

## MORTALITY ANALYSIS OF A SURGICAL UNIT

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*The progress in surgery has largely been due the recent emphasis on audit and analysis. This has become the cornerstone of evidence - based medicine. We retrospectively analyzed data for the year 2002 with the view to determine the rate and causes of mortality in our general surgical unit. In a total of 2771 admissions, 173 patients expired. The most frequent group was trauma and the most frequent cause was burn i.e. 34.1%. The burnt patients were predominantly females. FAI and stabs also figured prominently. Among them 52.1% patients had septicaemia resulting in multi-organ system failure as the final common pathway. With our current analysis we were able to establish guidelines in the subsequent year, which helped us achieve a better patient care and a resulting lower mortality. Hence we conclude that recording and analyzing mortality is a way of testing the diagnostic and therapeutic efficacy in a quest for a high quality of care.*

### INTRODUCTION

Surgery is a very rapidly advancing field. Developments have occurred in technology, anatomical knowledge and surgical techniques. This allows us to use many new treatment modalities, however the question is; are they always better than the old treatments? To answer this question we need to continuously analyse mortalities, as their analysis is a major component of this audit<sup>1,2</sup>. By analyzing the mortalities, we hope to identify the major reasons of death in a surgical ward<sup>3</sup>. Then we can devise strategies to preempt and hence prevent the terminal events leading to the expiry of any given patient.

The audit of mortality also helps us in many other ways. First we can install our preventive strategies and allocate appropriate resources in terms of manpower and equipment where they are most critically needed instead of wasting them on diseases, which occur rarely in our population. Secondly, analyzing the deaths in our wards helps us tailor our undergraduate and postgraduate curricula<sup>4</sup>. Our trainees will know more about the disease that actually occurs in our society such as tuberculosis, which are only briefly dealt with in most standard textbooks.

Thirdly we can compare our mortality results with other centers and also with our own previous records to see if we are performing as well as other comparable centers or not<sup>5</sup> or if we have improved ourselves or not.

In this paper we present the analysis of the mortality of a general surgical unit for one year.

### PATIENTS AND METHOD

The present study includes all the patients admitted to the South Surgical Ward, Mayo Hospital, Lahore from 1<sup>st</sup> January, 2002 till 31<sup>st</sup> December, 2002. The hospital records of these patients for the year were examined. Out of all the admissions for one year, we have extracted the detailed data of all the patients who expired. All patients who stayed in the ward for a short stay of less than 6 hours were excluded as were those patients who presented to emergency and needed immediate CPR i.e. those who were declared dead on arrival. A standardized proforma was designed to collect data about the expired patients emphasizing on the cause of deaths and the events leading to it. We were greatly helped in this by our computerized database of patients where we record all the patients' data.

This data was analyzed using Microsoft Excel. And the results thus generated were tabulated for review.

### RESULTS

During this period in question a total of 2771 patients were admitted in the South Surgical Ward. 1903 (68.7%) of them were admitted through the emergency and the rest via OPD. Out of these 173 patients expired. So our mortality rate was 6.2%.

Amongst the patients who expired 89 (51.4%) were males and 84 (48.5%) were females. This is disproportionate to the 1695 (61.1%) male admissions during the same period. The average age overall was 37 years while that was males was

higher (40.6 years) than females (33.8 years). The minimum age was 2 years: a patient whose transfer to the pediatrics emergency was not justified in view of his extreme shock.

The detailed aetiology has been given in Table 1.

**Table 1:** *Diagnosis at admission.*

Admission Diagnosis (N = 170)	Number of Patients *(173)	Percentage (%)
<b>TRAUMA</b>		
Burns	59	34.1
FAI	17	10
Road Traffic Accident	8	4.5
<b>NON TRAUMA</b>		
Blunt Trauma	5	2.9
Cutthroat Injury	1	0.58
<b>Peritonitis</b> (Misc Origin)	13	7.6
<b>Peritonitis</b> (Tuberculosis)	7	4.0
<b>Peritonitis</b> (D U Perforation)	5	2.9
Malignancy	10	5.7
Intestinal Obstruction	10	5.7
Abscess (Including Liver Abscess)	7	4.0
Gas Gangrene	3	1.8
Oesophagus Related	3	1.8
Thrombosed Piles	2	1.1
Toxic MNG	2	1.1
Septicemia of Unknown Origin	2	1.1
Strangulated Incisional Hernias	2	1.1
Necrotizing Fasciitis	2	1.1
Peripheral Vascular Disease	1	0.58
Miscellaneous	14	8.1

The most common single aetiology was burns. 34.1% mortality was from this cause alone. Percentage of burns varied from 30% to 100%. The overall average being 68.4% of the body surface area. Among them 37 (62.7%) of the burn mortalities were females. This reflected the prevalent evil of female immolation by the in-laws. Males were

usually involved in work related or industrial accidents.

The second most common cause was again from trauma group: firearm injury. Among them 17 (10%) patients had firearm injuries. These ranged from single low velocity bullet to semiautomatic weapons.

Trauma (90 patients) as a group marginally exceeded the non-trauma (83 patients) group. However there was a wider diversity of diagnoses in non-trauma group. 25 (14.4%) patients had peritonitis at the admission diagnosis. Subsequent exploration divided them into three groups: tuberculosis (7 patients), duodenal ulcer perforation (5 patients) and miscellaneous (13 patients) which included typhoid perforation, caecal perforation etc.

We lost 10 patients (5.7%) to malignancy, 6 were females. All patients had advanced metastatic tumours, which were irresectable. Tumours involved duodenum, stomach, breast, colon, gall bladder, liver and cervix.

92 patients (53.1%) succumbed directly or indirectly to septicaemia. Only two patients among the burn victims died of respiratory failure; rest all died of SIRS because of septicaemia. Among the distinct categories of septic patients, we saw a better control for necrotizing fasciitis where only 2 (1.1%) expired, out of a total of 18 patients received. Gas gangrene however resulted in 3 (1.8%) expiries. Strangulated hernias were responsible for two expiries.

## DISCUSSION

The patient management is a very critical issue. It is literally a matter of life and death. Hence the pertinent questions to be raised are: is the quality of care what it should be and are they doing as well as the other comparable centers<sup>6</sup>. These questions may only be answered if an effective system of audit is in place. Since the inception of an effective audit and analysis system in Scotland the mortality figures have continued to fall<sup>7</sup>. The current analysis is a step towards this very direction. We at South Surgical have developed a computerized database enabling us to access and search that data. Thus we have been able to generate a start at audit. This could serve as a pointer to all others who are currently not moving in this direction.

The mortality rate was held to a very reasonable figure of 6.2%. This is still high compared to international figures<sup>1</sup>, however it is understandable in view of the situation prevalent in our hospitals.

As in olden times septicaemia has returned with force. We had more than half of the expiries due to direct or indirect result of septicemia. Aside from the burn victims, in 35 (20.2%) patients sepsis could not be controlled despite repeated explorations and / or debridements and culture directed antibiotic therapy. The well - recognized cycle of systemic inflammatory response syndrome leading to multi-organ failure was the final common pathway.

The lack of effective accident prevention strategies in our social setup lead to an inordinately high number of trauma victims. In a series from Leeds; for trauma patients below the age of 65 years, they found the most common cause of death to be multi-organsystem failure while in the elderly, pneumonia predominates followed by heart failure and myocardial infarction<sup>8</sup>. In our center more than half of the mortalities were due to trauma. And this despite the fact that the typical trauma victim is a young healthy adult male with no co-morbidities. This is the result of a total disregard of safety precautions.

Among the 59 burn victims most had greater than 50% burnt surface. The upper limit for saving a burn victim appears to be less than 30% of body surface area with full thickness burns. However the need is to develop a system of achieving a substitute skin cover in patients with extensive burns to prevent the overwhelming sepsis that eventually leads to mortality. This is one area that needs to be addresses on an urgent basis.

Regarding the two deaths from strangulated hernias, it has been shown that, death in a surgical ward or within 30 days of surgery for patients with an inguinal, femoral or incisional hernia occurs in an elderly, unfit population<sup>9,10</sup>. This was the case with our patients both of whom died of the consequences of pushing massive hernial contents back in the abdomen. The Scottish Audit of Surgical Mortality Report suggest that elderly patients if ASA 3 or greater undergoing hernia surgery should

be anaesthetized and operated upon by consultant staff within normal working hours for best outcome<sup>11</sup>.

With our current analysis we were able to establish guidelines in the subsequent year, which helped us, achieve a better patient care and a resulting lower mortality. Hence we conclude that recording and analyzing mortality is a way of testing the diagnostic and therapeutic efficacy in the quest for a high quality of care<sup>6</sup>.

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