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Original research article

A Prospective Study on Factors Affecting Morbidity in Patients Undergoing Emergency Abdominal Surgery

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Abstract

Background : Emergency abdominal surgery adversely affects surgical outcomes. Predictors of increased morbidity and mortality of emergency abdominal surgery are known. We determined the predictors of post-operative complications of emergency abdominal surgery. Age, sex, blood urea, serum creatinine, total protein, serum albumin, surgery duration and smoking were independent predictors of morbidity.

Methods : We conducted prospective study at Anugrah Narayan Magadh Medical college and Hospital Gaya, patients who had an emergency abdominal surgery procedure, Study duration of Two Years. Who underwent emergency abdominalsurgery within 12 hours of admission. Our primary outcome was post-operative complications within 30 days.

Results: Of 50 cases 58% had one or more complications with 6% mortality within 30 days. Common complications are surgical site infections and respiratory.

Conclusion : Emergency abdominal surgery patients with post-operative complications are likely to be older, male, smokers, have increased blood glucose and creatinine levels, lower serum albumin levels and longer surgical times. Fluid resuscitation and experienced surgical teams are putative targets to improve outcomes.

Keywords: Emergency, Abdominal Surgery, Factors, Morbidity, Post-operative, Complications.

Introduction

Emergency surgery is defined as non elective surgery that is performed with the aim toprevent morbid or fatal health consequences of a surgically treatable disease.[1,2] Emergency surgical procedures, account for a small fraction of all surgical procedures, butfor a disproportionately large amount of postoperative morbidity and mortality. Globally, millions of people every year require urgent time-critical emergency abdominal surgery to resolve potentially catastrophic small bowel obstructions, gastrointestinal tract perforations, hemorrhage, invasive cancerous tumors, blunt force/penetrative trauma injuries, and peritonitis.[3] Emergency surgical presentation is one such situation where surgeon is faced with therapeutic dilemma. On the one hand, it is clear that most of these patients may have a limited life expectancy, while on the other surgical intervention appears to be unavoidable inthese circumstances. Postoperative outcomes following emergency abdominal surgery are generally poorer whencompared to elective surgery. Over past decade, there has been significant focus on reducing postoperative complications. Despite the focus on quality improvement in surgery, studies continue to show that emergency status contributes significantly to morbidity and mortality in patients undergoingabdominal surgery.[4,5] Advanced age and perioperative conditions like sepsis and dependent functional statusincrease the mortality rate to over 50 %.[6] There is a huge variation in the organization of emergency departments [7,8] and there is limitedevidence regarding the

optimal treatment of patients undergoing emergency surgery [9,10.] The general surgical population is a broad group of patients suffering from a wide range of conditions and existing co-morbidities. Outcomes vary within this very heterogeneous group of patients. The most common emergency abdominal surgical presentation is bowel obstruction, appendicitis, perforative peritonitis and bleeding. Emergency abdominal surgery patients who develop post-operative complications are more likely to be older, male, smokers, have increased peri-operative blood glucose, creatinine levels and lower serum albumin levels.[11] Those patients with complications also incur longer surgical times.[7] Pre-operative intravenous fluid administration to adequately resuscitate patients, tighter glucose control and experienced surgical teams to decrease surgical times are putative targetsto improve outcomes in patients undergoing emergency abdominal surgery.

Objectives

*To determine the factors that contribute to morbidity associated with patients undergoing emergency abdominal surgery.

*To identify the risk factors that are potentially modifiable, which reduce post operative complications of emergency abdominal surgery.

Material and methods

A prospective study of 50 cases of patients undergoing emergency abdominal surgery, All patients coming to Anugrah Narayan magadh medical College and Hospital Gaya, Bihar. in whom, emergency abdominal surgery was done within 12 hours of admission, studied over a period of two years.

Method of collection of data

Patients undergoing emergency abdominal surgery in ANMMCH, over a period of two years. History of patients will be noted. APACHE SCORE calculation will be done. Post operative complications will be noted which include bleeding, Surgical site infection(superficial, deep, organ space), sepsis, urinary(acute renal failure, urinary tract infection), cardiac, respiratory(pulmonary embolism, pneumonia), DVT. Broadly divided into two category i.e, patient with complications and without complicationswith factors which are sex, transfer(from home or other hospital), wound class, ASA class, DVT prophylaxis, antibiotic administration, sepsis, diabetes mellitus, steroid use, COPD, smoker.

Inclusion criteria

All patients undergoing emergency abdominal surgery within 12 hours of admission in Anmmch Gaya, over a period of two years.

Exclusion criteria

*Prior surgery within 30 days.

*Those patients who will leave the study in between, due to any reason.

Age below 12 years.

*Immunocompromised patients

Results

The observations made in the conducted study as it is prospective study and inference were drawn and highlighted in the following pages.

Table 1: Age distribution

	Complications	

AGE	YES	NO	TATISTICALANALYSIS
16-25	1	7	
26-35	2	7	: 21.13, df=5,P<0.01
36-45	5	1	
46-55	5	3	
56-65	9	1	
ABOVE 65	8	1	

Distribution of patients in our study is between 17 to 85 years, among which 19 patients are more than 55years and found to have more postoperative complications compared to young patients undergoing emergency surgery.
The number of male patients are high compared to females 34 (68%) are males and 16 (32%) are females. Chi-square value of 0.61 and was not statistically significant, so postoperative morbidity in relation to sex is not significant.

Table 2: Smoking history with postoperative complications

VARIABLES		NO. OFCASES	COMPLICATIONS	
			YES	NO
SMOKING	YES	26	22	4
	NO	24	16	8

In our study 26 patients were smokers among which 22 had postoperative complications, suggesting higher association between smoking history and postoperative complications. In our study 12 were coolie by occupation, 11 businessmen, 15 farmers and 12 were housewife respectively. Distribution of patients belong to low to medium socioeconomic group.
18 patients presented with perforation (gastro-duodental, ileal), 4 patients with small bowel obstruction , 7 patients with gangrene of ilium and jejunum. Acute appendicitis in 3 patients and strangulated inguinal hernia in 7 patients.

Table 3: Measure of postoperative complications

POST OPERATIVE COMPLICATIONS	NO OF CASES
YES	29
NO	21

In our study 50 patients underwent emergency abdominal surgery among which 29 patientshad postoperative complications.

Table 4: Hb% and postoperative complications

PARAMETERS		COMPLICATIONS		STATISTICAL ANALYSIS
		YESN=29	NO N=21	
HB % (gm/dl)	<11	25	04	$\chi 2$ =22.55, P<0.000
	>11	04	17	

Anaemia is defined as Hb% <11 gm/dl. In our study chi-square value is 22.55 with p-value <0.0000 i.e. higher association between Hb% and postoperative complications is noted.Further from the table lower the Hb% has higher the postoperative complications.

Table 5: RBS and postoperative complications

PARAMETERS		COMPLICATIONS		STATISTICAL ANALYSIS
		YESN=29	**NO N=21**	
RBS(mg/dl)	<180	04	16	$\chi 2$ =19.75, P<0.000
	>180	25	05	

Normal level of RBS is less than 180 mg/dl. RBS more than 180 mg/dl is called as hyperglycemia. In our study 30 patients have hyperglycemia among which 25 patients have postoperative complications, chi-square values is 19.75 and p-value <0.000 i.e. higher association is noted with hyperglycemia and postoperative complications. In our study 32 patients have increased level of creatininei.e>1.4 mg/dl of which 26 patients have postoperative complications. Chi-square value is 19.72 and p-value is <0.000 i.e. significant association between increased level of creatinine and postoperative complications.

Table 6: Serum albumin and postoperative complications

PARAMETERS		**COMPLICATIONS**		**STATISTICAL ANALYSIS**
		YESN=29	**NO N=21**	
SERUM ALBUMIN (mg/dl)	**<3**	27	12	$\chi 2$ =9.17, P<0.005
	>3	2	9	

In our study 39 patients have increased level of creatininei.e>1.4 mg/dl of which 27 patients have postoperative complications. Chi-square value is 9.17 and p-value is <0.000 i.e. significant association between increased level of creatinine and postoperative complications. Chi-square value is 8.836, p-value is 0.0315 i.e. there is higher association between durationof procedure and complication. Further from table it is clear that greater the duration of procedure more is the postoperative complications.

Table 7: Types of complications

TYPE OF COMPLICATION	NO OF PATIENTS	PERCENT
ARF	4	8
MI	1	2
MODS	9	18
SSI	12	24
Bronchitis	1	8
Pneumonia	2	4
No complications	21	42

distribution of postoperative complications. 12 patients have surgical siteinfection (SSI), 9 patients have multiorgan dysfunction syndrome (MODS), 1 patient havemyocardial infarction (MI) and 4 patients have acute renal failure (ARF).

Discussion

In our study 50 patients analyzed of which 34(68%) patients were male and 16(32%)patients were female. In Akinbamiet al[1] 42% were male and 58% were female. The patients in our study underwent emergency abdominal surgery were Appendectomy 3 (6%), Gastro-Duodenal ulcer perforation closure 7 (14%), Ileal Perforation closure 11 (22%), Hernia surgery 7 (14%), Laparotomy with Adhesiolysis 4 (8%), Haemoperitoneum due to trauma abdomen 10(20%). Most of patients were Ileal perforation and Haemoperitoneum dueto trauma abdomen. Post operative complications inour study were identified in 29 patients (58%), in Akinbami etal[1]

202 (24.7%) cases were post operative complications within 30 days of procedure. 30 day mortality in our study were 3(6%) compare to Akinbami et al[1] 73(8.9%). Most common post-operative complications are surgical site infection and followed by respiratory complications. Mortality due to Multiple organ dysfunction syndrome, Acute renal failure, Myocardial infarction, Acute respiratory distress syndrome. Most of patients who underwent emergency surgery were31 (62%) patients less than 55 years and more than 55 years were 19(38%) patients. In out of 19patients who more than 55 years,17 (89%) patients have post operative complications and 2(10%) mortality in this patients. As increasing the age there is increased post-operative morbidity. Patients who underwent emergency abdominal surgery,post operative complications 72% were male and 28% were female, so morbidity is seen in our study more in male. The cause isstill unknown. 26 patients were smokers of which 22 patients have post-operative complications. Smokingcauses reduce collagen synthesis and decreases oxidative killing mechanism of neutrophils. So smokers are increased susceptible for post operative complications.[12, 13] Hyperglycemia is known to have deleterious effect on wound healing. In our study only 30patients had hyperglycemia and of which 25 patients have post-operative complications. Sogood glycemic control reduce the post-operative complications. Increased blood urea when blood urea level more than 45mg/dl, 31 patients had increased blood urea level, 25 patients had post-operative complications. P value is 0.00003 and chi square value is 17.17. So level there is higher association with postoperative complications.Increased blood urea level found in our study possibly due to hypovolemic, so patients maybenefited by adequate intravenous fluid resuscitation. Which reduce the post-operative complications. Serum creatinine level more than 1.4mg/dl is called increased serum creatinene level. 32 patients had increased serum creatinine level, 26 patients had post-operative complications . Chi square value is 19.72 and p-value is 0.000008. So there is higher association between increased serum creatinine level and postoperative complications. Decreased serum albumin and total protein there is higher association with post operative complications (p-value =0.002) . In Golub's et al serum albumin level less than 3 have higherthe post-operative complications. Post-operatively by giving intravenous supplementation of albumin or oral supplementation of protein will improve post-opeartively.[14] It is an effort to decrease mortality rates, precautions should be taken beforehand particularlyto avoid complications observed in geriatric patients considering the high mortality rates observed in late stage complications. For instance, elderly patients with common conditions,such as acute cholecystitis incarcerated hernia, can be offered elective surgery to avoid emergency intervention. Keeping systematic disease under control will render surgical operations safer. Britt et al developed an acute care surgery model to decrease time delays to surgery by usingdaytime operating rooms and the experience of the surgeons to improve medical decision making.[15] Earley et al examined effects of this model on outcomes of patients undergoing appendectomies and found in decrease time to surgery, complication rate and length of stay.[16]

CONCLUSION

Concluded that emergency abdominal surgery patients who develop post operative complications are more likely to be older, male, smokers and have increased peri-operative serum creatinine and blood urea levels, and lower serum albumin levels. Those patients who had post operative complications also have longer duration of staying in hospital. This is financial burden to the patients. Preoperative intravenous fluid administration to adequately resuscitate patients, adequate glucose control and experienced surgical teams to decrease surgical times are putative targetsto improve outcomes in emergency abdominal surgery. It is an effort to decrease mortality rates, precautions should be taken beforehand particularlyto avoid complications observed in geriatric patients considering the high mortality rates observed in late stage complications. For instance, elderly patients with common conditions,such as

acute cholecystitis incarcerated hernia, can be offered elective surgery to avoid emergency intervention. Keeping systematic disease under control will render surgical operations safer. Patient-related risk factors should be assessed before surgery, and should be rectified immediately. High risk patients should be operated on by an experienced surgeon, and with proper timing. Postoperative patient care is extremely important. If the risk factors can be predicted early, their number can be decreased, and obviously, the incidence of post- operative complications would be lowered

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