

# Professional Master's Degree

## Severe Trauma in the ICU





## Professional Master's Degree Severe Trauma in the ICU

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/pk/medicine/professional-master-degree/master-severe-trauma-icu](http://www.techtitute.com/pk/medicine/professional-master-degree/master-severe-trauma-icu)

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# 01

# Introduction

Advances in monitoring, diagnostic devices and protocols for trauma patients in the ICU have improved intervention strategies and the approach to complex clinical situations. In this scenario, it is necessary that medical professionals are up-to-date with the protocols of action, the most advanced diagnostic technology, as well as research in trauma. In response to this need, this 100% online program was created to provide the graduate with an effective update on Severe Traumatology in Intensive Care Units. All this, in addition, over 12 months and through numerous multimedia teaching materials, created by specialists and professionals in the health sector, accessible from any electronic device with internet connection.



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*Thanks to this Professional Master's Degree you will be able to combine your medical responsibilities with a first level update in Trauma”*

In recent years, the improvement and technical progress in diagnostic devices such as computed tomography, portable ultrasound or advanced monitoring mark the evaluations of trauma patients in the ICU. At the same time, there have been notable advances in the medications used, all supported by scientific-medical studies. This scenario leads professionals to carry out daily multidisciplinary work and employ new therapeutic strategies.

Faced with this reality, doctors are constantly updating their skills and abilities to deal with complex clinical situations. For this reason, TECH has developed this Professional Master's Degree of 1,500 teaching hours, created by an excellent team of specialists with experience in hospitals.

This is a program that will lead the graduate to delve into the approach to emergent situations, rapid decision making and precise coordination with the different teams of specialists. It will also delve into the planning of rehabilitation and recovery of traumatized patients or the latest technology used in life support devices and advanced assessment tools.

A syllabus that acquires greater dynamism thanks to the multimedia pills and the wide variety of didactic resources such as specialized readings or case studies. In addition, the *Relearning* methodology used by this academic institution will allow the professional to achieve a much more effective update in a shorter period of time.

A unique opportunity to keep up-to-date through an online and flexible teaching option, which favors the compatibility of the most demanding daily responsibilities with a university proposal that is at the forefront.

This **Professional Master's Degree in Severe Trauma in the ICU** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Severe Trauma in ICU
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*Do you want to be aware of  
the most effective strategies  
for dealing with traumatized  
patients in special situations?  
Do it thanks to this program"*

“

*Delve into the prevention of complications and pain management in trauma with the best multimedia content”*

*Delve into the latest emergency response protocols, injury severity assessment and stabilization techniques.*

*Upgrade through the most comprehensive Severe Trauma ICU program created by the world's largest digital university.*

The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.



# 02 Objectives

This university program of 1,500 teaching hours has been designed to offer the medical professional a complete update of their knowledge and skills for the management of the trauma patient in the ICU. In this way, the graduate at the end of this program will be up-to-date with the most advanced diagnostic and therapeutic strategies, advances in pharmacology and communication skills with the patient and the rest of the specialists and healthcare professionals involved in their clinical care.



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*Extend the information provided by this program even further with scientific literature that will show you the latest findings in the management of Severe Trauma in the ICU”*

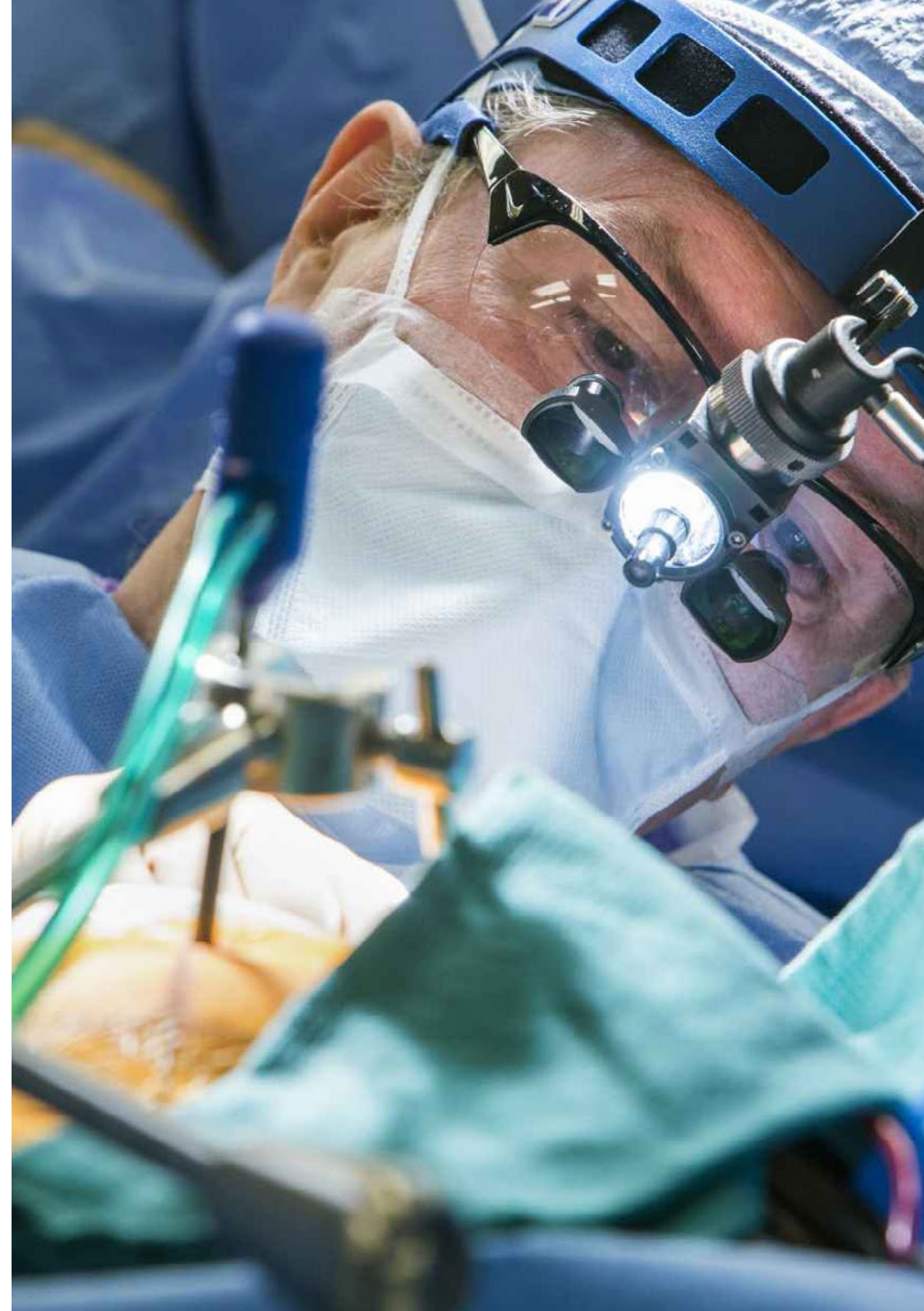


## General Objectives

- ♦ Delve into a thorough understanding of the anatomophysiological, pathophysiological, and clinical basis of severe traumatic injuries, as well as associated complications and comorbidities
- ♦ Effectively communicate injury prevention information to different audiences and utilize health promotion strategies
- ♦ Delve into protocols for the prehospital management of specific trauma, such as head, chest, and orthopedic trauma
- ♦ Integrate quality and safety practices in the management of trauma patients, minimizing risks and optimizing outcomes
- ♦ Be aware of the specific nutritional requirements of severe trauma patients and develop appropriate nutrition plans
- ♦ Implement triage protocols in mass trauma situations and prioritize care



*Learn from the comfort of your own home and at any time of the day about the approach to coagulation disorders associated with traumatic shock”*





## Specific Objectives

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### Module 1. Traumatic Disease in Public Health

- ♦ Apply the concepts of epidemiology to analyze the incidence, prevalence and patterns of traumatic injuries in the population
- ♦ Evaluate the impact of traumatic injuries on public health, considering economic, social and quality of life factors
- ♦ Analyze injury prevention programs, considering vulnerable populations and intervention strategies
- ♦ Delve into the role of health policy in the prevention and management of traumatic injuries, considering relevant regulations and legislation
- ♦ Interpret epidemiological data and assess traumatic injury trends, identifying areas of focus for effective interventions
- ♦ Plan public health responses to mass trauma situations, considering resource coordination and crisis management
- ♦ Evaluate the effectiveness of public health interventions in preventing traumatic injuries and adjust strategies according to the findings

### Module 2. Prehospital Trauma Management

- ♦ Be aware of rapid and systematic assessments of trauma patients in prehospital settings
- ♦ Identify and prioritize prehospital management interventions according to patient severity and condition
- ♦ Establish strategies to ensure adequate ventilation
- ♦ Refresh techniques for controlling external and internal bleeding and minimizing blood loss in trauma situations
- ♦ Master safe immobilization techniques to prevent further damage and ensure adequate mobilization of trauma patients
- ♦ Update the medications used in prehospital management, their dosage and appropriate routes of administration

### Module 3. Initial Trauma Care in the ICU Hospital

- ♦ Rapidly assess the severity and extent of traumatic injuries in patients admitted to the ICU
- ♦ Identify and prioritize medical and surgical interventions according to the urgency and stability of the patient
- ♦ Delve into techniques to restore hemodynamic stability and control shock in trauma patients
- ♦ Apply methods to control active bleeding and prevent excessive blood loss
- ♦ Interpret radiographs and other medical images to identify injuries and guide care
- ♦ Delve into strategies for pain management and sedation in trauma patients, considering their individual needs

#### **Module 4. Management of Severe Trauma in ICU**

- ♦ Evaluate advanced clinics to determine the severity and extent of traumatic injuries in critically ill patients
- ♦ Be up-to-date on the interpretation of diagnostic test results, such as medical imaging and laboratory tests, to identify injuries and complications
- ♦ Increase informed decision making about the most appropriate medical and surgical treatment for each trauma patient
- ♦ Master advanced strategies for managing shock and controlling bleeding in patients with severe traumatic injuries
- ♦ Perform advanced surgical procedures, such as damage control surgeries and tissue repair procedures
- ♦ Utilize advanced life support therapies, including mechanical ventilation and use of vasoactive medications
- ♦ Identify and manage common complications in trauma patients and develop long-term care plans

#### **Module 5. Advanced ICU care**

- ♦ Advance the clinical assessment of trauma patients in the ICU, identifying signs of shock, bleeding, and deterioration
- ♦ Manage and care for complex medical devices used in patients with severe traumatic injuries, such as catheters and probes
- ♦ Be up-to-date on the administration of specific medications for pain management, sedation, and shock control in trauma patients
- ♦ Update knowledge for interpretation and utilization of monitoring data, such as vital signs and hemodynamic parameters, to make care decisions
- ♦ Identify and prevent common complications in trauma patients in the ICU, such as infections and pressure ulcers

#### **Module 6. Radiology, complications and rehabilitation in trauma in the ICU**

- ♦ Delve into the interpretation of radiographs, computed tomography and magnetic resonance imaging to identify traumatic injuries
- ♦ Differentiate between acute injuries and pre-existing conditions on radiologic images of trauma patients
- ♦ Describe traumatic injuries in areas such as the musculoskeletal system, internal organs, and soft tissues
- ♦ Delve into the technologies and equipment used in medical imaging and understand how they influence diagnosis
- ♦ Delve into the role of the radiologist and develop skills in communicating radiologic findings to the health care team
- ♦ Delve into radiologic findings to make informed clinical decisions about the management and treatment of trauma patients

#### **Module 7. Management of shock in ICU trauma**

- ♦ Delve into the different types of shock in trauma patients in the ICU
- ♦ Delve into the interpretation of vital signs and hemodynamic parameters to assess the severity and progression of shock
- ♦ Learn the principles of intravenous fluid administration and its proper use to maintain perfusion
- ♦ Update knowledge of vasoactive medications and their mechanisms of action to correct hemodynamic imbalance
- ♦ Identify and address coagulation disorders associated with traumatic shock
- ♦ Develop strategies for recognizing and treating septic shock, a common complication in trauma patients



### **Module 8. Management of mild trauma in ICU**

- ♦ Update knowledge of advanced clinical evaluations of patients with severe traumatic injuries in intensive care units
- ♦ Interpret diagnostic tests and clinical findings to identify and assess the extent of traumatic injuries
- ♦ Be up-to-date on techniques to control bleeding and prevent excessive blood loss in trauma patients
- ♦ Learn about the medical and surgical management of specific trauma, such as head and thoracic injuries
- ♦ Be aware of advanced medical technologies and life-sustaining therapies in the ICU for severe trauma patients
- ♦ Evaluate ethical and legal situations related to trauma management and make informed decisions

### **Module 9. Trauma Pharmacology and Nutrition**

- ♦ Select and administer specific medications for pain management, sedation and shock control in trauma patients
- ♦ Update knowledge on appropriate dosages and routes of administration for different medications used in trauma patients
- ♦ Delve into the side effects and possible complications of medications used in the management of trauma patients

### **Module 10. Trauma in special situations**

- ♦ Understand how traumatic injuries affect special populations such as children, the elderly and pregnant women
- ♦ Manage trauma situations in contexts of natural disasters, mass accidents and armed conflicts
- ♦ Delve into specific protocols and procedures for trauma management in special contexts

# 03 Skills

Thanks to the experience and advanced knowledge of the teaching team in the area of Severe Trauma in ICU, the professional will be able to update on patient management through the latest techniques, increasing their ability to make decisions or in the design of rehabilitation and recovery plans in traumatized patients. For this purpose, the syllabus has a theoretical-practical approach and materials such as simulations of case studies that will put you in situation before various clinical scenarios.





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*This university program will provide you with the necessary techniques to increase your leadership in the management of trauma situations”*



## General Skills

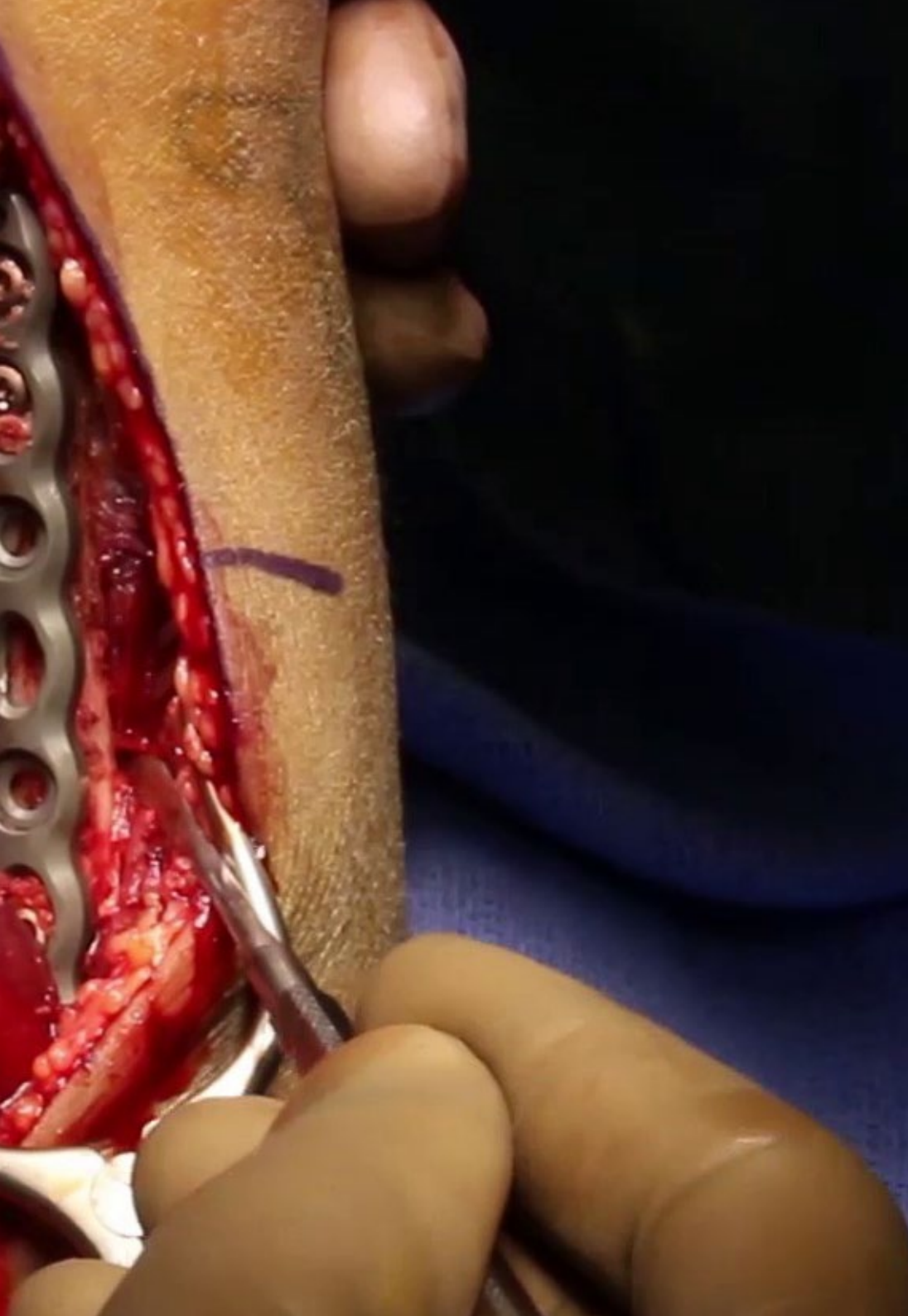
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- ♦ Foster interdisciplinary collaboration in acute care settings, working effectively in medical teams to provide comprehensive care
- ♦ Increase leadership skills in decision making and management of trauma situations, coordinating teams and resources efficiently
- ♦ Stay up-to-date with advanced medical technologies used in the management of severe trauma, such as monitoring devices and imaging equipment
- ♦ Prevent traumatic injuries and foster skills to educate patients and communities about safety measures
- ♦ Increase skills to maintain a patent airway and ensure adequate oxygenation and ventilation
- ♦ Take immediate and effective measures to stabilize patients with traumatic shock
- ♦ Coordinate medical resources and trauma response teams in vulnerable communities
- ♦ Communicate effectively with patients, families, and other professionals in trauma and emergency situations



*Increase your communication skills with traumatized patients and their families in complex ICU situations"*





## Specific Skills

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- ♦ Improve the ability to perform rapid and accurate assessments of trauma patients, determining severity of injury and priority of care
- ♦ Master medical and surgical intervention techniques to stabilize patients with severe traumatic injuries, including airway management, hemorrhage control, and life support
- ♦ Make informed, evidence-based decisions in acute trauma situations, considering ethical and legal issues
- ♦ Increase effective communication skills with patients, family members and members of the health care team, ensuring a clear and empathetic understanding of the situation
- ♦ Improve the ability to make informed and evidence-based decisions in acute trauma situations, considering ethical and legal aspects
- ♦ Promote research in Severe Trauma, contributing to the advancement of the field
- ♦ Design educational campaigns to promote safe behaviors and reduce risks of traumatic injuries in the community
- ♦ Prioritize and provide initial medical and surgical care in acute trauma situations
- ♦ Apply existing strategies to restore hemodynamic stability and address conditions such as shock

# 04

## Course Management

ICU treatment involves the multidisciplinary work of professionals, which is why TECH has brought together in this program a teaching team made up of doctors, nurses, therapists and other specialists in the health sector. In this way, students will obtain an effective update from an integral perspective. Likewise, during this program you will be able to resolve any doubts you may have about the content of this advanced Professional Master's Degree.

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*Get up-to-date with the best multidisciplinary team with extensive experience in Intensive Care Medicine”*

## Management



### Dr. Bustamante Munguira, Elena

- ♦ Head of the Intensive Care Medicine Department of the Hospital Clínico de Valladolid
- ♦ Medical Director of the Health Area of Ibiza and Formentera
- ♦ Specialist in Intensive Care Medicine
- ♦ Teacher of refresher courses and workshops
- ♦ Illustrious Official College of Physicians of Salamanca Award
- ♦ Ramón Llul Award of the Patient Safety Unit
- ♦ PhD in Medicine and Surgery
- ♦ Master's Degree in Management
- ♦ Medical and Healthcare Management
- ♦ Master in Patient Safety

## Professors

### Dr. Velasco García, Álvaro

- ♦ Intensive Care Physician at the Hospital Clínico Universitario de Valladolid
- ♦ Graduate in Medicine from the University of Valladolid
- ♦ Professional Master's Degree in Integration of medical knowledge and its application to the resolution of clinical problems Universidad Católica San Antonio de Murcia

### Dr. Posadas Pita, Guillermo

- ♦ Intensive Care Physician at Hospital Universitario Río Hortega
- ♦ Member of the ECMO team at Hospital Universitario Río Hortega
- ♦ Specialist in advanced life support in trauma care
- ♦ Honorary collaborator at the University of Valladolid
- ♦ Degree in Medicine from the University of Navarra

**Dr. Portugal Rodríguez, Esther**

- ♦ Medical Specialist in Intensive Care Medicine at the Hospital Clínico Universitario
- ♦ Specialist in Intensive Care Medicine at the Lucus Augusti Hospital
- ♦ Specialist in Intensive Care Medicine at the Hospital Recoletas in Campo Grande
- ♦ Specialist in Intensive Care Medicine, Critical Care and Coronary Units at the
- ♦ Instructor in Clinical Simulation in Intensive Care Medicine at the Spanish Society of Intensive Care Medicine and Coronary Units (SEMICYUC)
- ♦ Degree in Medicine from the University of Valladolid
- ♦ Master's Degree in Clinical Nutrition from the University of Granada University

**Dr. Macho Mier, María**

- ♦ Orthopedic and Traumatology Physician at Miguel Servet University Hospital
- ♦ Doctor of Science, University of Zaragoza
- ♦ Degree in Medicine from the University of Cantabria
- ♦ University Master's Degree: Initiation to Research in Medicine by the University of Zaragoza
- ♦ Master's Degree in Traumatology and Orthopedic Surgery Update by the University Cardenal Herrera - CEU
- ♦ Internship in Sports Medicine at Olympia Quirónsalud Group
- ♦ Member of the Spanish Society of Orthopedic Surgery and Traumatology, Aragonese Society of Orthopedic Surgery and Traumatology and Illustrious Official College of Physicians of Zaragoza

**Dr. Alcalde Susi, Roberto**

- ♦ Doctor of the Extrahospital Emergency Service at the Miranda del Ebro Base
- ♦ Specialist. In Intensive Care Medicine in the ICU of the Hospital Clínico de Valladolid
- ♦ Intensive Care Physician in the Intensive Care Unit of the University Hospital of Burgos
- ♦ Precursor, director and coordinator of the Project "El gorro Solidario"
- ♦ Expert in HEMS (Helicopter Emergency Medical Service)
- ♦ Degree in Medicine from the University of Navarra
- ♦ Member of the Board of Directors of doctors in training of the Colegio Oficial de Médicos de Burgos and Semicyuc

**Mr. Murias Rodríguez, Marcos**

- ♦ Emergency Nurse Practitioner
- ♦ Emergency Nurse. Helicopters 112 SACYL
- ♦ Emergency Nurse, Mobile ICU, Red Cross of León
- ♦ Emergency Nurse, Mobile ICU, Servimed Norte
- ♦ Nurse at Virgen Peregrina Residence, Clece Group
- ♦ Teacher in Occupational Risk Prevention, Work at Heights and BLS and AEDs
- ♦ Basic Life Support and AED teacher
- ♦ Teacher of Basic Life Support and AED for the Spanish Red Cross in León
- ♦ Master's Degree in Occupational Risk Prevention Safety at Work, Ergonomics, Industrial Hygiene and Applied Psychosociology by the UNED
- ♦ Degree in Nursing from the University of León
- ♦ Postgraduate Diploma in Emergencies and Catastrophes by the European University Miguel de Cervantes

**Ms. Curieses Andrés, Celia**

- ♦ Intensive Care Physician at the Hospital Clínico Universitario de Valladolid, Spain
- ♦ Physician at Babcock International Group
- ♦ Physician at Ambuibérica
- ♦ Physician at the Hospital Recoletas Castilla y León
- ♦ Physician at Sanatorio Sagrado Corazón
- ♦ Physician at Valladolid City Hall
- ♦ Teacher at the Training and Employment Foundation of Castilla y León
- ♦ Graduate in Medicine from the University of Valladolid
- ♦ Degree in Chemistry from the University of Valladolid

**Dr. Mamolar Herrera, Nuria**

- ♦ Intensive Care Physician at the Hospital Clínico Universitario de Valladolid
- ♦ Member of the Post-ICU Syndromic Post-ICU Working Group
- ♦ Honorary collaborator attached to the Department of Surgery, Ophthalmology, Otorhinolaryngology and Physiotherapy of the University of Valladolid
- ♦ Collaborating researcher in the project: PI 22-2613."Trophic enteral nutrition in patients undergoing high-flow oxygen therapy and/or noninvasive mechanical ventilation"
- ♦ Collaborating researcher in the project:"Identification of Biomarkers that Predict Severity in COVID-19 patients"
- ♦ Degree in Medicine from the University of Valladolid
- ♦ Online Master's Degree in Intensive Care Medicine by CEU Cardenal Herrera University
- ♦ Postgraduate Diploma in Current Management of Neurology and Severe Trauma in Intensive Care Medicine
- ♦ Member of the Spanish Society of Intensive Care Medicine, Critical Care and Coronary Units (SEMICYUC) and the Spanish Society of Intensive Care Medicine, Critical Care and Coronary Units (SCLMICYUC)

**Dr. Artola Blanco, Mercedes**

- ♦ Intensive Care Physician at Hospital Clínico Universitario de Valladolid
- ♦ Collaborator of the Working Group SINDROME POST-ICU, attached to the Hospital Commission of Humanization of Health Care of the Clinical Hospital of Valladolid
- ♦ Degree in Medicine from the University of Cantabria
- ♦ Master in Updating in Intensive Care Medicine by the CEU-Cardenal Herrera University
- ♦ Member of the Castilian-Leonese Society of Intensive Care Medicine, Critical Care and Coronary Units (SCLMICYUC) and the Spanish Society of Intensive Care Medicine, Critical Care and Coronary Units (SEMICYUC)

**Dr. Aguado Hernández, Héctor José**

- ♦ Medical specialist at the Hospital Clínico Universitario de Valladolid
- ♦ Specialist Physician at the Río Hortega University Hospital
- ♦ Attending physician at the Hospital San Juan de Dios del Aljarafe in Seville
- ♦ Attending Physician at the Hospital Príncipe de Asturias de Alcalá de Henares
- ♦ Medical specialist at the Hospital Ramón Y Cajal
- ♦ PhD in Medicine and Surgery from the University of Valladolid
- ♦ SACYL Grant 2022, PIPPAS study
- ♦ AO Trauma 2020 Fellowship, PIPPAS study
- ♦ Rotation in the Vascular Surgery Service at Kaplan Hospital in Rehovot
- ♦ Rotation in the Cardiovascular Surgery Service at Mount Sinai Hospital in New York
- ♦ Rotation at the Trauma Emergency Unit of the Centre de Traumatologie et d'Orthopedie de Strasbourg

**Dr. Pérez Gutiérrez, Jaime Eduardo**

- ♦ Intensive Care Physician at Hospital Clínico Universitario de Valladolid
- ♦ General Physician at Hospital 12 de Octubre
- ♦ Graduate in Medicine from the Francisco de Vitoria University
- ♦ Member of the Spanish Society of Intensive Care Medicine, Critical Care and Coronary Units (SEMICYUC), Official College of Physicians of Madrid and Official College of Physicians of Valladolid

**Dr. De la Torre Vélez, Paula**

- ♦ Internist at Burgos Hospital
- ♦ Physician at Summa 112. Emergency Service of the Community of Madrid
- ♦ Degree in Medicine from the University of Burgos
- ♦ Master's Degree in Integration and Clinical Problem Solving in Medicine

**Dr. Bueno González, Ana María**

- ♦ Specialist in Intensive Care Medicine at the Hospital Clínico Universitario de Valladolid, Spain
- ♦ Graduate in Medicine and Surgery from the University of Valladolid
- ♦ Collaborating teacher at the Faculty of Medicine of Ciudad Real
- ♦ Teacher of Advanced Life Support in HGUCR and Faculty of Medicine of Ciudad Real
- ♦ Collaborating researcher in CRASH-3 trial and SEMICYUC project
- ♦ Diploma in Statistics in Health Sciences, Universitat Autònoma de Barcelona
- ♦ Master in Research Methodology in Health Sciences, Universitat Autònoma de Barcelona
- ♦ Master's Degree in Updating in Intensive Care Medicine from the CEU University

**Ms. De Pedro Sánchez, María Ángeles**

- ♦ Nurse at the Regional Health Management of Valladolid
- ♦ Nurse at the Sagrado Corazón Hospital of Valladolid
- ♦ Nurse at Insalud in Valladolid
- ♦ Teacher of courses of the College of Nursing of Palencia and the Department of Social Welfare of the City of Palencia
- ♦ Collaborating teacher at the University School of Nursing in Valladolid
- ♦ Postgraduate Certificate in Nursing at the University of Valladolid
- ♦ Degree in Nursing from the University of León
- ♦ Master's Degree in Nursing Unit Management by the European University Miguel de Cervantes
- ♦ MBA in Skills Development and Effective Communication from the Asevegue European School of Health Education.
- ♦ Nursing Leadership Program. Nightngale Challenge by ISFOS and UNIR.
- ♦ Master's Degree in Humanization of Health Care by the European University Miguel de Cervantes.

05

# Structure and Content

The syllabus of this Professional Master's Degree has been developed by a multidisciplinary teaching team that will bring the physician up to date on the methods of diagnosis, evaluation and the most effective strategies to address severe traumatic injuries in ICU. All this, over 12 months and with the best teaching materials, available in a virtual library, accessible 24 hours a day, 7 days a week and from any electronic device with internet connection.



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*A syllabus that will keep you up-to-date on  
the most advanced ICU technologies for  
trauma patient care”*

## Module 1. Traumatic Disease in Public Health

- 1.1. Epidemiology of traffic accidents
  - 1.1.1. Traffic Accidents
  - 1.1.2. Definition
  - 1.1.3. Importance
  - 1.1.4. Epidemiology
  - 1.1.5. Prevention
- 1.2. Influence of the consumption of medicines, alcohol, drugs and certain pathologies on driving
  - 1.2.1. Drug and alcohol use
  - 1.2.2. Influence of drug use on driving
  - 1.2.3. Action of health professionals when prescribing medication to the driving patient
  - 1.2.4. Action to be taken by driver-patients
  - 1.2.5. Alcohol and driving
    - 1.2.5.1. Legal regulations on alcohol and driving
    - 1.2.5.2. Pharmacokinetics of alcohol and factors determining its concentration in blood
    - 1.2.5.3. Effects of alcohol on driving
  - 1.2.6. Illegal drugs and driving
    - 1.2.6.1. Types of drugs and their effects on driving
- 1.3. Biomechanics of Accidents
  - 1.3.1. Accidents
  - 1.3.2. Historical Aspects
  - 1.3.3. Fases de la colisión
  - 1.3.4. Principles of biomechanics
  - 1.3.5. Biomechanics of injuries according to anatomical area and type of accident
    - 1.3.5.1. Automobile accidents
    - 1.3.5.2. Motorcycle, moped and bicycle accidents
    - 1.3.5.3. Truck and bus accidents
- 1.4. Organization of care in severe traumatic pathology
  - 1.4.1. Configuration of the trauma team
  - 1.4.2. Characteristics of a successful team
  - 1.4.3. Roles and responsibilities of the team leader
    - 1.4.3.1. Team perception
    - 1.4.3.2. Receiving the report
    - 1.4.3.3. Team management and reaction to information
    - 1.4.3.4. Team feedback
    - 1.4.3.5. Communication with the patient's family
  - 1.4.4. Effective leadership
    - 1.4.4.1. Qualities and behavior of an effective team leader
    - 1.4.4.2. Culture and climate
  - 1.4.5. Roles and responsibilities of team members
    - 1.4.5.1. Team members
    - 1.4.5.2. Responsibility of the members
      - 1.4.5.2.1. Prepare for the patient
      - 1.4.5.2.2. Receive report
      - 1.4.5.2.3. Assess and manage the patient
      - 1.4.5.2.4. Participate in feedback
- 1.5. Severity indexes in trauma
  - 1.5.1. Valuation indexes
  - 1.5.2. Glasgow Scale
  - 1.5.3. Abbreviated injury scale
  - 1.5.4. Injury severity assessment
  - 1.5.5. Characterization of the severity of the traumatized patient
- 1.6. Records, severity and avoidable mortality scales
  - 1.6.1. Scales
  - 1.6.2. Physiological scales
    - 1.6.2.1. Glasgow
    - 1.6.2.2. Revised trauma score (RTS)
    - 1.6.2.3. Pediatric trauma score or pediatric trauma index (ITP)

- 1.6.3. Anatomical scales
  - 1.6.3.1. Abbreviated injury scale (AIS)
  - 1.6.3.2. Injury severity score (ISS)
  - 1.6.3.3. New Injury severity score (NISS)
  - 1.6.3.4. Organ injury scales (OIS)
  - 1.6.3.5. Penetrating abdominal trauma index (PATI)
- 1.6.4. Combined scales
  - 1.6.4.1. TRISS scale or model
  - 1.6.4.2. International Classification of Diseases Injury Severity Score (ICISS)
  - 1.6.4.3. Trauma Mortality Prediction Model (TMPM)
  - 1.6.4.4. Trauma Risk Adjustment Model (TRAM)
  - 1.6.4.5. Sequential Trauma Score (STS)
- 1.6.5. Avoidable mortality and errors in trauma
- 1.7. Quality and safety in trauma care?
  - 1.7.1. Quality and Safety
  - 1.7.2. Definition of concepts, quality and safety
  - 1.7.3. Ensuring effective team communication
  - 1.7.4. Record keeping, protocols, checklists, etc
  - 1.7.5. Risk Management
  - 1.7.6. Conflict Management
- 1.8. Simulation-based trauma team training
  - 1.8.1. Team building
  - 1.8.2. Simulation-based training concepts
  - 1.8.3. Development of a FEBS (Simulation Based Team Building) program
    - 1.8.3.1. Comprehensive needs analysis
    - 1.8.3.2. Simulation design: Event-based team building
      - 1.8.3.2.1. Selection of competencies
      - 1.8.3.2.2. Training Objectives
      - 1.8.3.2.3. clinical context
      - 1.8.3.2.4. Development of the scenario
      - 1.8.3.2.5. Expected responses
      - 1.8.3.2.6. Measurement Tools
      - 1.8.3.2.7. Scenario script
    - 1.8.3.3. Debriefing
      - 1.8.3.3.1. Debriefing
      - 1.8.3.3.2. Briefing-prebriefing
      - 1.8.3.3.3. Objectives
      - 1.8.3.3.4. Conventional techniques and support for debriefing
      - 1.8.3.3.5. Evaluation Systems
- 1.9. Bibliographic resources
  - 1.9.1. New paths for training
    - 1.9.1.1. Use of innovative teaching resources
      - 1.9.1.1.1. Learning based on clinical cases
      - 1.9.1.1.2. Inverted classroom model
      - 1.9.1.1.3. Clinical simulation
      - 1.9.1.1.4. Gamification
      - 1.9.1.1.5. Clinical discussions
    - 1.9.1.2. Adaptation to the current cognitive model
- 1.10. Trauma-related social networks
  - 1.10.1. Use of new digital resources for training
    - 1.10.1.1. FODMed and social networks
    - 1.10.1.2. Twitter as an educational tool
  - 1.10.2. Impact of digital transformation on research
    - 1.10.2.1. Dissemination in social networks
    - 1.10.2.2. Big Data

- 1.10.3. Impact of social networks on healthcare
  - 1.10.3.1. Introduction
  - 1.10.3.2. Use of social networks by health care professionals and organizations
  - 1.10.3.3. Use of social networks and digital media by patients and their environment
  - 1.10.3.4. Impact on the user
  - 1.10.3.5. Impact on the relationship with health professionals
- 1.10.4. Good practices in social networks

## Module 2. Prehospital Trauma Management

- 2.1. General activation recommendations
  - 2.1.1. Recommendations
  - 2.1.2. What should I do?
  - 2.1.3. Golden rules for a polytraumatized patient
  - 2.1.4. Useful recommendations in case of traveling
- 2.2. Care priorities in on-site care and in medical transport
  - 2.2.1. Scene assessment
    - 2.2.1.1. Approach to the scene of intervention
    - 2.2.1.2. Scene management and handling
    - 2.2.1.3. Triage
    - 2.2.1.4. Management of additional resources
  - 2.2.2. Primary assessment and urgent actions
    - 2.2.2.1. Initial estimate (General impression)
    - 2.2.2.2. Control of exsanguinating hemorrhages
    - 2.2.2.3. Airway and Ventilation
    - 2.2.2.4. Circulatory status
    - 2.2.2.5. Neurological Status
    - 2.2.2.6. Exposure and transition to secondary assessment
- 2.3. Life support and integral coordination in traffic accidents
  - 2.3.1. Definitions
  - 2.3.2. Objectives of life support
  - 2.3.3. Basic and advanced life support sequences in adults
  - 2.3.4. Analysis of the main changes in the recommendations
  - 2.3.5. Risk of disease transmission for the resuscitator during CPR
  - 2.3.6. Lateral Safety Position
  - 2.3.7. Algorithm of BLS/AVS in adults

- 2.4. General self-protection and safety measures
  - 2.4.1. Scope
  - 2.4.2. Identification of the licensees and the site of the activity
  - 2.4.3. Description of the activity and physical environment
    - 2.4.3.1. Description of the activity that is the subject of the self-protection plan
    - 2.4.3.2. Description of the establishment, premises and facilities
    - 2.4.3.3. Description of the surroundings
    - 2.4.3.4. Description of accesses
  - 2.4.4. Inventory, analysis and risk assessment
    - 2.4.4.1. Description and location of risks
    - 2.4.4.2. Analysis and evaluation of risks specific to the activity and external risks
- 2.5. Wound Classification
  - 2.5.1. Classification
  - 2.5.2. Skin Anatomy
  - 2.5.3. Concept, classification and clinic of wounds
  - 2.5.4. Treatment of Wounds
  - 2.5.5. Wounds caused by stab wounds and firearms
    - 2.5.5.1. Stab Wounds
      - 2.5.5.1.1. Definition and classification of stabbing weapons
        - 2.5.5.1.1.1. Stab wounds
        - 2.5.5.1.1.2. Sharp stab wounds
        - 2.5.5.1.1.3. Stab wounds due to a sharp stabbing weapon
        - 2.5.5.1.1.4. Wounds due to sharp and blunt stab wounds
      - 2.5.5.1.2. Gunshot Wounds
        - 2.5.5.1.2.1. Morphology of firearm wounds
        - 2.5.5.1.2.2. Clinical aspects and treatment
- 2.6. Activation of rescue teams
  - 2.6.1. Activation
  - 2.6.2. Traffic Accident Victims Unit

- 2.6.3. Emergency coordinating center
  - 2.6.3.1. Reception and control phase of the warning call
  - 2.6.3.2. Phase of assessment or medical regulation of data
  - 2.6.3.3. Phase of assistance response, follow-up and control
  - 2.6.3.4. Health action phase
    - 2.6.3.4.1. Arrival and assessment of the incident
    - 2.6.3.4.2. Organization of the scene and its environment
    - 2.6.3.4.3. Location of affected persons and triage (classification)
    - 2.6.3.4.4. Assistance and evacuation of the injured
- 2.7. Techniques of deescarceration and extrication
  - 2.7.1. Preparation
  - 2.7.2. Response and recognition
  - 2.7.3. Control
  - 2.7.4. Vehicle stabilization
  - 2.7.5. Boarding: access to the victim
  - 2.7.6. Stabilization of the victim and de-escarceration
  - 2.7.7. Extraction and termination
  - 2.7.8. Necessary Material
  - 2.7.9. The airbag
- 2.8. Immobilization of the severely traumatized patient
  - 2.8.1. Extrication
  - 2.8.2. Who should we perform RME?
  - 2.8.3. With what means do we perform the RME?
  - 2.8.4. How do we perform the EMR?

- 2.9. Assessment of the injured patient in the out-of-hospital setting
  - 2.9.1. Patients
  - 2.9.2. Initial Assessment
    - 2.9.2.1. Airway, cervical spine control
    - 2.9.2.2. Ventilation
    - 2.9.2.3. Circulation
    - 2.9.2.4. Neurological Status
    - 2.9.2.5. Patient exposure
  - 2.9.3. Second Evaluation
- 2.10. Pathophysiology of medical transport and recommendations during patient transport
  - 2.10.1. Concept
  - 2.10.2. History
  - 2.10.3. Classification
    - 2.10.3.1. Transporte aéreo
    - 2.10.3.2. Transporte terrestre
  - 2.10.4. Pathophysiology of out-of-hospital transport
    - 2.10.4.1. Accelerations
    - 2.10.4.2. Mechanical and acoustic vibrations
  - 2.10.5. Indications and contraindications of the helicopter
  - 2.10.6. Prevention of disturbances due to transport
  - 2.10.7. Destination
  - 2.10.8. Means of transport
  - 2.10.9. Assistance during transfer
  - 2.10.10. Transfer
  - 2.10.11. Assistance material

### Module 3. Initial Trauma Care in the ICU Hospital

- 3.1. Indications for transfer to a trauma center
  - 3.1.1. Indications

- 3.1.2. Determine the need to transfer the patient
  - 3.1.2.1. Relocation factors
    - 3.1.2.1.1. Primary screening: Airway
    - 3.1.2.1.2. Primary screening: Breathing
    - 3.1.2.1.3. Primary screening: Circulation
    - 3.1.2.1.4. Primary screening: Neurological Deficit
    - 3.1.2.1.5. Primary screening: Exhibition
    - 3.1.2.1.6. Secondary review: Head and Neck
    - 3.1.2.1.7. Maxillofacial
  - 3.1.2.2. Timing of transfer
    - 3.1.2.2.1. Evaluate anatomy of the injury
    - 3.1.2.2.2. Evaluate mechanisms of injury and evidence of high energy impact
    - 3.1.2.2.3. Evaluate special patients, pediatrics, elderly, obese, pregnant women
- 3.2. Assistance in the Vital Box of the hospital. Organization and care team
  - 3.2.1. Objectives
  - 3.2.2. Organization of the care team
  - 3.2.3. Characteristics of the Vital Trauma Care Box
  - 3.2.4. Recommended protective measures
- 3.3. Primary assessment and initial resuscitation
  - 3.3.1. Primary screening with simultaneous resuscitation
    - 3.3.1.1. Airway with restriction of cervical spine motion
    - 3.3.1.2. Breathing and ventilation
    - 3.3.1.3. Circulation with hemorrhage control
      - 3.3.1.3.1. Blood volume and cardiac output
      - 3.3.1.3.2. Bleeding
    - 3.3.1.4. Neurological evaluation (deficit)
    - 3.3.1.5. Exposure and environmental monitoring
- 3.3.2. Life threatening injuries
  - 3.3.2.1. Airway problems
    - 3.3.2.1.1. Airway obstruction
    - 3.3.2.1.2. Bronchial tree injury
  - 3.3.2.2. Respiratory Problems
    - 3.3.2.2.1. Hypertensive pneumo
    - 3.3.2.2.2. Open pneumothorax
    - 3.3.2.2.3. Massive hemothorax
  - 3.3.2.3. Circulatory problems
    - 3.3.2.3.1. Massive hemothorax
    - 3.3.2.3.2. Cardiac Tamponade
    - 3.3.2.3.3. Traumatic circulatory arrest
- 3.4. Second Evaluation
  - 3.4.1. History
    - 3.4.1.1. Mechanism of injury and suspected patterns
    - 3.4.1.2. Environment
    - 3.4.1.3. Previous state of injury and predisposing factors
    - 3.4.1.4. Pre-hospital care observations
  - 3.4.2. Physical Examination
    - 3.4.2.1. Introduction
    - 3.4.2.2. Look and ask
    - 3.4.2.3. Assess head, neck, thorax, abdomen and pelvis
    - 3.4.2.4. Circulatory evaluation
    - 3.4.2.5. Radiological Examination
- 3.5. Anti-tetanus and antibiotic prophylaxis
  - 3.5.1. Indications
  - 3.5.2. Guidelines
  - 3.5.3. Dosage
- 3.6. Airway and ventilatory management
  - 3.6.1. First Steps
  - 3.6.2. Recognition of the Problem
    - 3.6.2.1. Maxillofacial trauma
    - 3.6.2.2. Laryngeal trauma

- 3.6.3. Objective signs of airway obstruction
- 3.6.4. Ventilation
  - 3.6.4.1. Recognition of the Problem
  - 3.6.4.2. Objective signs of inadequate ventilation
- 3.7. Prediction of difficult airway management
  - 3.7.1. Airway
  - 3.7.2. Potential difficulties
  - 3.7.3. LEMON evaluation for difficult intubation
    - 3.7.3.1. External look
    - 3.7.3.2. Evaluates the 3-3-2 rule
    - 3.7.3.3. Mallampati
    - 3.7.3.4. Obstruction
    - 3.7.3.5. Neck mobility
- 3.8. Airway Management
  - 3.8.1. Airway Management
    - 3.8.1.1. Predict the management of a difficult airway
    - 3.8.1.2. Airway decision scheme
  - 3.8.2. Airway maintenance techniques
    - 3.8.2.1. Chin lift maneuver
    - 3.8.2.2. Mandibular traction maneuver
    - 3.8.2.3. Nasopharyngeal airway
    - 3.8.2.4. Oropharyngeal airway
    - 3.8.2.5. Extra glottic or supraglottic devices
      - 3.8.2.5.1. Laryngeal mask and laryngeal mask for intubation
      - 3.8.2.5.2. Laryngeal tube and laryngeal tube for intubation
      - 3.8.2.5.3. Multilumen esophageal airway
  - 3.8.3. Definitive airways
    - 3.8.3.1. Orotracheal Intubation
    - 3.8.3.2. Surgical airway
      - 3.8.3.2.1. Needle cricothyroidotomy
      - 3.8.3.2.2. Surgical cricothyroidotomy
- 3.9. Errors and occult injuries in trauma. Tertiary recognition
  - 3.9.1. Tertiary recognition
    - 3.9.1.1. Indicators of Quality of Care

- 3.9.2. Errors in initial care
  - 3.9.2.1. Most frequent errors in the different phases of initial care
  - 3.9.2.2. Types of Error
- 3.9.3. Occult injury or undiagnosed injury (NLI)
  - 3.9.3.1. Definition. Incidence
  - 3.9.3.2. Confounding variables contributing to the occurrence of NLD
    - 3.9.3.2.1. Unavoidable factors
    - 3.9.3.2.2. Potentially avoidable factors
  - 3.9.3.3. Most frequent NLD
- 3.9.4. Tertiary recognition
  - 3.9.4.1. Definition
  - 3.9.4.2. Importance of continuous revaluation
- 3.10. Registration and transfer
  - 3.10.1. Referring physician
  - 3.10.2. ABC-SBAR for trauma patient transfer
  - 3.10.3. Receiving Physician
  - 3.10.4. Mode of transport
  - 3.10.5. Transfer protocol
    - 3.10.5.1. Referring physician information
    - 3.10.5.2. Information for transfer personnel
    - 3.10.5.3. Documentation
    - 3.10.5.4. Treatment during transfer
    - 3.10.5.5. Data for relocation

## Module 4. Management of Severe Trauma in ICU

- 4.1. Severe trauma
  - 4.1.1. Severe trauma
  - 4.1.2. Indications
  - 4.1.3. Conclusions
- 4.2. Mechanism of injury and suspicious lesion patterns
  - 4.2.1. Mechanism of injury

- 4.2.2. Frontal impact (vehicular collision)
  - 4.2.2.1. Cervical spine fracture
  - 4.2.2.2. Unstable anterior thorax
  - 4.2.2.3. Cardiac contusion
  - 4.2.2.4. Pneumothorax
  - 4.2.2.5. Traumatic rupture of the aorta
  - 4.2.2.6. Splenic or hepatic laceration
  - 4.2.2.7. Fracture, posterior dislocation of the knee and/or hip
  - 4.2.2.8. TBI
  - 4.2.2.9. Facial Fractures
- 4.2.3. Lateral impact (vehicular collision)
  - 4.2.3.1. Contralateral cervical sprain
  - 4.2.3.2. TBI
  - 4.2.3.3. Cervical spine fracture
  - 4.2.3.4. Lateral unstable thorax
  - 4.2.3.5. Pneumothorax
  - 4.2.3.6. Traumatic rupture of the aorta
  - 4.2.3.7. Diaphragmatic rupture
  - 4.2.3.8. Splenic/hepatic and/or renal laceration depending on the side of the impact
- 4.2.4. Rear impact (vehicular collision)
  - 4.2.4.1. Cervical spine injury
  - 4.2.4.2. TBI
  - 4.2.4.3. Cervical soft tissue injury
- 4.2.5. Vehicle ejection
  - 4.2.5.1. Ejection, prevents true prediction of injury patterns, higher risk patient
- 4.2.6. Vehicle impacts pedestrian
  - 4.2.6.1. TBI
  - 4.2.6.2. Traumatic rupture of the aorta
  - 4.2.6.3. Visceral abdominal injuries
  - 4.2.6.4. Fractures of lower extremities
- 4.2.7. Fall from height
  - 4.2.7.1. TBI
  - 4.2.7.2. Axial spine trauma
  - 4.2.7.3. Visceral abdominal injuries
  - 4.2.7.4. Fracture of the pelvis or acetabulum
  - 4.2.7.5. Bilateral fracture of lower extremities (including calcaneal fracture)
- 4.2.8. Stab wound
  - 4.2.8.1. Anterior thorax
    - 4.2.8.1.1. Cardiac Tamponade
    - 4.2.8.1.2. Hemothorax
    - 4.2.8.1.3. Pneumothorax
    - 4.2.8.1.4. Hemopneumothorax
  - 4.2.8.2. Left thoracoabdominal
    - 4.2.8.2.1. Injury of the left diaphragm, injury of the spleen, hemothorax
    - 4.2.8.2.2. Abdomen, possible abdominal visceral injury if peritoneal penetration
- 4.2.9. Wounded by firearm
  - 4.2.9.1. Trunk
    - 4.2.9.1.1. High probability of injury
    - 4.2.9.1.2. Retained projectiles help predict injury
  - 4.2.9.2. Extremity
    - 4.2.9.2.1. Neurovascular injury
    - 4.2.9.2.2. Fractures
    - 4.2.9.2.3. Compartment Syndrome
- 4.2.10. Thermal burns
  - 4.2.10.1. Circumferential eschar on extremity or thorax
  - 4.2.10.2. Occult trauma (mechanism of burn/means of escape)
- 4.2.11. Electrical burns
  - 4.2.11.1. Cardiac arrhythmia
  - 4.2.11.2. Myonecrosis / Compartment syndrome
- 4.2.12. Inhalation burns
  - 4.2.12.1. Carbon Monoxide Poisoning
  - 4.2.12.2. Airway edema
  - 4.2.12.3. Pulmonary Edema

- 4.3. Importance of triage
  - 4.3.1. Triage
  - 4.3.2. Definition
  - 4.3.3. Relevance
- 4.4. Resource mobilization
  - 4.4.1. Resources
  - 4.4.2. Configuration of the trauma team
  - 4.4.3. Receiving the report
    - 4.4.3.1. Mechanisms
    - 4.4.3.2. Lesions
    - 4.4.3.3. Signs
    - 4.4.3.4. Treatment and travel
  - 4.4.4. Direct the team and reacting to information: Assess and manage the patient
    - 4.4.4.1. Airway control and cervical spine motion restriction
    - 4.4.4.2. Breathing with ventilation
    - 4.4.4.3. Circulation with hemorrhage control
    - 4.4.4.4. Neurological Deficit
    - 4.4.4.5. Exposure and environment
    - 4.4.4.6. Record keeping
- 4.5. Dual Response Trauma Care
  - 4.5.1. Triage as severe trauma. Definition
  - 4.5.2. Triage as potentially severe trauma. Definition
  - 4.5.3. Dual Response Trauma Care Teams
    - 4.5.3.1. High level response
    - 4.5.3.2. Low-level response
  - 4.5.4. Dual-response attention management algorithm
- 4.6. Treatment of the potentially critically ill patient
  - 4.6.1. Severe patient
  - 4.6.2. Criteria for potentially severe patient
    - 4.6.2.1. Physiological criteria
    - 4.6.2.2. Anatomical criteria
    - 4.6.2.3. Injury mechanism
    - 4.6.2.4. Circumstances to take into account
- 4.7. Complementary tests in the screening for occult lesions
  - 4.7.1. Tests
  - 4.7.2. Initial Assessment
    - 4.7.2.1. Airway
    - 4.7.2.2. Ventilation
    - 4.7.2.3. Circulation
    - 4.7.2.4. Neurology
    - 4.7.2.5. Exhibition
  - 4.7.3. Second Evaluation
    - 4.7.3.1. Head and face
    - 4.7.3.2. Neck
    - 4.7.3.3. Chest
    - 4.7.3.4. Abdomen
    - 4.7.3.5. Perineum
    - 4.7.3.6. Back
    - 4.7.3.7. Extremities
  - 4.7.4. Nexus/CRR criteria for cervical injury screening
  - 4.7.5. Duty criteria for cervical vascular lesion screening
- 4.8. Laboratory Data
  - 4.8.1. Laboratory
  - 4.8.2. Request for Tests
  - 4.8.3. Systematic review
- 4.9. Imaging Techniques
  - 4.9.1. Image
  - 4.9.2. TBI
  - 4.9.3. Cervical Trauma and detection of cervical vascular injury
  - 4.9.4. Thoracic Trauma
  - 4.9.5. Dorsolumbar Spinal Trauma
  - 4.9.6. Genitourinary Trauma
  - 4.9.7. Pelvic and Orthopedic Trauma
- 4.10. Registration and transfer
  - 4.10.1. Referring physician
  - 4.10.2. ABC-SBAR for trauma patient transfer
  - 4.10.3. Receiving Physician

- 4.10.4. Transfer protocol
  - 4.10.4.1. Referring physician information
  - 4.10.4.2. Information for transfer personnel
  - 4.10.4.3. Documentation
  - 4.10.4.4. Data for relocation

## Module 5. Advanced ICU care

- 5.1. The role of care in the trauma care team
  - 5.1.1. Caregiving
  - 5.1.2. Out-of-hospital care, a field in its own right
  - 5.1.3. Care nucleus
  - 5.1.4. Research
  - 5.1.5. Teaching
  - 5.1.6. Administration and management
  - 5.1.7. Bioethical Aspects
  - 5.1.8. Legal aspects
  - 5.1.9. Techniques, skills, signs and symptoms in emergency care
- 5.2. Pre-hospital care in severe trauma care
  - 5.2.1. Pre-hospital care
  - 5.2.2. Nursing care in TBI
    - 5.2.2.1. Nursing care in the emergency phase
      - 5.2.2.1.1. Neurologic
      - 5.2.2.1.2. Hemodynamic
      - 5.2.2.1.3. Respiratory
      - 5.2.2.1.4. Renal
    - 5.2.2.2. Nursing care in acute spinal cord trauma
      - 5.2.2.2.1. Hemodynamic complications
      - 5.2.2.2.2. Respiratory Complications
    - 5.2.2.3. Nursing care in thoracic trauma
    - 5.2.2.4. Nursing care in abdominal and pelvic trauma
    - 5.2.2.5. Nursing care in orthopedic trauma
- 5.3. Phases of prehospital care
  - 5.3.1. Pre-hospital care
  - 5.3.2. Scene assessment
    - 5.3.2.1. Approach to the scene of intervention
    - 5.3.2.2. Scene management and handling
    - 5.3.2.3. Triage
    - 5.3.2.4. Management of additional resources
- 5.4. The process of initial care in severe trauma
  - 5.4.1. Review and preparation of the reception area
  - 5.4.2. Activation of the team
  - 5.4.3. Reception of the patient
  - 5.4.4. Patient transfer
- 5.5. Development of actions in the initial assessment
  - 5.5.1. Nurse A: airway
    - 5.5.1.1. Airway and Ventilation
  - 5.5.2. Nurse B: circulation
    - 5.5.2.1. Control of exsanguinating hemorrhages
  - 5.5.3. Assessment of neurological status
- 5.6. Secondary examination
  - 5.6.1. Assessment
  - 5.6.2. Concomitant management in initial care
    - 5.6.2.1. Controlling Temperature
    - 5.6.2.2. Bladder catheterization and oropharyngeal gastric catheterization
    - 5.6.2.3. Analgesia and techniques requiring sedation
    - 5.6.2.4. Tetanus prophylaxis and antibiotherapy
  - 5.6.3. Coordination with the trauma team leader and team for intrahospital transfer after imaging tests or urgent therapeutic actions
  - 5.6.4. Assessment and sterile dressing of traumatic or postoperative wounds
  - 5.6.5. Initiation of pharmacological treatment as appropriate

- 5.7. Systematic review
  - 5.7.1. Reassessment of life-threatening emergency priorities
  - 5.7.2. Record sheet completed and signed
  - 5.7.3. Secondary examination
  - 5.7.4. Continued re-evaluation during the initial hours
    - 5.7.4.1. Vital signs
    - 5.7.4.2. Pupils, level of consciousness, GCS
    - 5.7.4.3. Control of catheters, perfusions, drains and catheters
    - 5.7.4.4. Monitoring: EKG, pulse oximetry, respirator, etc
- 5.8. Family Care
  - 5.8.1. Family
  - 5.8.2. Information division
    - 5.8.2.1. Current Situation
    - 5.8.2.2. Evolution and Prognosis
  - 5.8.3. Accompaniment: Explain operation and schedules
- 5.9. Management of psychic trauma
  - 5.9.1. Psychic trauma
  - 5.9.2. How to understand psychic trauma
  - 5.9.3. Families
  - 5.9.4. How To Act
  - 5.9.5. Attitude in the out-of-hospital and hospital environment
  - 5.9.6. How to communicate
  - 5.9.7. Prevention
- 5.10. Intrahospital Transport
  - 5.10.1. Intrahospital Transport
  - 5.10.2. ABC-SBAR for patient transfer
  - 5.10.3. Intrahospital transfer protocol
    - 5.10.3.1. Transfer checklist
    - 5.10.3.2. Transfer nurse report
    - 5.10.3.3. Documentation

## Module 6. Radiology, complications and rehabilitation in trauma in the ICU

- 6.1. Radiology in ICU
  - 6.1.1. Definition
  - 6.1.2. Structure
  - 6.1.3. Conclusions
- 6.2. Imaging management and protocols in the severely polytraumatized patient
  - 6.2.1. Assessment of clinical criteria
    - 6.2.1.1. Criteria for severity and suspicion of severe trauma
      - 6.2.1.1.1. Vital Signs
      - 6.2.1.1.2. Obvious injuries
      - 6.2.1.1.3. High energy injury mechanism
    - 6.2.1.2. Assessment according to signs and vital signs
      - 6.2.1.2.1. Dynamically stable hemo: Complete CT scan
      - 6.2.1.2.2. Dynamically unstable hemo: Echo-fast
  - 6.2.2. Standard CT Protocol: Patients with severity criteria without signs of shock
    - 6.2.2.1. Cranial CT without contrast
    - 6.2.2.2. Cervical spine CT without contrast
      - 6.2.2.2.1. Bone window
      - 6.2.2.2.2. Soft tissue window
    - 6.2.2.3. Thorax-abdomen-pelvis CT with contrast
      - 6.2.2.3.1. Arterial phase study
      - 6.2.2.3.2. Portal phase study
  - 6.2.3. Shock protocol: Severity criteria and with signs of shock
    - 6.2.3.1. CT without VSD: Chest, abdomen and pelvis
      - 6.2.3.1.1. Arterial and venous phase
      - 6.2.3.1.2. Late phase
  - 6.2.4. Protocol for high suspicion of bladder-urethral injury
    - 6.2.4.1. CT scan without VSD of the abdomen and pelvis
  - 6.2.5. Other situations
    - 6.2.5.1. Suspicion of cervical vessel lesion
    - 6.2.5.2. Clinical suspicion of large complex facial fractures
    - 6.2.5.3. Suspected traumatic rupture of the esophagus

- 6.3. Ultrasound in the initial care of the polytraumatized patient
  - 6.3.1. Ultrasound
  - 6.3.2. What is Echo-fast?
  - 6.3.3. Indications
  - 6.3.4. Information provided and attitude derived according to findings
- 6.4. TBI
  - 6.4.1. TBI
  - 6.4.2. Study Protocol
  - 6.4.3. Systematic search for findings
    - 6.4.3.1. Intra-extraxial hematomas
    - 6.4.3.2. Mass effect exerted by these hematomas: ventricular or sulcus collapse, obstruction of basal cisterns, signs of cerebral herniation
    - 6.4.3.3. Traces of bone fracture, calotte and skull base
    - 6.4.3.4. Fracture traces and alignment of vertebral somas in sagittal plane
- 6.5. Cervical trauma
  - 6.5.1. Cervical trauma
  - 6.5.2. Study Protocol
  - 6.5.3. Systematic search for findings
    - 6.5.3.1. Lesions of large cervical vessels
    - 6.5.3.2. Cervical vertebral fractures, assess signs of instability, assess possible extravasation of associated contrast
- 6.6. Trauma of the dorsolumbar spine
  - 6.6.1. Dorsolumbar spine
  - 6.6.2. Study Protocol
  - 6.6.3. Systematic search for findings
    - 6.6.3.1. Thoracoabdominal great vessels lesions
    - 6.6.3.2. Dorsolumbar vertebral fractures, assess signs of instability, assess for possible extravasation of associated contrast
- 6.7. Thoracic Trauma
  - 6.7.1. Chest
  - 6.7.2. Study Protocol
  - 6.7.3. Systematic search for findings
    - 6.7.3.1. Injury of great thoracic vessels
    - 6.7.3.2. Hemo or pneumomediastinum
    - 6.7.3.3. Hemo or pneumothorax: Secondary mediastinal deviation
    - 6.7.3.4. Pulmonary laceration, pulmonary contusive foci, airway lesion
    - 6.7.3.5. Single/multiple costal fracture traces
    - 6.7.3.6. Dorsal vertebral fractures, assess if listhesis, signs of instability
- 6.8. Abdominal Trauma
  - 6.8.1. Abdomen
  - 6.8.2. Study Protocol
  - 6.8.3. Systematic search for findings
    - 6.8.3.1. Lesion of great abdominal vessels
    - 6.8.3.2. Hemo or pneumoperitoneum, high/low density free fluid
    - 6.8.3.3. Splenic or hepatic visceral lesion
    - 6.8.3.4. Lumbar vertebral fractures, assess signs of instability, assess possible points of associated contrast extravasation
- 6.9. Pelvic Trauma
  - 6.9.1. Pelvis
  - 6.9.2. Study Protocol
  - 6.9.3. Systematic search for findings
    - 6.9.3.1. Pelvic great vessels lesion
    - 6.9.3.2. Hemo or pneumoperitoneum, high/low density free fluid
    - 6.9.3.3. Renal injury
- 6.10. Endovascular techniques and the hybrid operating room
  - 6.10.1. Operating Theatre
  - 6.10.2. Intervention Techniques
    - 6.10.2.1. Interventionism in pelvic trauma
      - 6.10.2.1.1. Indications
    - 6.10.2.2. Interventional procedures in liver trauma
      - 6.10.2.2.1. Indications
    - 6.10.2.3. Interventional procedures in splenic and renal trauma
      - 6.10.2.3.1. Indications
    - 6.10.2.4. Interventional procedures in thoracic trauma
      - 6.10.2.1. Indications

6.10.3. What is the hybrid operating room?

6.10.4. Present and future of the hybrid OR

## Module 7. Management of shock in ICU trauma

### 7.1. Objectives end points of trauma resuscitation

#### 7.1.1. Resuscitation

#### 7.1.2. Pathophysiology

#### 7.1.3. Global parameters

7.1.3.1. Clinical parameters, physical examination, vital signs

7.1.3.2. Hemodynamic parameters: Optimization of volemia

7.1.3.3. Hemodynamic parameters: Cardiac work

7.1.3.4. End-expiratory CO<sub>2</sub> values (End-tidal CO<sub>2</sub>)

7.1.3.5. Oximetric values

7.1.3.6. Measurement of tissue metabolism anaerobiosis

#### 7.1.4. Regional parameters

7.1.4.1. Gastric mucosal tonometry

7.1.4.2. Sublingual capnography

7.1.4.3. Tissue oximetry and capnometry

7.1.4.4. Near Infrared Spectrometry (NIRS)

#### 7.1.5. Conclusions

### 7.2. Multi-organ dysfunction in trauma

#### 7.2.1. Dysfunction

#### 7.2.2. Pathophysiology

#### 7.2.3. Classification

7.2.3.1. Early Onset

7.2.3.2. Late Onset

#### 7.2.4. Diagnosis

7.2.4.1. Scales

7.2.4.2. Risk Factors

#### 7.2.5. Therapeutic Approach

7.2.5.1. Cardiorespiratory support

7.2.5.2. Damage control surgeries

7.2.5.3. Surgeries for debridement of infectious foci

7.2.5.4. Blood volume and blood products supply

7.2.5.5. Others: Protective mechanical ventilation and nutrition

#### 7.2.6. Conclusions

### 7.3. Hemorrhagic shock

#### 7.3.1. Recognition of the state of shock

#### 7.3.2. Clinical differentiation of shock etiology

7.3.2.1. General description of hemorrhagic shock

#### 7.3.3. Physiological classification

7.3.3.1. Grade I hemorrhage >15% blood volume loss

7.3.3.2. Hemorrhage grade II 15-30% of blood volume loss

7.3.3.3. Hemorrhage grade III 31-40% of blood volume loss

7.3.3.4. Hemorrhage grade IV >40% blood volume loss

#### 7.3.4. Initial management of hemorrhagic shock

##### 7.3.4.1. Physical Examination

7.3.4.1.1. Airway and Breathing

7.3.4.1.2. Circulation, hemorrhage control

7.3.4.1.3. Neurological Deficit

7.3.4.1.4. Exposure: complete examination

##### 7.3.4.2. Vascular Access

##### 7.3.4.3. Initial treatment with liquids

##### 7.3.4.4. Blood restitution

7.3.4.4.1. Crossmatching tests

7.3.4.4.2. Prevention of hypothermia

7.3.4.4.3. Autotransfusion

7.3.4.4.4. Massive transfusion

7.3.4.4.5. Coagulopathy

7.3.4.4.6. Calcium administration

### 7.4. Systemic inflammatory response syndrome and sepsis in severe trauma

#### 7.4.1. Systemic inflammatory response

#### 7.4.2. CNS

7.4.2.1. Common infections

7.4.2.2. Treatment

7.4.2.3. Antibiotic prophylaxis for CNS infections

#### 7.4.3. Pneumonia

- 7.4.4. Fracture-related infections
    - 7.4.4.1. Introduction
    - 7.4.4.2. Factors associated with infection
    - 7.4.4.3. Diagnosis of fracture-related infection
    - 7.4.4.4. Infection-related treatment
  - 7.5. Coagulation disorders in trauma
    - 7.5.1. Coagulation
    - 7.5.2. Coagulopathy associated with trauma
      - 7.5.2.1. Trauma-associated coagulopathy (TAC)
        - 7.5.2.1.1. Tissue damage and inflammation
        - 7.5.2.1.2. Endothelial Dysfunction
        - 7.5.2.1.3. Shock and hypoperfusion
        - 7.5.2.1.4. Platelet dysfunction
        - 7.5.2.1.5. Coagulation factor consumption and dysfunction
        - 7.5.2.1.6. Hyperfibrinolysis
      - 7.5.2.2. Coagulopathy Secondary to Trauma (CST)
        - 7.5.2.2.1. Associated with the patient's situation
          - 7.5.2.2.1.1. Hypothermia
          - 7.5.2.2.1.2. Acidosis
        - 7.5.2.2.2. Dilutional
        - 7.5.2.2.3. Added
          - 7.5.2.2.3.1. Comorbidities
          - 7.5.2.2.3.2. Concomitant Drug
  - 7.5.3. Diagnosis
    - 7.5.3.1. Conventional tests
      - 7.5.3.1.1. Conventional coagulation tests
        - 7.5.3.1.1.1. Platelet count
        - 7.5.3.1.1.2. Fibrinogen levels
      - 7.5.3.1.2. Viscoelastic test
        - 7.5.3.1.2.1. Reactions and parameters
        - 7.5.3.1.2.2. Interpretation
        - 7.5.3.1.2.3. Advantages and Limitations
    - 7.5.3.2. Evaluation of CIT and prediction of massive transfusion
- 7.5.4. Management of coagulopathy
  - 7.5.4.1. Management of CIT/HECTRA
    - 7.5.4.1.1. Red blood Cell Concentrates
    - 7.5.4.1.2. Fresh frozen plasma
    - 7.5.4.1.3. Platelets
    - 7.5.4.1.4. Fibrinogen
    - 7.5.4.1.5. Protombinic Concentrate Complexes (PCC)
    - 7.5.4.1.6. Tranexamic Acid
    - 7.5.4.1.7. Other hemostatic drugs
    - 7.5.4.1.8. Other Measures
  - 7.5.4.2. Management of hypercoagulability
- 7.6. Massive transfusion
  - 7.6.1. Transfusion
  - 7.6.2. Definition
  - 7.6.3. Transfusion management guidelines in severely traumatized patients
  - 7.6.4. Associated risks
    - 7.6.4.1. Coagulopathy
    - 7.6.4.2. TRALI
    - 7.6.4.3. Infections
- 7.7. Cardiac arrest in trauma
  - 7.7.1. Stop
  - 7.7.2. Etiopathogenesis of traumatic CRA
  - 7.7.3. Cardiopulmonary resuscitation algorithm in traumatic CRA
  - 7.7.4. Prognosis of traumatic CRA
  - 7.7.5. Emergency thoracotomy
    - 7.7.5.1. Indications and Contraindications
    - 7.7.5.2. Role of ultrasound
    - 7.7.5.3. Objectives
  - 7.7.6. Surgical Technique
    - 7.7.6.1. Emergency sternotomy
    - 7.7.6.2. Left thoracotomy
  - 7.7.7. Material and monitoring

- 7.8. Neurogenic shock in trauma
  - 7.8.1. Shock
  - 7.8.2. Memory Clinical differentiation of shock etiology
    - 7.8.2.1. General description of hemorrhagic shock
  - 7.8.3. Classification of spinal cord injury
    - 7.8.3.1. Level
    - 7.8.3.2. Severity of neurological deficit
    - 7.8.3.3. Spinal Cord Syndromes
- 7.9. Thromboembolic disease in trauma and post-traumatic fat embolism syndrome
  - 7.9.1. Thrombo
  - 7.9.2. Venous Thromboembolic Disease
    - 7.9.2.1. Pathophysiology
    - 7.9.2.2. Prophylaxis and pharmacology
      - 7.9.2.2.1. Onset
      - 7.9.2.2.2. Anticoagulation and posology
    - 7.9.2.3. Mechanical Prophylaxis
    - 7.9.2.4. Diagnosis
    - 7.9.2.5. Treatment of venous thromboembolic disease
    - 7.9.2.6. Prognosis
  - 7.9.3. Fat Embolism Syndrome
    - 7.9.3.1. Pathophysiology
    - 7.9.3.2. Clinical Symptoms
    - 7.9.3.3. Diagnosis
    - 7.9.3.4. Treatment
    - 7.9.3.5. Prevention
- 7.10. Compartment syndrome and crushing
  - 7.10.1. Compartment Syndrome
    - 7.10.1.1. Definition and localizations
    - 7.10.1.2. Etiology and Clinic
    - 7.10.1.3. Treatment and Prophylaxis

- 7.10.2. Crush Syndrome
  - 7.10.2.1. Introduction
  - 7.10.2.2. Pathophysiology
  - 7.10.2.3. Evolution
  - 7.10.2.4. Clinical Management

## Module 8. Management of mild trauma in ICU

- 8.1. Mild TBI
  - 8.1.1. TBI
  - 8.1.2. Anatomical review
  - 8.1.3. Physiological review
  - 8.1.4. TBI Classification
  - 8.1.5. Medical treatment of traumatic brain injuries
- 8.2. Severe TBI
  - 8.2.1. Management of severe TBI
  - 8.2.2. ICP monitoring
  - 8.2.3. PIC Treatment
  - 8.2.4. Severe hyperventilation
  - 8.2.5. Decompressive techniques
  - 8.2.6. Barbiturate coma
  - 8.2.7. Hypothermia and anticonvulsants
- 8.3. Facial Trauma
  - 8.3.1. Classification
  - 8.3.2. Diagnosis
  - 8.3.3. Treatment
- 8.4. Thoracic Trauma
  - 8.4.1. Thorax
  - 8.4.2. Anatomic and physiologic memory of the Thorax
  - 8.4.3. Classification of thoracic traumas
  - 8.4.4. Initial evaluation of thoracic trauma

- 8.4.5. Initial treatment of thoracic trauma
  - 8.4.5.1. Injuries with imminent risk of death
    - 8.4.5.1.1. Airway obstruction
    - 8.4.5.1.2. Tension pneumothorax
    - 8.4.5.1.3. Open pneumothorax
    - 8.4.5.1.4. Massive hemothorax
    - 8.4.5.1.5. Costal volet, unstable thorax
    - 8.4.5.1.6. Cardiac Tamponade
    - 8.4.5.1.7. Severe lesion of great vessels of the mediastinum
  - 8.4.5.2. Injuries with low risk of death
    - 8.4.5.2.1. Rib fractures
    - 8.4.5.2.2. Fractures of the clavicle, sternum and scapula
- 8.5. Abdominal Trauma. Damage control surgeryDamage control surgeries
  - 8.5.1. Ultrasound
  - 8.5.2. Anatomy of the abdomen
  - 8.5.3. Mechanism of injury
    - 8.5.3.1. Blunt trauma
    - 8.5.3.2. Penetrating trauma
    - 8.5.3.3. Blast trauma
  - 8.5.4. Evaluation and Management
    - 8.5.4.1. Physical Examination
      - 8.5.4.1.1. Inspection
      - 8.5.4.1.2. Pelvic evaluation
      - 8.5.4.1.3. Urethral and perineal examination
  - 8.5.5. Diagnosis, complementary tests in the examination
    - 8.5.5.1. Peritoneal lavage puncture
    - 8.5.5.2. Ultrasound
    - 8.5.5.3. Radiography
    - 8.5.5.4. CAT
    - 8.5.5.5. Diagnostic laparoscopy
- 8.5.6. Damage control surgery
  - 8.5.6.1. Indications
  - 8.5.6.2. Phases of damage control surgery
- 8.6. Pelvic trauma
  - 8.6.1. Pelvis
  - 8.6.2. Anatomical Review
  - 8.6.3. Evaluation and Management
    - 8.6.3.1. Urethral, perineal, rectal, vaginal and buttocks examination
  - 8.6.4. Complementary Diagnostic Tests
    - 8.6.4.1. Simple radiology
    - 8.6.4.2. CAT SCAN
- 8.7. Orthopedic trauma
  - 8.7.1. Orthopedics
  - 8.7.2. Primary review and resuscitation of patients with potentially life-threatening extremity injuries
    - 8.7.2.1. Severe arterial hemorrhage and traumatic amputation
    - 8.7.2.2. Bilateral femur fracture
    - 8.7.2.3. Crush syndrome, catastrophic limb or complex limb injury
  - 8.7.3. Secondary revision, limb-threatening injuries
    - 8.7.3.1. History
    - 8.7.3.2. Physical Examination
    - 8.7.3.3. Open fractures and joint injuries
    - 8.7.3.4. Vascular injuries
    - 8.7.3.5. Compartment Syndrome
    - 8.7.3.6. Neurological lesion secondary to fracture or dislocation
  - 8.7.4. Other Lesions
    - 8.7.4.1. Contusions and lacerations
    - 8.7.4.2. Joint and ligament injuries
    - 8.7.4.3. Fractures

- 8.7.5. Principles of Immobilization
    - 8.7.5.1. Introduction and Indications
    - 8.7.5.2. Femur Fracture
    - 8.7.5.3. Knee injuries
    - 8.7.5.4. Tibia fracture
    - 8.7.5.5. Ankle Fracture
    - 8.7.5.6. Injuries of upper extremity and hand
  - 8.7.6. Rehabilitation
    - 8.7.6.1. Introduction and justification of rehabilitation in the ICU
    - 8.7.6.2. Training of the Teaching Staff
    - 8.7.6.3. Rehabilitation therapies
      - 8.7.6.3.1. General care guidelines
        - 8.7.6.3.1.1. Nursing: general care
        - 8.7.6.3.1.2. Orthotic corrections
      - 8.7.6.3.2. Rehabilitative treatment
        - 8.7.6.3.2.1. Immobility syndrome
          - 8.7.6.3.2.1.1. Level 0
          - 8.7.6.3.2.1.2. Level 1
          - 8.7.6.3.2.1.3. Level 2
          - 8.7.6.3.2.1.4. Level 3
          - 8.7.6.3.2.1.5. Level 4
          - 8.7.6.3.2.1.6. Electrotherapy
        - 8.7.6.3.2.2. Respiratory techniques
          - 8.7.6.3.2.2.1. Secretion Drainage
          - 8.7.6.3.2.2.2. Ventilatory Techniques
          - 8.7.6.3.2.2.3. Occupational Therapy
- 8.8. Vertebro-spinal cord trauma
  - 8.8.1. Vertebro-spinal cord
  - 8.8.2. Anatomy Recap
  - 8.8.3. Injury mechanism
  - 8.8.4. Evaluation of the spinal cord injury
    - 8.8.4.1. Neurological evaluation of the spinal cord injured person
    - 8.8.4.2. Rectal Examination
  - 8.8.5. Management of the spinal cord injury
- 8.9. Vertebro-spinal cord trauma
  - 8.9.1. Classification of spinal cord injury
  - 8.9.2. Treatment
  - 8.9.3. Complications in spinal cord injury
  - 8.9.4. Treatment of skin alterations
  - 8.9.5. Prevention and treatment of joint contractures
  - 8.9.6. Treatment of spasticity
  - 8.9.7. Treatment of gastrointestinal disturbances
  - 8.9.8. Treatment of genitourinary disorders
  - 8.9.9. Sexuality and fertility
  - 8.9.10. Occupational therapy and physiotherapy
  - 8.9.11. Psychology
  - 8.9.12. Functional outcomes
- 8.10. Penetrating trauma
  - 8.10.1. Penetrating trauma
  - 8.10.2. Definition
  - 8.10.3. Evaluation of specific penetrating injuries
    - 8.10.3.1. Introduction
    - 8.10.3.2. Thoracoabdominal injuries
    - 8.10.3.3. Anterior abdominal wounds, non-surgical management
    - 8.10.3.4. Flank and dorsal injuries, non-surgical management
    - 8.10.3.5. Evaluation of other specific injuries
      - 8.10.3.5.1. Diaphragmatic lesions
      - 8.10.3.5.2. Duodenal lesions
      - 8.10.3.5.3. Pancreatic lesion
      - 8.10.3.5.4. Urogenital lesions
      - 8.10.3.5.5. Hollow viscera lesions
      - 8.10.3.5.6. Solid organ injuries
  - 8.10.4. Management and Treatments

## Module 9. Trauma Pharmacology and Nutrition

- 9.1. Indications for sedation
  - 9.1.1. Sedation
  - 9.1.2. Physiological response to pain
    - 9.1.2.1. Pain Control
    - 9.1.2.2. Control of sedation
- 9.2. Drugs commonly used in the care of the severely traumatized patient
  - 9.2.1. Drugs:
  - 9.2.2. Hypnotics: intravenous sedatives
    - 9.2.2.1. Thiopental
    - 9.2.2.2. Etomidate
    - 9.2.2.3. Ketamine
    - 9.2.2.4. Propofol
    - 9.2.2.5. Benzodiazepines
  - 9.2.3. Muscle relaxants
    - 9.2.3.1. Depolarizing neuromuscular relaxants
    - 9.2.3.2. Non-depolarizing neuromuscular relaxants
    - 9.2.3.3. Anticholinesterase drugs
  - 9.2.4. Opioid Analgesics
    - 9.2.4.1. Pure Agonists
    - 9.2.4.2. Pure antagonists
  - 9.2.5. Inotropic agents
    - 9.2.5.1. Adrenaline
    - 9.2.5.2. Dopamine
    - 9.2.5.3. Dobutamine
- 9.3. Sedation analgesia guidelines
  - 9.3.1. Short-duration sedo analgesia
  - 9.3.2. Prolonged Sedo analgesia guideline
  - 9.3.3. Conclusions
- 9.4. Minor analgesics
  - 9.4.1. Analgesia
  - 9.4.2. Drugs and dosage
    - 9.4.2.1. NSAIDS
    - 9.4.2.2. Nonsteroidal Anti-Inflammatory Drugs
    - 9.4.2.3. Patient-controlled analgesia
- 9.5. Regional Thorax and Abdomen Analgesia
  - 9.5.1. Indications
  - 9.5.2. Classification
    - 9.5.2.1. Central Blocks
    - 9.5.2.2. Peripheral blocks
    - 9.5.2.3. Fascicular blocks
  - 9.5.3. Procedures used in Thorax and Abdomen
  - 9.5.4. Procedures used on the Upper Limb and Lower Limb
- 9.6. Neuromuscular Blockade
  - 9.6.1. Blockade
  - 9.6.2. Indications
  - 9.6.3. Classification
    - 9.6.3.1. Depolarizing agents
    - 9.6.3.2. Non-depolarizing
  - 9.6.4. Monitoring
- 9.7. Delirium
  - 9.7.1. Delirium
  - 9.7.2. Definition and scales
  - 9.7.3. Risk Factors
  - 9.7.4. Classification and clinical
    - 9.7.4.1. Hyperactive delirium
    - 9.7.4.2. Hypoactive delirium
    - 9.7.4.3. Mixed delirium
  - 9.7.5. Management and Treatments
  - 9.7.6. Prevention of delirium in ICU
- 9.8. Monitoring. Analgesia and sedation scales

- 9.8.1. Scales
- 9.8.2. Causes of pain
- 9.8.3. Clinical Symptoms
- 9.8.4. Analgesia Scales
  - 9.8.4.1. Pain assessment in the conscious patient
    - 9.8.4.1.1. EVA Scale
    - 9.8.4.1.2. Numerical verbal scale
  - 9.8.4.2. Pain assessment in the intubated patient with non-deep sedation
    - 9.8.4.2.1. EVA Scale
    - 9.8.4.2.2. Numerical verbal scale
  - 9.8.4.3. Assessment of pain in the non-communicative patient or under deep sedation
    - 9.8.4.3.1. Campbell Scale
    - 9.8.4.3.2. ESCID Scale
- 9.8.5. Sedation scales
  - 9.8.5.1. Ramsay Scale
  - 9.8.5.2. RASS Scale
  - 9.8.5.3. BIS monitoring
- 9.9. Prophylaxis and antimicrobial treatment in the polytraumatized patient
  - 9.9.1. Prophylaxis
  - 9.9.2. Indications for Prophylaxis
    - 9.9.2.1. Most frequent antibiotic guidelines in polytraumatized patients
  - 9.9.3. Infections related to fractures
  - 9.9.4. Pneumonia
  - 9.9.5. Infections related to cranioencephalic traumatism
- 9.10. Nutrition
  - 9.10.1. Nutrition
  - 9.10.2. Indications for nutritional support in trauma
    - 9.10.2.1. When to initiate nutritional support
    - 9.10.2.2. Assessment of requirements
    - 9.10.2.3. Micronutrients
    - 9.10.2.4. Type of diet and follow-up

- 9.10.3. Complications
- 9.10.4. Monitoring
  - 9.10.4.1. Introduction
  - 9.10.4.2. Monitoring
  - 9.10.4.3. Nutritional risk analysis
  - 9.10.4.4. Imaging technique
- 9.10.5. Nutrition in Special Situations
  - 9.10.5.1. Abdominal Trauma
  - 9.10.5.2. Spinal trauma
  - 9.10.5.3. Barbiturate coma
  - 9.10.5.4. ECMO

## Module 10. Trauma in special situations

- 10.1. Recommendations for child trauma care
  - 10.1.1. Childhood trauma
  - 10.1.2. Types and patterns of injury
  - 10.1.3. Unique characteristics of the pediatric patient
  - 10.1.4. Airway
  - 10.1.5. Breathing
  - 10.1.6. Circulation and Shock
  - 10.1.7. Cardiopulmonary Resuscitation
  - 10.1.8. Thoracic Trauma
  - 10.1.9. Abdominal Trauma
  - 10.1.10. TBI
  - 10.1.11. Spinal cord Injury
  - 10.1.12. Musculoskeletal trauma
  - 10.1.13. Child Abuse

## Module 9. Trauma Pharmacology and Nutrition

- 9.1. Indications for sedation
  - 9.1.1. Sedation
  - 9.1.2. Physiological response to pain
    - 9.1.2.1. Pain Control
    - 9.1.2.2. Control of sedation
- 9.2. Drugs commonly used in the care of the severely traumatized patient
  - 9.2.1. Drugs:
  - 9.2.2. Hypnotics: intravenous sedatives
    - 9.2.2.1. Thiopental
    - 9.2.2.2. Etomidate
    - 9.2.2.3. Ketamine
    - 9.2.2.4. Propofol
    - 9.2.2.5. Benzodiazepines
  - 9.2.3. Muscle relaxants
    - 9.2.3.1. Depolarizing neuromuscular relaxants
    - 9.2.3.2. Non-depolarizing neuromuscular relaxants
    - 9.2.3.3. Anticholinesterase drugs
  - 9.2.4. Opioid Analgesics
    - 9.2.4.1. Pure Agonists
    - 9.2.4.2. Pure antagonists
  - 9.2.5. Inotropic agents
    - 9.2.5.1. Adrenaline
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    - 9.2.5.3. Dobutamine
- 9.3. Sedation analgesia guidelines
  - 9.3.1. Short-duration sedo analgesia
  - 9.3.2. Prolonged Sedo analgesia guideline
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  - 9.4.1. Analgesia
  - 9.4.2. Drugs and dosage
    - 9.4.2.1. NSAIDS
    - 9.4.2.2. Nonsteroidal Anti-Inflammatory Drugs
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- 9.5. Regional Thorax and Abdomen Analgesia
  - 9.5.1. Indications
  - 9.5.2. Classification
    - 9.5.2.1. Central Blocks
    - 9.5.2.2. Peripheral blocks
    - 9.5.2.3. Fascicular blocks
  - 9.5.3. Procedures used in Thorax and Abdomen
  - 9.5.4. Procedures used on the Upper Limb and Lower Limb
- 9.6. Neuromuscular Blockade
  - 9.6.1. Blockade
  - 9.6.2. Indications
  - 9.6.3. Classification
    - 9.6.3.1. Depolarizing agents
    - 9.6.3.2. Non-depolarizing
  - 9.6.4. Monitoring
- 9.7. Delirium
  - 9.7.1. Delirium
  - 9.7.2. Definition and scales
  - 9.7.3. Risk Factors
  - 9.7.4. Classification and clinical
    - 9.7.4.1. Hyperactive delirium
    - 9.7.4.2. Hypoactive delirium
    - 9.7.4.3. Mixed delirium
  - 9.7.5. Management and Treatments
  - 9.7.6. Prevention of delirium in ICU
- 9.8. Monitoring. Analgesia and sedation scales

- 9.8.1. Scales
- 9.8.2. Causes of pain
- 9.8.3. Clinical Symptoms
- 9.8.4. Analgesia Scales
  - 9.8.4.1. Pain assessment in the conscious patient
    - 9.8.4.1.1. EVA Scale
    - 9.8.4.1.2. Numerical verbal scale
  - 9.8.4.2. Pain assessment in the intubated patient with non-deep sedation
    - 9.8.4.2.1. EVA Scale
    - 9.8.4.2.2. Numerical verbal scale
  - 9.8.4.3. Assessment of pain in the non-communicative patient or under deep sedation
    - 9.8.4.3.1. Campbell Scale
    - 9.8.4.3.2. ESCID Scale
- 9.8.5. Sedation scales
  - 9.8.5.1. Ramsay Scale
  - 9.8.5.2. RASS Scale
  - 9.8.5.3. BIS monitoring
- 9.9. Prophylaxis and antimicrobial treatment in the polytraumatized patient
  - 9.9.1. Prophylaxis
  - 9.9.2. Indications for Prophylaxis
    - 9.9.2.1. Most frequent antibiotic guidelines in polytraumatized patients
  - 9.9.3. Infections related to fractures
  - 9.9.4. Pneumonia
  - 9.9.5. Infections related to cranioencephalic traumatism
- 9.10. Nutrition
  - 9.10.1. Nutrition
  - 9.10.2. Indications for nutritional support in trauma
    - 9.10.2.1. When to initiate nutritional support
    - 9.10.2.2. Assessment of requirements
    - 9.10.2.3. Micronutrients
    - 9.10.2.4. Type of diet and follow-up

- 9.10.3. Complications
- 9.10.4. Monitoring
  - 9.10.4.1. Introduction
  - 9.10.4.2. Monitoring
  - 9.10.4.3. Nutritional risk analysis
  - 9.10.4.4. Imaging technique
- 9.10.5. Nutrition in Special Situations
  - 9.10.5.1. Abdominal Trauma
  - 9.10.5.2. Spinal trauma
  - 9.10.5.3. Barbiturate coma
  - 9.10.5.4. ECMO

## Module 10. Trauma in special situations

- 10.1. Recommendations for child trauma care
  - 10.1.1. Childhood trauma
  - 10.1.2. Types and patterns of injury
  - 10.1.3. Unique characteristics of the pediatric patient
  - 10.1.4. Airway
  - 10.1.5. Breathing
  - 10.1.6. Circulation and Shock
  - 10.1.7. Cardiopulmonary Resuscitation
  - 10.1.8. Thoracic Trauma
  - 10.1.9. Abdominal Trauma
  - 10.1.10. TBI
  - 10.1.11. Spinal cord Injury
  - 10.1.12. Musculoskeletal trauma
  - 10.1.13. Child Abuse

# 06 Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.



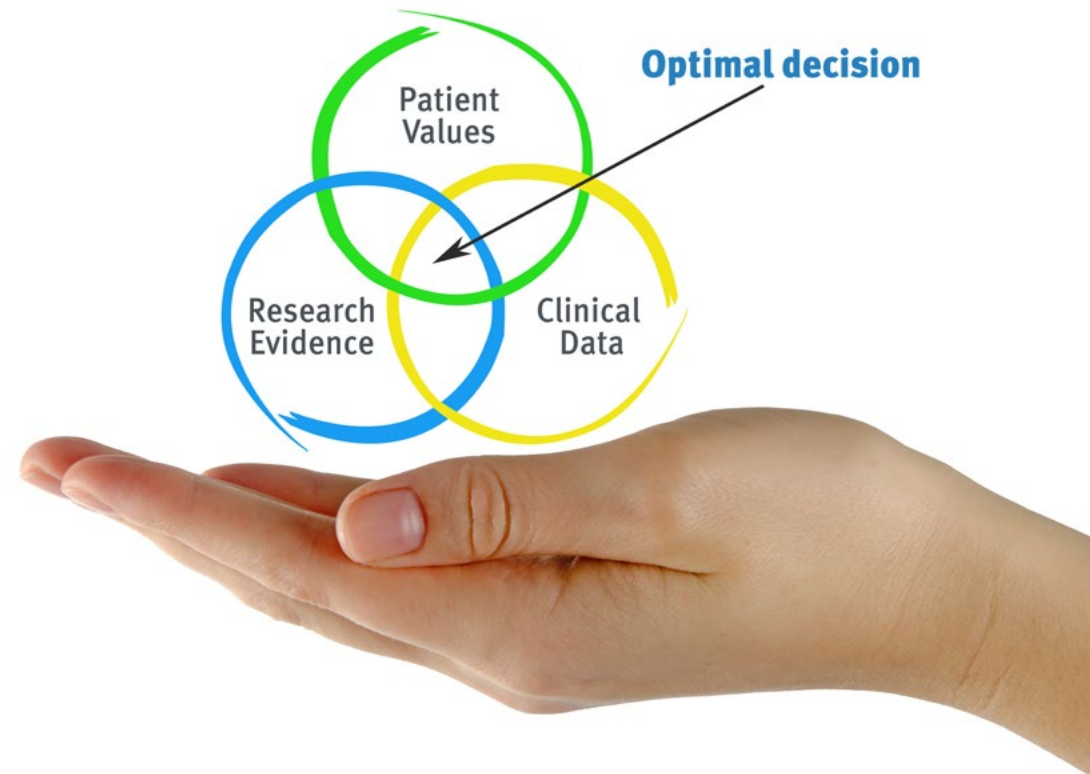
“

*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gervas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

“

*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

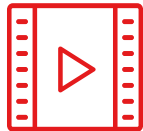
*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

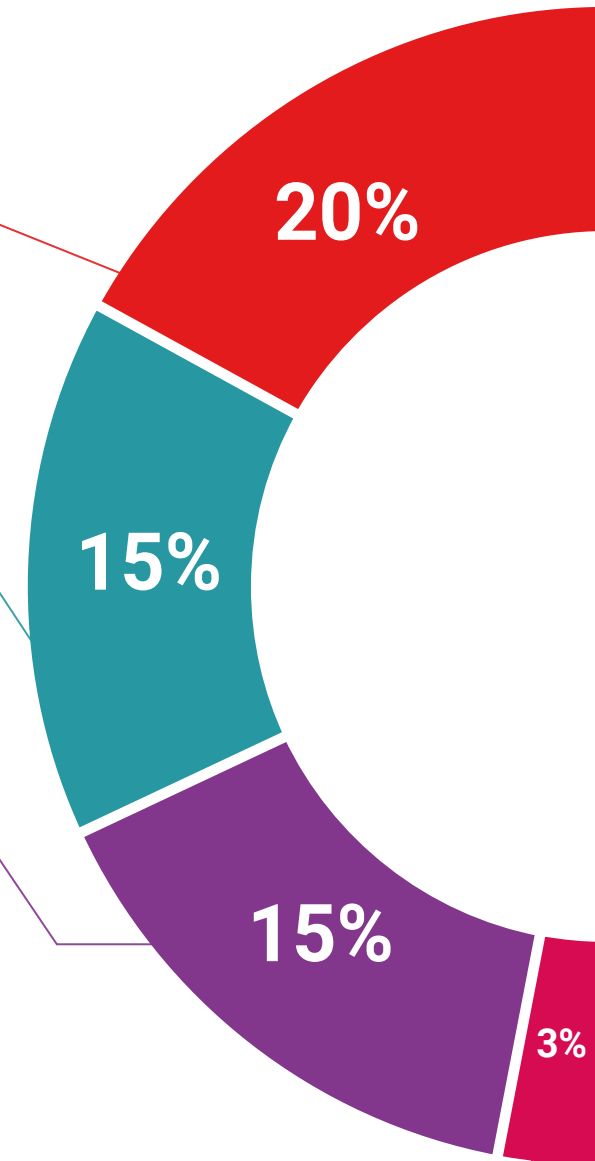
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

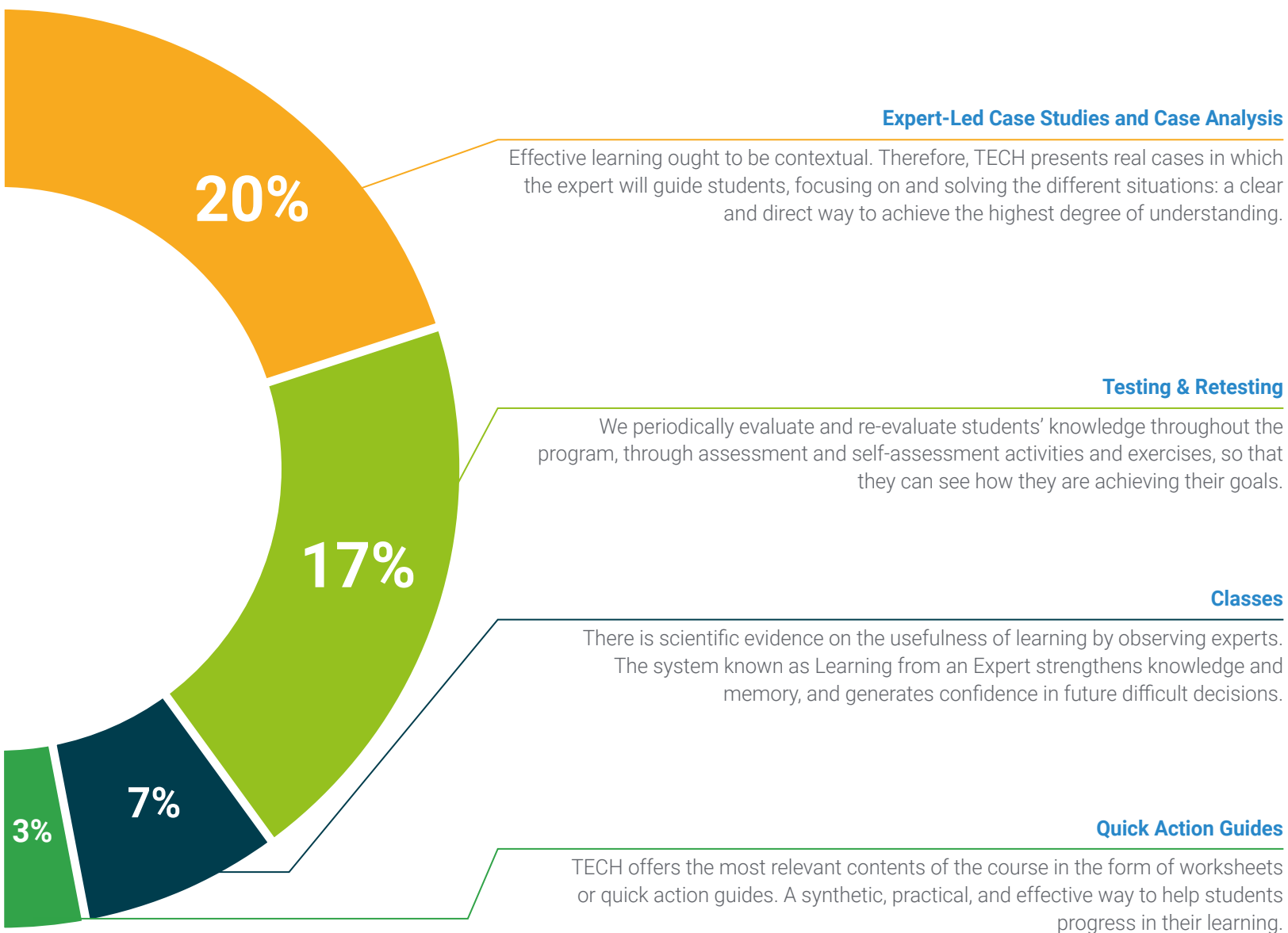
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story"



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





# 07 Certificate

The Professional Master's Degree in Severe Trauma in the ICU guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree issued by TECH Technological University.



“

*Successfully complete this program and  
receive your university certification without  
traveling or complex paperwork”*

This **Professional Master's Degree in Severe Trauma in the ICU** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** diploma issued by **TECH Technological University** via tracked delivery\*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Severe Trauma in the ICU**

Official N° of hours: **1,500 h.**



## Professional Master's Degree in Severe Trauma in the ICU

| Subject type                 | Hours |
|------------------------------|-------|
| Compulsory (CO)              | 1,500 |
| Optional (OP)                | 0     |
| External Work Placement (WP) | 0     |
| Master's Degree Thesis (MDT) | 0     |
| Total 1,500                  |       |

### General Structure of the Syllabus

| Year | Subject                                                          | Hours | Type |
|------|------------------------------------------------------------------|-------|------|
| 1º   | Traumatic Disease in Public Health                               | 150   | CO   |
| 1º   | Prehospital Trauma Management                                    | 150   | CO   |
| 1º   | Initial Trauma Care in the ICU Hospital                          | 150   | CO   |
| 1º   | Management of Severe Trauma in ICU                               | 150   | CO   |
| 1º   | Advanced ICU care                                                | 150   | CO   |
| 1º   | Radiology, complications and rehabilitation in trauma in the ICU | 150   | CO   |
| 1º   | Management of shock in ICU trauma                                | 150   | CO   |
| 1º   | Management of mild trauma in ICU                                 | 150   | CO   |
| 1º   | Trauma Pharmacology and Nutrition                                | 150   | CO   |
|      | Trauma in special situations                                     | 150   | CO   |

  
Tere Guevara Navarro  
Dean



\*Apostille Convention. In the event that the student wishes to have their paper certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.



## Professional Master's Degree Severe Trauma in the ICU

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Professional Master's Degree

## Severe Trauma in the ICU