

Statistics of trauma surgery in Mexico in the XIX century

Estadística de la cirugía de trauma en México en el siglo XIX

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Palabras clave:

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ABSTRACT

Trauma cases have historically been an entity that has required constant attention by the surgeon throughout history in all cultures. However, in how they have been explained using statistics since the XIX century in our country, it has been possible to give a quantitative vision to solve this problem. Although medical statistics was born with the beginning of the activities of the National Academy of Medicine of Mexico in 1864, the first articles that used this mathematical means were written by the Australian physician Frederich Semeleder (1832-1901) in 1878, of a non-traumatic medical type and referring to ovarian cysts. The first works with quantitative description appeared thanks to Dr. Manuel Soriano (1837-1927) in 1886 in the same journal of the National Academy. They described the low mortality with the use of antiseptics in battle wounded. When reviewing theses and articles, we can affirm that trauma at the end of the 19th century in our country occurred predominantly in young people between 25 and 35 years of age and was due to sequelae of injuries caused by cutting trauma by streetcars or sharp weapons injuries (79% of cases) with a mortality rate of 41%.

RESUMEN

Los casos de trauma históricamente han sido una entidad que ha requerido de manera constante atención por el cirujano a través de la historia en todas las culturas, pero, en la forma que se han explicado por medio de la estadística a partir del siglo XIX en nuestro país, se ha logrado dar una visión cuantitativa a fin de resolver dicho problema. Aunque la estadística médica nació con el inicio de las actividades de la Academia Nacional de Medicina de México en 1864, los primeros artículos que usaron este medio matemático son del médico australiano Frederich Semeleder (1832-1901) en 1878, de tipo médico no traumático y referentes a quistes ováricos. Los primeros trabajos con descripción cuantitativa surgieron gracias al Dr. Manuel Soriano (1837-1927) en 1886 en la misma revista de la Academia Nacional, y describían la escasa mortalidad con el uso de antisepsia en heridos de una batalla. Al hacer la revisión de tesis y artículos, podemos afirmar que el trauma a finales del siglo XIX en nuestro país se dio predominantemente en jóvenes de 25 a 35 años y fueron por secuelas de lesiones de trauma cortante por tranvías o lesiones por arma punzocortante (79% de los casos) con una mortalidad de 41%.

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INTRODUCTION

The word "trauma" comes from Greek and means wound. It was found in a vessel corresponding to the 2nd century B.C. as the affirmation of two brothers who denied having hit a third one. Trauma has accompanied the human being since its most remote origins and is an eternal health problem that medicine faced before it became a science.

Trauma constitutes in the medical field the fatal cause of immediate death and injuries requiring immediate attention; since the end of the 20th century, the World Health Organization has considered trauma an epidemic. In 2006, there were more than 800,000 people in Europe with injuries, with an annual loss of 2% of its gross domestic product.¹ In the United States, 59% of deaths in the population aged 1-44 years are due to trauma, with a mortality rate of 7.6% in hospitals that

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handle trauma relative to 9.5% in non-injury hospitals,² with 79,000 deaths per year, 7.5 days of hospital stay on average and 240.7 billion dollars of spending on health care costs from 2001 to 2011.³

Spain confirms the alarming frequency in people between 25 and 35 years of age, with more than 400,000 deaths in 2012 and an increase in those over 65 years of age, with the aggravating factor of difficulty in their management due to anticoagulants, poly pathology, etcetera.⁴ Mexico does not have continuous national statistics as in developed countries. From the data shown in the case series, trauma was the fourth cause of death and the first among patients aged 25 to 44 years, with 38 deaths per 100,000 persons; of these figures, vehicular accidents represented the fifth cause of death due to trauma in 1999 in Latin America, which occurred more frequently in men.⁵

DESCRIPTION OF TRAUMA BEFORE 1800

Although we have the descriptions of trauma management in the classics of the Ebers-Smith papyrus,⁶ aphorism of Hippocrates or commentaries of Celsus,⁷ there is no numerical or quantitative review of how many people were injured in a disaster, battle or catastrophe before 1800; perhaps the comments on the number of deaths in the European plagues were an excellent motivation to translate the disasters into statistics and thus show their magnitude (although there were only estimates),⁸ but with studies carried out after the event (due to the natural absence of the testimony of the actors who were there at the precise moment or of those who survived it afterward), only partial analyses remain to be seen.⁹

Except for these comments, medicine has always been mainly qualitative. Modern studies that analyze the number of wounded described in Homer's *Iliad* come out of this context, where several specialists transcribed, based on the literary aspect, an accurately quantitative vision of how many and how the participants of the conflict were wounded;¹⁰⁻¹² perhaps Homer used it as a literary element linked to the drama in order to make the text more realistic;

however, he gave us for posterity an element that serves to make a quantitative analysis of the magnitude of this human conflict and the type of wounds handled.

As described by Vaquero-Puerto and collaborators, since the Renaissance, the evidence of management was based on the description of clinical cases by the entity, without, of course, statistics. Classical is the texts by Ambrosio Paré (*Dix Livres de la Chirurgie*) and Dionisio Daza Chacón (*Practica y teórica de cirugía*), who, on opposite sides, gave testimony about cutting and gunshot wounds in a narrative and not the quantitative way.¹³

THE MEXICAN 19TH-CENTURY TRAUMA

Carmichael is right when he talks about the problems involved in studying a historical event when it has already happened and is described by people who did not participate. Primary sources, being written by the participants of the event themselves, have a connotation of greater relevance,⁸ that is why we wish to rescue the quantitative data on trauma in Mexico at the end of the 19th century, based on primary sources described by the doctors themselves.

We begin with the first work on trauma surgery in our country, edited by Dr. S. Barceló, a viceroy military doctor, who described two cases of post-trauma trephine in the then prison of Chihuahua.¹⁴ In the new nation, several works were collected in different stages of the *Gaceta Médica de México* between 1834 and 1900. However, it was not until the work of Dr. Carlos Alberto Ehrmann (1822-1871) that studies with statistical support were formalized within the nascent National Academy of Medicine (the second section of the Academy was in charge of the field of forensic medicine and statistics).¹⁵ The first work incorporating a statistical study, but not on trauma, was that of Dr. Frederich Semeleder (1832-1901), where the management of 45 ovarian cysts was recorded.¹⁶

In trauma, the first formal work published in a journal was that of Dr. Manuel Soriano (1837-1927). Manuel Soriano (1837-1927), when describing with percentage statistics the causes of death after the Battle of San

Luis Potosí on July 1st, 1872, in the uprising of the Plan de la Noria (1871-1872);¹⁷ this eminent military doctor described that out of 41 wounded patients, 18 died, 18 were cured and five convalesced; and he emphasized that the recovered patients were due to the daily change of clean sheets, the use of Labarraqué liquor and radical measures in surgeries,¹⁸ for what is also our oldest antecedent of the beginning of antisepsis,¹⁹ before Lister's era.²⁰

After the era of armed conflicts, the schemes of administration, clinical systems, and the teaching of medicine were modified (the analysis is yet to be written). This was favored by the creation of the National Academy of Medicine of Mexico, the incorporation of positivism, the organization of new medical schools in the country,²¹ and other factors that saved the study of this work. What is certain is that the motivation within some medical schools to write degree theses left us an extraordinary legacy²² firsthand that serves to reconstruct the situation of various diseases in Mexico at that time. Regarding trauma, the outlook was bleak as urban aggressions replaced armed ones.

If someone was wounded in Mexico City and survived the injuries, he was not taken to a hospital (at that time, the injured patients were handled by the *Hospital Juárez de México*^{14,23,24}), as if he were just another object of a legal process, the injured patient was taken to the police station and, inside these dungeons of terror, he was left in a room called "Afanaduría", which consisted of a marble table, two tables where the statements were taken (while the wounded was alive) and a rudimentary instrumental room. He was left in a room called "Afanaduría",²⁵ which consisted of a marble table, two tables where statements were taken (while the wounded person was alive) and rudimentary instruments to give him some medical management, plus two practicing doctors, this happened 24 hours a day, every day; this trauma management alone was terrifying. Sotero and Zertuche describe in their thesis that, between 1870 and 1890, between 40 and 70% of trauma cases attended at the Juárez Hospital and between 50 and 200 cases in the fifth police district from 1880 to 1890.^{25,26} In the same thesis, they described that 91% were men,

with 34% of the wounded between 20 and 25 years of age, the mortality rate for stab wounds (HPAPC) was 18% and for firearms was 100%, while anatomically in the abdomen it was 42% and if it involved the intestine it was 85%.

Concerning other mechanisms of injury, in addition to the direct aggressions due to fights and assaults mentioned above, there were industrial and labor injuries and, of course, those caused by trains (streetcars) and, to a lesser extent, animal-drawn vehicles (remember that automobiles did not appear in our country until after 1900); of these last two types of injuries, between 1888 and 1895 in the Juárez Hospital, there were 405 cases, of which 79% were due to "crushing", which was described in the thesis as having a high mortality rate, especially when the injury involved the thigh (the etiology of these injuries was due to the passing of the streetcar and when the pedestrian was careless he sawed the femur, tibia-fibula, and other bones), so most of them needed to be amputated or remodeled in the stump, this created mortality of 41% (*Figure 1*).²⁷

It is interesting that the theses were based on European studies and that while in Europe, the causes of trauma were predominantly due to injuries in factories (as in England, France, and Germany), in Mexico City and San Luis Potosi, the injuries were due to tramways; and despite the wars of the 19th century, both in war and peace, in our country trauma involved a more significant number of pelvic limb amputations than thoracic;^{27,28} even, Dr.

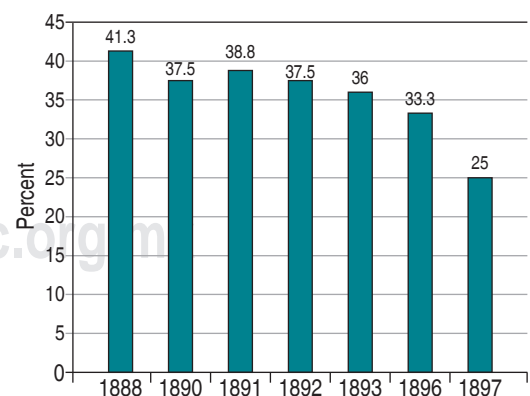


Figure 1: Mortality of amputations at Juárez Hospital. Source: Macías AC.²⁸

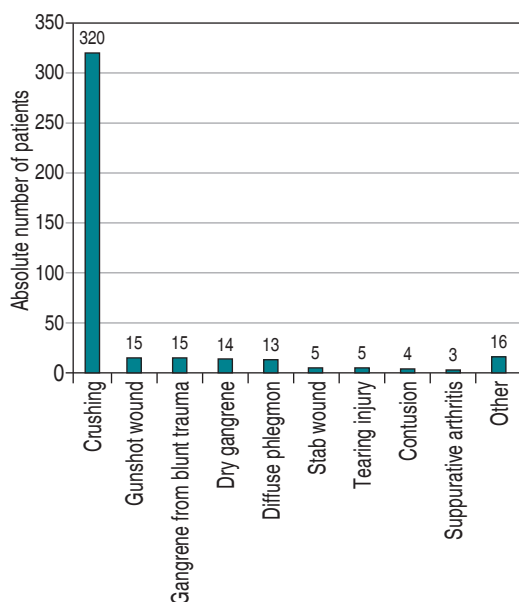


Figure 2: Etiology of amputations at Juarez Hospital, Mexico, from 1888 to 1897.

Source: Villarreal C.²⁷

Eduardo Vargas ratified in his undergraduate thesis work regarding two cases of thoracic limb amputations, that upper limb injuries were more common in Europe according to Dr. Trelat (Charity Hospital in Paris). However, it is true that in both countries, the mechanism was by crushing. In his comments and other theses in Mexico, he refers that it was thoracic limb injuries.

Another interesting difference between urban trauma in Mexico City was described with the data accumulated in Figure 2,²⁷ where the mechanism of aggression is, of course, very different in our 21st century, marked by vehicle injuries, compared to Mexico at the end of the 19th century which was located in patients with post-trauma gangrene (rarely seen after the antibiotic era), wrenching, among others.²⁹

Another type of injury, no less important, was the abdominal injuries caused by HPAPC and HPPAF (firearm projectile injury) that we have already described previously in another work,³⁰ injuries of which, although their impact and clinical-surgical wear and tear was not so high in numbers for a hospital, just look at the reasons for mortality in Hospital Juarez

in 1889, where most of the cases were non-traumatic processes, while the fifth cause of death in 1889 were amputations (Figure 3); it is important to note that what the trauma theses of the late nineteenth-century claim as “leukemia” in these injured patients are a post-traumatic status where, due to blood loss, they were left with a significant clinical pallor. Of course, most of the data are either simple numerical or percentage, without the notion of presenting the data by rate. However, Villarreal realized the severity, noting that the trauma of various origins caused 90.2% of amputations.²⁷

Although the change in the way of presenting the results of a medical study in Mexico started in 1864 with the beginning of the first statistical works, works on trauma continued to be published in a descriptive manner of series of cases, without quantitative casuistry, an example of this is the second journal on trauma published in our country,³¹ the Annals of the Larrey Association, which was published from 1875 to 1876,³² and where the totality of its works were narratives of compelling cases of trauma, but which in the end did not present an idea of severity, compiling series of cases of ailments such as those described in the previous quantitative works.

Regarding trauma cases in children, they were not appreciated or described in the XIX

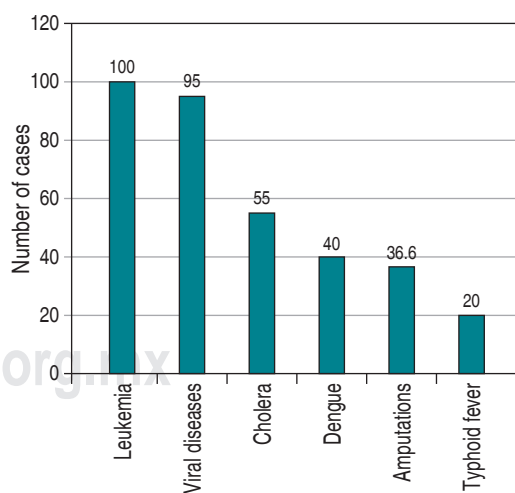


Figure 3: General mortality in Juarez Hospital, Mexico, 1889.

Source: Macias AC.²⁸

century, finding works with formal statistics until the second half of the XX century; trauma in infants was divided between urban accidents in vehicles and carelessness at home³³ and being more significant in the southern states of the country.³⁴ Unfortunately, the few citations regarding the management of trauma in children found that in the late nineteenth century was given by urban accidents by vehicles (streetcars as in adults),³⁵ or work injuries, as children worked in factories^{36,37} and mines.³⁸

CONCLUSIONS

During the era of the government of Porfirio Díaz, the experience gained in the wars of the mid-nineteenth century was compiled, while the new generation of medical students changed the way of describing diseases; roughly speaking, we see that the reason for mortality (infections) changed in a century in the Juárez Hospital at the end of the nineteenth century, and in the same city, with social changes, trauma was now the first cause of care in the hospitals of the Medical Services network of the Federal District³⁹ and the rest of the country. Although in a veiled manner, studies from the 19th century emerged where we realize that occupational injuries, especially in children, had a social relevance, perhaps not statistical.^{37,38}

Opening new lines of work for the investigation of the past in the surgical areas in order to understand the actual changes that have occurred in various conditions, especially those of trauma, we can indeed establish the evolution of the trauma patient, as occurred between 2005 to 2009, a trend in various parts of the country in describing the surgical experiences, which fortunately has been maintained by defining surgical schools throughout the country.⁴⁰

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