



UPDATE IN INTENSIVE CARE MEDICINE

Are the paradigms in trauma disease changing?☆



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Damage control

Abstract Despite an annual trauma mortality of 5 million people worldwide, resulting in countless physical disabilities and enormous expenses, there are no standardized guidelines on trauma organization and management.

Over the last few decades there have been very notorious improvements in severe trauma care, though organizational and economical aspects such as research funding still need to be better engineered. Indeed, trauma lags behind other serious diseases in terms of research and organization.

The rapid developments in trauma care have produced original models available for research projects, initial resuscitation protocols and radiological procedures such as CT for the initial management of trauma patients, among other advances. This progress underscores the need for a multidisciplinary approach to the initial management and follow-up of this complicated patient population, where intensivists play a major role in both the patient admission and subsequent care at the trauma unit.

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PALABRAS CLAVE

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Reanimación inicial;
Equipo de Atención al Trauma;
Control de daños

¿Están cambiando nuestros paradigmas en la enfermedad traumática?

Resumen Aunque la mortalidad por trauma supera los 5 millones al año en todo el mundo, con innumerables incapacidades y enormes costes, faltan estándares globales y uniformes para su organización y manejo.

Los cambios en el conocimiento y los cuidados del paciente con trauma grave han sido espectaculares en las últimas décadas, pero los recursos en investigación, organización y cuidados no han crecido de forma paralela. En nuestro medio, la enfermedad traumática se sitúa muy por debajo de la investigación y organización de otras enfermedades graves.

En los últimos años hemos cambiado nuestros modelos en investigación en trauma, organización, cambios en la reanimación inicial, la presencia de la TC como pieza clave en el manejo inicial, etc. Estos cambios actuales y de futuro del manejo del paciente traumatizado generan una valoración y tratamiento multidisciplinarios, siendo necesaria la presencia del especialista en Medicina Intensiva como parte fundamental en el equipo de atención al trauma grave y su posterior cuidado en la unidad de críticos.

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Introduction

Severe trauma is the leading cause of death in individuals under 44 years of age in the western world, and is the main cause of infant mortality in children over one year of age. Over 5 million people die each year worldwide as a result of trauma disease—hemorrhagic shock being the underlying cause in 35–40% of the cases. Despite a global increase in trauma disease (except in some high-income geographical settings where the traffic accident-related mortality figures have decreased) and the great volume of surgeries it generates, trauma is usually little represented in regional, national and international programs. The lack of global and uniform standards for the collection, reporting and auditing of data referred to trauma is in clear contrast to the situation in other public health areas such as cancer or cardiovascular disease.^{1,2}

Although there have been spectacular changes in the knowledge and care of severe trauma in the last two decades, unfortunately there has been no parallel dedication of resources to organization and research in this field.

Trauma disease has been rather neglected in the context of serious acute disease. In our setting, care organization referred to trauma disease is far behind that found in relation to time-dependent disorders such as infarction or stroke.

There is still no clear definition of the regional systems of trauma care or of trauma centers, and in- and out-hospital trauma committees are moreover lacking. Indeed, even management standards for guaranteeing equity within the health system, commonly mediated by political structures, are lacking.³

In recent years there has been a change in paradigms, with the rerouting of our models toward new and sometimes even opposite positions. The most relevant changes experienced in the last two decades can be summarized as follows:

1. Changes in trauma care organization.
2. Importance of the multidisciplinary team in initial trauma care.
3. Need for multidisciplinary training and assessment.⁴
4. Physiopathological changes (injury mechanisms, initial inflammation, early coagulation disorders, alarmins, etc.).^{5–9}
5. Genetically determined evolutive differences of different phenotypes.
6. Advanced and sophisticated prehospital care.
7. Definition of trauma centers, high complexity centers and useful centers.¹⁰
8. Patient triage.
9. Implantation of resuscitation techniques with damage control and surgical damage control.
10. Incorporation of full-body computed tomography in the initial assessment of stable patients and patients with hemodynamic instability, except exanguination.¹¹
11. Radiological interventionism as an initial option.
12. Analysis of variables other than mortality, such as level of complexity, complications, sequelae, quality of life, return to work, etc.
13. Standardized regional, national and international registries.

14. Individualized treatment, supported by points of care, provided at the patient bedside.¹²

Peculiarities of research in trauma

According to Brohi, “research in trauma is disorderly, fragmented and often of low quality. It is slow and insufficient.”¹³ Few centers place priority on research in trauma, and there are possibly no such centers in our setting. Policies centered on global trauma research strategies are needed, extending from laboratory to patient care. Such initiatives should include research in prevention, biomechanics, physiology, clinical aspects, etc. Obviously, such efforts require infrastructures and support and funding mechanisms at least in proportion to the impact which trauma disease has in society today.¹⁴

Research in trauma is difficult, and its limitations include the heterogeneity of trauma disease. Different mechanisms produce different injuries, with dynamic and sometimes opposite responses secondary to time-dependent physiopathological changes. There are problems related to the critical condition of the patients, requiring the application of emergency techniques to save the life of the individual, and which make it difficult to simultaneously conduct research activities. Such activities could be carried out in the post-injury period by personnel not directly involved in the care of the patient. On the other hand, adequate patient selection is complicated. Informed consent requires some special formula, since in the first moments there are often no legal representatives present. Specific injuries may occur exceptionally and in an unpredictable manner, and randomized studies become impossible. However, even the existing case series are short, protracted in time, and limited to centers with a large volume of trauma patients.

Another problem is the difficulty of patient follow-up, since trauma patients suffer multiple disease conditions that result in different complications. Acute interventions are difficult to measure and quantify.

Traumatism sometimes occur while the patient is traveling, and so may have his or her place of residency in some other city or country—thus further complicating follow-up.

There are few standardized and structured trauma registries, and bias is common. Registries with high methodological quality are needed, capturing all the data referred to clinical evolution, from injury to rehabilitation and social reinsertion. The comparison of results is typically made with variables such as mortality or hospital stay, and not with complications, disabilities, the complexity of care, the need for specific resources, global costs, etc.

Large-scale cohort studies are needed to investigate the mechanisms of injury, along with randomized and controlled studies in order to apply homogeneous therapies and evaluate interventions. Such efforts must be characterized by high methodological quality, adopting a practical and ethical system for the selection of individuals for clinical studies, and with personnel experienced in final outcome assessments. There must be personnel from the clinical committees, though obviously not the directly implicated individuals.

Research in trauma remains fragmented, and is often an activity resulting from individual interest or comprising

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