

The burden of morbidity in polytrauma

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Abstract

Background Trauma is a leading cause of death, hospitalization and disability for all ages under 45 years. The development of complications in the clinical course could make management more complex and worsen the outcome. We evaluated our polytrauma patients with a view to elucidating the pattern of morbidity and mortality in our practice.

Methods: We prospectively studied the patients presenting to our institution with polytrauma over a one year period. Those who incurred any complications or died in the course of their management were extracted and studied. Survivors were followed up to the point of discharge and for two or three subsequent outpatient follow up visits.

Results 131 patients presented over the study period out of which there were complications in 27 patients (20.6%). The most common complications were wound infections

particularly in patients with compound extremity fractures. 80% of the deaths occurred in patients with severe head injury. Mortality was 10(7.6%) all had associated severe head injury.

Conclusion Infectious complications predominate in patients with polytrauma while head injury accounts for most of the mortality among patients presenting to the hospital. A more energetic management of these injuries is advocated as a way of reducing the morbidity and mortality associated with polytrauma.

Keywords: injuries, morbidity, mortality, polytrauma, trauma.

Highland Med Res J 2014;14(1):9-11

Introduction

Trauma is the leading cause of death, hospitalization, and both short and long term disability for all ages from the end of the first year to the 45th. The greatest contributor to the aetiology of trauma worldwide is the Road Traffic Collisions², but others include gunshots, falls from heights, assaults, sports and recreational injuries and the increasing spates of violent conflicts in our environment. The burden of trauma is higher in developing countries because even though these have a lower volume of vehicular traffic, they have much higher road traffic accident rates³. Complications in a traumatised patient could result in higher occurrence of adverse outcome indices including prolongation of hospital stay, mortality and short and long term disabilities as well as increased cost of treatment¹. This study investigates the frequency and pattern of occurrence of complications among our polytrauma patients and compares those patients

with complications against those without for outcome parameters.

Materials and Methods

We prospectively studied the patients presenting to our institution, the Jos University Teaching Hospital, Nigeria, with polytrauma over the one year period between July 2002 and June 2003. For the purpose of this study, polytrauma was defined as the presence of significant injury involving two or more systems or two or more organs in the same system. Initial care was according to the Advanced Trauma Life Support protocol of the American College of Surgeons. Definitive care was based on individual injuries. Patients were admitted and followed up to discharge. Information about the patients were entered into a proforma and analyzed using the Epi Info 2005 version 3.4.3 statistical software. Information gathered included demographics, type of injury, treatment and outcome. This paper focuses on the pattern of morbidity and mortality of the patients.

Results

One hundred and thirty-one patients presented over the study period. The age distribution ranged between 2 and 61 years with a mean of 28.4±12.4. There were 103 males and 28 females, 78.6% and 21.4% respectively. Road traffic accident was the most

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common cause of injury in 113 (86.3%) patients followed by falls in 7 (5.3%), gunshots in 5 (3.8%) and civil unrests in 3 (2.3%) respectively. The mean duration of hospital stay was 23.5% days \pm 33.8SD and the mean ISS was 17.4

Thirty complications were encountered in 27 (20.6%) patients. The most frequent was wound infection in 10 (7.6%) of the patients. It complicated five compound fractures, three external soft tissue injuries and one penetrating chest injury. Bedsores and urinary tract infections occurred in 4 (3.1%) patients each. All the bedsores occurred in patients with spinal cord injury. Two patients developed chest infection (1.5%). Both had suffered blunt chest injury. Overall, infective complications accounted for 20 (15.2%) complications. Of the non infective complications, the most common were related to pregnancy in 4 (3.1%) of the patients. Other complications encountered are listed in Table 1.

The mean age of those with complications was 28.8 ± 12.8 years compared to 27.3 ± 10.9 years for those without, $p=0.6$. There was no significant association between sex and occurrence of complications (OR = 0.722, 95% CI 0.27-1.93). The mean ISS was 17.4 ± 10.5 for those with complications compared to 17.2 ± 7.7 for those without, ($p=0.9$). Complications were more frequent among patients who sustained injury to the head and neck region compared to those who sustained injuries to other parts of the body ($X^2 = 7.65$, $p = 0.02$). Patients who had complications had significantly longer mean lengths of hospital stay (45.9 ± 52.2 days) compared to those who did not (17.8 ± 23.2 days), $p = 0.001$. Only two (1.5%) patients with complications died in the study.

Table 1. Complications in polytraumatised patients at Jos University Teaching Hospital

Complication	Frequency	Percentage
Infective		
Wound infection	10	7.6
Bed sores	4	3.1
Urinary tract infection	4	3.1
Pneumonia	2	1.5
Septicaemia	1	0.8
Non infective		
IUFD	2	1.5
Premature delivery	2	1.5
Others	5	4

NB: others include acute renal failure, acute heart failure, vesicocutaneous fistula, traumatic iritis and arthritis.

Discussion

The age and sex distribution of our patients is in keeping with the epidemiology of trauma generally,

being predominantly a disease of young males¹. The most common cause of trauma was the road traffic collision. Young people are the mobile and productive segment of the society and this explains why they are predominantly involved in trauma. Polytrauma is challenging enough to manage, and management is made more difficult by the development of complications.

Thirty complications were seen in 27(20.6%) patients. Broadly, the complications fell into the infective and non infective categories. The infective complications predominated. This is in keeping with a study from Lagos which showed a predominance of infective morbidities among polytraumatized patients with complications⁴. Generally, Infective complications following trauma occurs in about 25 % of cases⁵. The lower incidence of infection in our study is because of the lack of sophisticated critical care, with fewer patients having ventilator associated pneumonia (VAP) and catheter related blood stream infections (CRBSI). These are common complications of prolonged mechanical ventilation and invasive monitoring of the patients in sophisticated critical care units.

Infection in the trauma patient may occur for a number of reasons. Firstly, all open wounds naturally break the normal epithelial and mucosal barrier to pathogens and lead to direct inoculation. Secondly, the metabolic response to trauma is immunosuppressive, with depression of both cellular and humoral immunity^{6, 7}. The elevated blood glucose following trauma, itself a part of the metabolic response, not only increases the risk of infection but also confers higher susceptibility to an adverse outcome and tight glycaemic control in trauma is known to reverse these susceptibilities⁸. During the process of care, hypothermia, from exposure of the patient and infusion of cold fluids, produces vasoconstriction which impairs blood flow and increases the risk of infection⁹. In addition, the chaos of the emergency response often leads to inadequate attention to the principles of asepsis especially in mass casualty situations².

Another major cause of infections is blood transfusion which carries a strong predisposition that increases with the number of units transfused¹⁰. Subsequently, urinary tract infections may result from prolonged urethral catheterisation, urethral instrumentation or prolonged recumbency while pneumonias may complicate lung contusions, could be due to endotracheal intubation with mechanical ventilation (VAP) and maybe orthostatic in origin. Pressure sores are mechanical in origin but invariably become infected and occur in patients with prolonged immobilization¹¹. Infectious

complications are a burden in severely injured patients, occur early in the critical care stay and carry significantly worse outcomes. Infection in trauma patients are known to be associated with increased progression to multiple organ failure (MOF), increased critical length of stay and increased hospital length of stay¹².

Of the non-infective complications, there were two intrauterine fetal deaths and two premature deliveries. Trauma is fairly common in pregnancy¹³ and may result in adverse maternal or fetal outcomes. A study from South East Nigeria found abortion and preterm delivery to be the most common complications of trauma in pregnancy¹⁴ and this is similar to our finding.

We did not observe any statistically significant association between in the age, sex or ISS with complications, this may be because of the near homogeneously young male population and again, a limitation due to the small sample size of our study. Higher ISS scores have been associated with higher morbidity and mortality but our study may have been limited by its relatively small size.

There was a nearly threefold increase in length of hospital stay between those polytrauma patients with complications and those without. This is in agreement with studies of infective complications in severely injured trauma patients¹². Such prolonged hospital stays also worsen the risk of complications (like nosocomial infections and deep venous thrombosis with pulmonary embolism). It also has major implications for the burden of costs of trauma. A longer duration of hospital stay would not only translate into higher hospital costs, but also greater costs in terms of loss of income, and other indirect costs such as those of loss of income of care givers, and cost to the institution. The finding of mortality predominantly among head injured patients is in keeping with our earlier finding of increased ISS, morbidity, mortality and length of hospital stay in severely head injured patients compared to polytraumatised patients without severe head injury¹⁵.

We conclude that complications are common in polytrauma, particularly the infective ones and are associated with increased length of hospital stay. We recommend a strict adherence to the principles of asepsis, meticulous infection surveillance and aggressive rational treatment to mitigate the consequences. Female trauma patients in the

reproductive age group should be screened for pregnancy and presence of pregnancy factored into patient management to avoid preventable obstetric complications such as premature delivery and foetal wastages. Other complications should also be sought early and treated.

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