Original Research Article

To study the usefulness of other parameters (Oxygen saturation, Random blood glucose, Serum creatinine, Delay in presentation to Hospital) in assessment of mortality and morbidity risk

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Abstract

Background & Method: The study was carried out in the Department of General Surgery, Arogya Sadan Hospital, Jhansi, Uttar Pradesh. Study has included patients those were admitted in the department of Surgery and underwent Exploratory Laparotomy within 24 hours of admission. **Result:** Average random blood glucose level in patients who died and who survived was 152.8 g/dl and 131.3 g/dl respectively. Average serum creatinine level present in patients survived was 1.67 mg/dl and 2.42 mg/dl in patients who died. Mean oxygen saturation in patients who died and who survived was 94.3% and 96.1% respectively. Mean delay in presentation to admission in hospital in survival group was 2.04 days and in patients who died was 2.89 days. **Conclusion:** We concluded that Both serum creatinine level and blood glucose level were high in mortality group, proving it to influence the outcome of surgery. Similarly, Oxygen saturation at the time of induction of anaesthesia and delay in presentation to the hospital, since the initiation of symptoms limits the final outcome.

Keywords: Serum creatinine, Mortality, Morbidity & Blood Glucose.

Introduction

In a study at Jabalpur involving 788 patients nearly 70% patients (529 out of 788) were in the low-risk group (predicted risk of mortality <10% and predicted risk of morbidity<40%).This group showed very poor fit, with O:E ratio of 0.27 for mortality and 0.65 for morbidity by POSSUM analysis and 0.54 for mortality by P-POSSUM analysis[1]. Given this poor fit, the need for a correction factor was identified and multiple logistic regression analysis was done[2]. A correction factor of 0.257 for mortality and 0.619 for morbidity for POSSUM risk group was obtained as correlation coefficient. After applying this correction factor, Jabalpur

Emergency laparotomy is one of the most common major procedures performed in emergency. It is important to know the risk of morbidity and mortality in patient undergoing emergency laparotomy, as these patients are associated with co-morbidities. Emergency laparotomy is a common procedure and has a mortality rate considerably greater than that of elective laparotomy[3]. It is estimated to be as high as 10-55 %.

In older patients abdominal pathology more often presents acutely and mortality is greater than that in younger patients. As patient gets older coincident disease are more common[4]. Even if there is no evidence of any disease there may well be a decrease in physiological reserve. The initial disease that requires surgery may be complicated by tissue hypo perfusion and acidosis from vomiting and loss of fluid in to the gastrointestinal tract, or bleeding. Patients may be malnourished or cachectic after prolonged illness[5]. A majority of the patients had poor nutritional status on admission. With the onset of acute emergency, there is a significant relation of nutritional status with disease severity, morbidity and mortality.

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Material & Method

The study was carried out in the Department of General Surgery, Arogya Sadan Hospital, Jhansi, Uttar Pradesh from July 2016 to June 2017. Study has included patients those were admitted in the department of Surgery and underwent Exploratory Laparotomy within 24 hours of admission.

Patients selection criteria

All patients who were admitted in Department of General Surgery, Arogya Sadan Hospital, Jhansi.

Protocol for workup

A working proforma sheet, containing patient's demography, variables form history, clinical examination, investigations, operation undergone and outcome, was designed. Physiological data were collected at the time of induction of anaesthesia, and operative data were collected at the completion of operation. Operative severity score was graded according to the guidelines provided by Copeland et. al. in his original article[1]. Since all surgical procedures were not listed, therefore closest was selected.

Results

Table 1: Comparison of expected and observed mortality using POSSUM mortality equation

Range of risk (%)	No. of patients	Mean Risk (%)	Expected Mortality	Observed Mortality	O:E Ratio
1-20	77	10.36	7.97	0	0.00
21-40	18	26.22	4.71	1	0.21
41-60	6	52.00	3.12	4	1.28
61-80	6	70.83	4.24	4	0.94
81-100	0	00.00	0.00	0	0.00
1-100	107	18.75	20.06	9	0.44

For all patients mean mortality risk as calculated by POSSUM was 18.75%. Expected and observed mortality was 20.06 and 9 patients respectively. 77 patients were having mortality risk in between 1 to 20%, with mean risk of 10.36% corresponding to expected mortality in 7.97 patients but no patient observed mortality. 6 patients were present in a mortality risk group of 41-60% and 61-80% corresponding to expected mortality in 3.12 and 4.24 patients. Total 4 patients died in each group. 18 patients were present in 21-40% risk group having mean risk of 26.22%. Expected and observed mortality in this group was 4.71 and 1 respectively.

Table 2: Comparison of expected and observed mortality using P-POSSUM mortality equation

Range	Frequency	Mean Risk (%)	Expected P-POSSUM Mortality	Observed P-POSSUM Mortality	O:E Ratio
1-20	95	3.07	2.91	1	0.34
21-40	7	33.14	2.31	4	1.73
41-60	3	52.00	1.56	2	1.28
61-80	2	65.00	1.30	2	1.53
81-100	0	00.00	0.00	0	0.00
1-100	107	8.52	9.11	9	0.98

For all patients mean mortality risk as calculated by P-POSSUM was 8.52%. Expected and observed mortality was 9.11 and 9 patients respectively. 95 patients were having mortality risk in between 1 to 20%, with mean risk of 3.07% corresponding to expected mortality in 2.91 patients but only 1 patient observed mortality. 7 patients were present in a mortality risk group of 21-40% corresponding to expected mortality in 2.31%. Total 2 patients died in this group. 3 patients were present in 41-60% risk group having mean risk of 52.00%. Expected and observed mortality in this group was 1.56 and 2 patients respectively. 2 patients were present in 61-80% group with mean risk of 65% and observed and expected mortality of 2 and 1.30 patients respectively.

Table 3: Comparison of mean Random Blood Sugar (RBS), Serum Creatinine, Oxygen Saturation, and delay in presentation in patients who died and who survived

	Average RBS value (g/dl)	Average Serum Creatinine (mg/dl)	Average Oxygen Saturation (%)	Delay in presentation (in days)
Patients Survived	131.3	1.67	96.1	2.04
Patients Died	152.8	2.42	94.3	2.89

Average random blood glucose level in patients who died and who survived was 152.8 g/dl and 131.3 g/dl respectively. Average serum creatinine level present in patients survived was 1.67 mg/dl and 2.42 mg/dl in patients who died. Mean oxygen saturation in patients who died and who survived was 94.3% and 96.1% respectively. Mean delay in presentation to admission in hospital in survival group was 2.04 days and in patients who died was 2.89 days.

Discussion

Campillo-Soto A et. al. studied 105 patients including 24 patients who underwent emergency laparotomy and 81 underwent elective surgery. When the observed results for mortality were compared with those predicted by the POSSUM scoring system, no significant differences were observed in the analysis by risk groups, except in the risk group < 20 %, in which the POSSUM scale overestimated mortality[6]. The risk of morbidity was underestimated by the POSSUM scale in the risk group < 20 %. He concluded that POSSUM scoring system is a useful predictor of morbidity and mortality in patients undergoing emergency and elective laparotomy[7].

Average Serum creatinine level, Random blood glucose level revealed higher value in patients who died than in patients who survived (2.42 vs. 1.67; 152.8 vs. 131.3). Average oxygen saturation was 94.3 in patients who died and 96.1 in survival group[8]. Average delay in presentation to the hospital since the initiation of symptoms was 2.89 days in patients who died and 2.01 days in patients who survived.

This study showed that POSSUM is a good method of risk evaluation in patients undergoing emergency laparotomy, in our set up as it predicts mortality and morbidity matched with the observed mortality and morbidity rates. P-POSSUM scoring system is more accurate in predicting mortality[9]. Hence, both POSSUM and P-POSSUM can

be helpful in better management of patients by predicting high risk group and taking necessary steps.

Conclusion

We concluded that Both serum creatinine level and blood glucose level were high in mortality group, proving it to influence the outcome of surgery. Similarly, Oxygen saturation at the time of induction of anaesthesia and delay in presentation to the hospital, since the initiation of symptoms limits the final outcome.

References

1. Edward AE, Seymour DG, McCarthy JM, Crumplin MKH. A5-year survival study of general surgical patients aged 65 or over. Anaesthesia1996; 51: 3-10.
2. Ravindra Singh Mohil, Abhinav Aggarwal, Namrata Singh, Jainendra Arora, Dinesh Bhatnagar. Does nutritional status play a role in patients undergoing emergency laparotomy? 2008; 5; e226e231.
3. Horsham P, N'guyen-Van-Tam JM, Letoquart JP, Pompilio M, HaffafY, Chaperone J, Mambrini A. Predictive factor of morbidity and mortality in coelectomy patients over 75 years of age. Journal Chirgurie Paris 1990; 127; 392-395.
4. W A Knaus. APACHE II system: A severity of disease classification – Vol 13, No. 10; Critical care medicine.
5. Winkel P, Afifi AA, Cady LD, et. al.; Application of statistical technique for assessment of prognosis in patients with acute circulatory failure. J. Chronic. Dis 1971; 24:61.
6. Campillo-Soto A, Flores-Pastor B, Soria-Aledo V, Candel-Arenas M, Andrés-García B, Martín-Lorenzo JG, Aguayo-Albasini JL; The POSSUM scoring system: an instrument for measuring quality in surgical patients; Cir Esp. 2006 Dec; 80(6):395-9.
7. Ceulemans R et. al. Safe laparoscopic surgery in the elderly. The American Journal of Surgery 2004; 187:323-327.
8. McCulloch P et al. Mortality and morbidity in gastro-esophageal cancer surgery: initial results of ASCOT multicenteric prospective cohort study. BMJ 2003; 327.
9. Midwinter MJ et al. Estimation of mortality and morbidity risk in vascular surgery using POSSUM and the Portsmouth predictor equation. Br J Surg 1999; 86:471-474.

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