

Assessment of 1 Month Mortality for Patients Admitted in the Surgery Emergency: A Retrospective Analysis

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ABSTRACT

Introduction: During the weekend periods, the healthcare systems organize services differently in comparison to week days, and there is some evidence that this may affect the quality of care and the outcomes of patients. Association of weekend admission with unmeasured increased patient risk profile is unknown. Whether the reported increased weekend mortality affects emergency or elective admissions or both has not been addressed properly and clearly by the past studies. Hence; we assessed the 1 month mortality for patients admitted in the emergency for surgical procedures.

Material and methods: Data was collected from various government and private hospitals in Lucknow, U. P. (India). Charles scores were obtained by converting the co-morbidity data using weightings employed by the hospital standardized mortality ratio. The mortality outcome of interest was in-hospital death within 30 days of admission. Estimation of age at the time of admission along with other clinical and demographic details was done with the help of available data. Other details were also recorded like time to procedure from admission, day of procedure, and day of in-hospital death. All the results were analyzed by SPSS software. Pearson's χ^2 test and one way ANOVA were used for assessment of level of significance.

Results: A total of 4060 emergency surgical admissions were enrolled for the present study. Data record of a total of one and a half percent was missing. More than 3 percent of admissions died within 1 month of their admission. More than 17 percent of the admissions were on Monday that formed the maximum number of emergency admissions while lowest number of emergency admissions occurred on Saturday or Sunday. Differences were observed in the individual baseline characteristic of the patients admitted in the emergency ward.

Conclusion: Great variation exists in the structure and processing characteristic of the tertiary health centres with significant risk associated with general surgery emergencies.

Keywords: Emergency, Health care, Surgery, Weekend

INTRODUCTION

During the weekend periods, the healthcare systems organize services differently in comparison to week days, and there is some evidence that this may affect the quality of care and the outcomes of patients.¹⁻⁴ Therefore, for the improvement of the outcomes, identification and quantification of increased weekend mortality is necessary which may further promote the redesign of healthcare services. An increased risk of death has been identified by a number of studies with weekend emergency admissions in the UK, and Spain.^{5,6} Admissions in the hospital for acute causes at the weekend time have been reported to be significantly associated with higher risk of deaths in various studies in Canada. In US also, such association has been cited in the literature for acute myocardial infarction, for acute kidney injury and an increased neonatal mortality among teenage

mothers giving birth during the weekend compared with mid-week days.⁶ However, despite these reports, several questions remain unanswered. Association of weekend admission with unmeasured increased patient risk profile is unknown. Past few studies have not clearly addressed the fact that whether emergency admissions are affected by weekend mortalities or not.⁸⁻¹² Hence; we assessed the 1 month mortality for patients admitted in the emergency for surgical procedures.

MATERIAL AND METHODS

Data was collected retrospectively from government and private hospitals in Lucknow, U.P. (India). From 1 January 2010 to 31 December 2014 data were requested for all emergency admissions under a general surgeon. In between 2000 to 2014 the cohort comprised all patients aged 16 years or more who were admitted under a general surgeon as an emergency to all acute hospitals. Ethical clearance was taken from the institutional ethical committee and written consent was obtained from the subjects after explaining them in written the entire research protocol. Working day admissions have been defined as those admissions that were done from Monday to Friday while weekend admissions have been defined as those which take place on Saturday and Sunday. Index of Multiple Deprivation (IMD) scores were derived by conversion from postal codes with the help of online postcode conversion tool 15 and then converted to deprivation quintiles. Thirty seven indicators across 7 of the main domains are used for the derivation of the IMD. At the lower super output area levels, these IMD are used for ranking the data zones. With the help of weights chosen by the mortality ratio of the standardised hospital protocols, Charlson scores were derived from co-morbidity data. The mortality outcome of interest was in-hospital death within 30 days of admission. The data provided enabled calculation of age at admission, day of admission, duration of hospital stay, and time to procedure from admission, day of procedure, and day of in-hospital death.

STATISTICAL ANALYSIS

SPSS software was used for evaluation of all the results. Pearson's χ^2 test and one way ANOVA were used for assessment of level of significance.

RESULTS

A total of 4060 emergency surgical admissions were enrolled

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| Parameters | | Mon | Tues | Wed | Thurs | Fri | Sat | Sun | p-value |
|-----------------------------|--------|------|------|------|-------|------|------|------|---------|
| Age (years) | | 54.8 | 52.6 | 53.1 | 46.8 | 52.7 | 54.2 | 56.6 | 0.101 |
| Admissions (%) | | 18.5 | 13.5 | 13.5 | 15 | 15.5 | 12 | 12 | 0.001* |
| Sex (%) | Male | 42.5 | 43.8 | 44.5 | 47.5 | 49.2 | 41.5 | 46.8 | 0.001* |
| | Female | 57.5 | 56.2 | 55.5 | 52.5 | 50.8 | 58.5 | 53.2 | |
| Charlson co-morbidity score | 0 | 38 | 32 | 38 | 33 | 39 | 31 | 32 | 0.001* |
| | 1- 4 | 34 | 32 | 31 | 34 | 37 | 35 | 34 | |
| | ≥5 | 28 | 36 | 31 | 33 | 24 | 34 | 36 | |
| Operation | Yes | 16 | 18 | 12 | 17 | 16 | 15 | 11 | 0.001* |
| | No | 84 | 82 | 88 | 83 | 84 | 85 | 89 | |

*: Significant

Table-1: Baseline characteristics of patients admitted as an emergency under a general surgeon, by day of admission

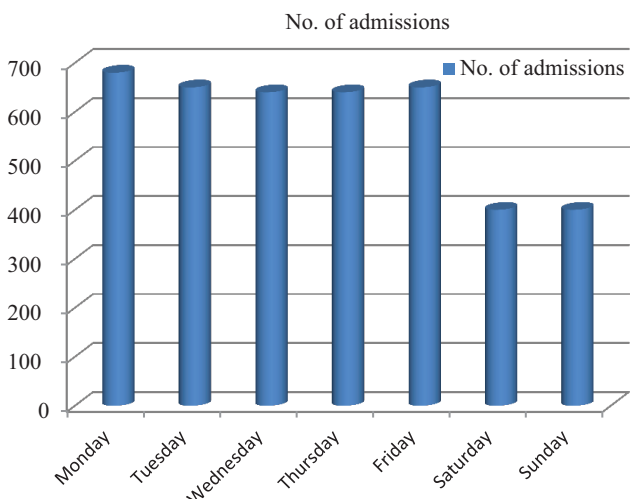


Figure-1: Total number of general surgical admissions by day of the week.

for the present study in tertiary health care centre. Data records were available for 4000 cases and included in the principal analyses. Data record of a total of one and a half percent was missing. More than 3 percent of admissions died within 1 month of their admission. In 600 individual patients, general surgical operations were undertaken out of which more than 5 percent of the individuals died. More than 17 percent of the admissions were on Monday that formed the maximum number of emergency admissions while lowest number of emergency admissions occurred on Saturday or Sunday (Figure-1). Differences were observed in the individual baseline characteristic of the patients admitted in the emergency ward (Table-1).

DISCUSSION

High risk of poor post-operative outcomes has been associated with patients undergoing emergency general surgery, especially those undergoing intra-abdominal operations.^{13,14}

One of the topics of growing concern in today’s world of medicine is the difference in the opinion of the quality and type of care provided in the emergency department of the hospitals.^{15,16} National Institute of Academic Anaesthesia’s Health Services Research Centre hypothesis various structural variations in the provisions which categorizes the emergency lines of treatments for the surgical patients. The secondary outcome measure was 3 months mortality rate while 1 month mortality rate was a primary outcome measure.^{17,18} Hence; we assessed the 1 month mortality for patients admitted in the emergency for surgical

procedures.

From the present study, we observed no increase in mortality in patients admitted under emergency general surgery over the weekend when appropriate co-variables are accounted for. Sicker patients are admitted at the weekend and care processes less effective; however, this findings was not significant in the present study. From the data, it was analyzed that significantly younger patients were admitted at the weekend and had minimal values for the Charlson scores of co-morbidity. With the help of grouping of clinical risks, judgment of lower etiologic severity was done which further suggested that in comparison with patients admitted on week days, patients admitted on weekends were comparatively less sick. Aldridge et al examined the preliminary associations between specialist intensity and weekend admission mortality across the English National Health Service. They observed that 27 of 141 eligible acute hospital trusts participated with no significant association between Sunday to Wednesday specialist intensity ratios and weekend to weekday mortality ratios. From the results, they concluded that no correlation exists between weekend staffing of hospital specialists and mortality risk for emergency admissions.¹⁹ The impact of specialist care might be modified by variation in other staff levels and support services in hospital (junior doctors, diagnostics, pharmacy, allied health professionals, clerical or administrative services), or in community and social care. The need for a system-wide approach is supported by evidence that hospital-care processes are unreliable at weekends;²⁰⁻²³ that more (or more skilled) nurses are associated with better outcomes; and that in surgical settings, failure to rescue (ie, the inability of the system to respond promptly to patient deterioration) not only explains the difference in outcomes between high and low volume centres, but also the difference in outcomes from patient safety incidents for patients admitted at weekends compared with weekdays.²⁴⁻²⁸ Mohammed et al retrospectively analyzed routinely collected acute hospital admissions in England and concluded that for dying in hospital and this risk is more pronounced in the elective setting, weekend admission appears to be an independent risk factor.²⁹

CONCLUSION

From the above results, it can be concluded that great variation exists in the structure and processing characteristic of the tertiary health centres with significant risk associated with general surgery emergencies. Future studies are recommended.

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