bypass and valvular surgery Features over 890 clear illustrations many in full color **Trauma** Ernest Eugene Moore, Kenneth L. Mattox, David V. Feliciano, 1991 The classic trauma surgery text This comprehensive and authoritative reference text covers prevention and pre hospital care transport through trauma scoring as well as operative and non operative management Known for its current and practical coverage the book features a commentary for each chapter written by a leading expert in the field

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