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Case Report

General Intensive Care Strategies - Case of Tetanus in a elder woman

V Primerano[1]*, A Cuccio[1], M Lauriola M[2] and D Alampi[3]

[1]*Intensive Care MD, Department of Anesthesia and Intensive Care, Polyclinic of Monza, Italy*

[2]*Infectiology Department MD, Polyclinic of Monza, Monza, Italy*

[3]*Researcher in Anesthesia and Intensive Care, Department of Surgical and Medical Sciences and Translational Medicine, Sapienza University of Rome, Rome, Italy*

***Corresponding Author:** V Primerano, Intensive Care MD, Department of Anesthesia and Intensive Care, Polyclinic of Monza, Italy.

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Abstract

The article takes as a starting point the case of an elderly woman with a full-blown tetanus to demonstrate how the implementation of early therapeutic strategies and intensive care approach, that take into account the reduced organ reserve and the problems in the medium and long term, can allow a favorable outcome. These strategies can suggest behaviors of good clinical practice even in similar situations in which a clear therapeutic path is associated in patients with a reduced "physiological" reserve of organs function.

Keywords: *Tetanus Epidemiology; Intensive Care of the Great Elder*

Introduction

Tetanus is an acute and severe infection caused by a bacterium. In this study, we aimed to analyze the factors that influence mortality in hospitalized tetanus patients. The Tetanus is an acute infectious disease, not contagious, caused by the bacterium Clostridium tetani, which secretes a neurotoxin. It is a Gram-positive that grows only in the absence of oxygen. It is present in nature in vegetative form and in the form of spores. The bacterium, normally present in the intestines of animals (such as cattle, horses and sheep) and in humans, is eliminated whit the faeces. The spores can survive in the external environment even for years, sometimes contaminating dust and earth, and penetrating the human organism through wounds. The bacterium does not invade the tissues. It is the toxin that reaches the central nervous system, interfering with the release of neurotransmitters that regulate muscles movement, causing diffuse contractions and spasms. In most cases, the incubation period ranges from 3 to 21 days and, generally, the shorter the incubation period, the more severe the clinical course. Muscle contractions usually start from the head and progress towards the trunk and limbs: the patient remains conscious and muscle spasms, caused by even minimal stimuli, cause pain. The diagnosis is basically clinical due to its typical picture of muscle contracture and spasms which is then confirmed by laboratory tests. The disease is not contagious, so the isolation of the patient is not necessary. However, there have acquired the disease does not confer immunity, therefore patients who have had tetanus should begin or continue the vaccination series as soon as clinically practicable. Various prognostic factors that influence mortality in patients with tetanus have been described in the literature. The main complication is linked to intense contractures that can cause lethal hyperkalemia or adrenergic storms that also lead to arrhythmias that are difficult to control. Therefore, it becomes essential to abolish hypertonicity and muscle contractures from its initial manifestations: Muscle paralysis and sedation are therefore necessary until the neurotoxin action is lost. Infectious complications and respiratory or renal complications can adversely affect the clinical picture.

However, in many countries, hospital survival from tetanus is now on the rise, but the long- term outcome is not always well known and described. Most often, tetanus is associated with muscle atrophy in adult survivors. The primary risk factors are those of a long stay in the ICU. Cardiorespiratory and neurological comorbidities, metabolic ones (such as diabetes and kidney failure) and the immunological condition will affect the anti-infective patient response to infection.

Despite being a fully preventable disease, cases of tetanus continue to occur in Italy and higher notification and hospitalization rates have been reported than in European and other industrialized countries. We reviewed legal notification, hospitalization, mortality and seroprevalence data to describe the epidemiology of tetanus in Italy from 2001 to 2010. A total of 594 cases of tetanus were reported, with an average annual incidence of 1.0/1,000.000 of population. Most of people were not vaccinated or were only incompletely vaccinated.

80% of cases occurred in subjects > 64 years of age, and a higher percentage of females than males were reported in this age group. The annual number of hospital admissions was 1.4 - 1.7 times higher than the number of notifications in the same year. The mean annual number of reported deaths was 21. The seroprevalence data show progressively higher susceptibility levels with increasing age. Over 50% of people aged 45 to 64 and over two-thirds of individuals aged ≥ 65 had anti-tetanus antibody levels < 0.01 IU/ml. The results show that tetanus is an ongoing problem in Italy and as in other countries, most cases occur in older adults, especially women. The observed differences in notification and hospitalization rates suggest that doctors underestimate the problem. In recent years, Italy has accounted for the majority of cases reported each year in the European Union (EU) even if different case definitions are used. In Italy, a confirmed case is one that satisfies the definition of clinical case. The EU case definition classifies confirmed cases as those with laboratory confirmation of disease. The incidence of clinical tetanus in Italy is ten times higher than in other industrialized countries. In view of the low prevalence of anti-tetanus antibodies in adults aged ≥ 45 years, it is necessary to implement strategies to improve vaccination in this population group.

Epidemiological aspects

Italy

"Tetanus in Italy 2001 - 2010: A continuing threat in older adults" (Vaccine 2013 Dec 25), provides an overview of the epidemiology of tetanus in Italy between 2001 and 2010.

The study found that 594 cases were notified in the period under review, with an average annual incidence of 1 case per million inhabitants (which went from 1.16/million in 2001 to 0.69/million in 2010). Of the total notified, 22 cases have received laboratory confirmation. 80% of the cases were reported by seven Regions (4 in the North, 2 in the Center and one in the South of the country) and each reported at least 60 cases. The age of the patients is known for 98.8% of cases: 471 occurred among over 64 years old, 111 in the 25 - 64 age group, 3 in the 15-24 year group and 2 in children under 14 years. The data on the incidence of the disease indicate that this is highest among the over 64s (4.1/million inhabitants) and drops to 0.2/million inhabitants under 65. Furthermore, 404 of the 594 cases analyzed were women, with an incidence three times higher than men (5.2 and 1.4/1,000,000 population respectively).

The vaccination status is available for 343 cases: 34 were vaccinated against tetanus but the number of doses received was only known for 21 (only one patient had completed the primary course). During the periods 2001-2003 and 2006-2010, 169 deaths were reported (62 and 107 respectively), with an annual average of 21 cases and a clear prevalence of deaths among the female population.

Europe

Situation of the European Union "Annual epidemiological report 2012. Reporting on 2010 surveillance data and 2011 epidemic intelligence data" In 2010, 12 countries belonging to the European Union and the European Economic Area reported 130 cases of tetanus, of which 74 laboratory confirmed. Austria, Denmark, Finland, Germany and Liechtenstein did not provide data. Italy, Poland, France, Romania, the United Kingdom and Spain reported the largest number of cases. Italy notified 57 of the 74 confirmed cases, confirming itself as the country with the highest incidence since 2006 (0.09 per 100,000 inhabitants in 2010). The age group most affected remains that of the over 65s (with an incidence of 0.02 per 100,000 inhabitants); the female population represents 63% of reported cases. Since 2006 it has been observed that the peak of reports is recorded in the months between June and October, probably in correlation with the increase in outdoor activities [1-16].

Case Report

P.I.S., female, 93 years old (SAPS 51 - MA 48% - 45 days of hospitalization in ICU).

Tetanus infection contracted in the garden where she got wound from a thorny shrub with continuous solution in the right leg. It is also likely that she contracted it indirectly from wild boars or foxes that usually come near at night in the garden. This opens the epidemiological theme of the demographic increase of wild animals.

Clinical history

Great elder patient without disabling organ pathologies, except for a mild arterial hypertension in pharmacological therapy cerebral vasculopathy. Two weeks after injury to the leg in the garden, progressive development of dysphagia, dysarthria that progressively transform into generalized hypertonic crisis with facial trismus, opisthotonus and sympathetic hypertonus with worsening of respiratory insufficiency. So, we faced with the physiological reduction of the functional reserves of organ and systems and with an acute pathology with high mortality/morbidity.

Pathology that according to literature data would require 4 to 8 weeks of ventilation. SAPS II was high. The following therapeutic strategy was therefore immediately undertaken: early tracheostomy associated with conventional mechanical ventilation to allow not only good control of the airways and the reduction of barotrauma, but also the reduction of respiratory work. These interventions subsequently allowed respiratory weaning and optimal recovery of respiratory performance both in mechanics and in gas exchange.

Bacteriological monitoring and minimal targeted antibiotic support. Total parenteral nutrition. Laboratory examinations reduction. Martial therapy and erythropoietin.

Prevention and early treatment of decubitus. Early passive mobilization (when the patient was still sedated and curarized) from the 4^{th} week of entry in ICU.

This allowed: in the third week of ventilation weaning from myorelaxant and switch to baclofen; a rapid weaning from ventilation and from the respiratory prosthesis. During the 45 days of hospitalization, the patient was never transfused with blood products.

This multiple approach made possible to treat all the problems related to the patient's prolonged stay in the ICU promptly and early.

ICU Stay

Sent chemical tests in the laboratory titration tetanus antitoxin antibodies.

IOT Ø 7.5 and mechanical ventilation for respiratory failure and hemodynamic monitoring.

Right subclavian cannulation was provided for multi-way CVC.

Two days after, percutaneous tracheostomy Ø 7; NPT was undertaken.

Sedation and muscles relaxation (with TOF monitoring) for about 3 weeks then progressive weaning from drugs by imbricating Baclofen for Os. Subsequent slow but progressive awakening and recovery of neuromuscular function first in the upper limbs then also in the lower ones which remain even less mobile due to reduced range of motion.

E. coli urinary infection treated for 5 days with carbapenems.

Patient was transferred to the rehabilitation ward after 45 days under the following conditions: well-oriented and collaborating; decannulated from tracheo with valid speech, swallowing and general protection of the airways. Expectoration valid.

Breath in O_2 mask. Good hemodynamics without pharmacological supports - diuretic stimulation.

Enteral nutrition with efficient nutritional indexes.

Rehabilitation program of joint mobilization and prevention of damage from bed stay already underway since the first days of hospitalization.

There was still slight hypertonia of the lower limbs, upper limbs 2/5 and lower limbs 3/5 strength deficit.

Mobilized in an armchair, she performed active and passive motor and respiratory physiotherapy.

The final result was a bilateral decubitus in the heels and partial muscle atrophy of the legs which required a long rehabilitation program with valid recovery.

Discussion and Conclusion

General reflections of therapeutic strategy

Could such a case suggest behaviors and good clinical practice in the ICU routine?

Often, especially in acute and severe clinical pictures, the "Time" factor turns out to be decisive. That is, this "Time" factor should be interpreted as one of the most important "drugs" of the ICU. Early interventions and procedures are often decisive in blocking or slowing down the rapid evolution of the clinical picture. Another key element is the rapid clinical and instrumental evaluation of the organ reserves which will allow to avoid further complications and prevent multiorgan failure.

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