



General Surgery

A STUDY ON PREOPERATIVE PULMONARY STATUS AND ITS EFFECT ON OUTCOME IN PATIENTS UNDERGOING EMERGENCY LAPAROTOMY IN TEERTHANKER MAHAVEER MEDICAL COLLEGE AND RESEARCH CENTRE

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ABSTRACT

Introduction The explorative laparotomy might be carried out like a therapeutic method of operation when the underlying pathology has been determined in certain cases, it might serve to confirm the diagnosis. Several patients had also experienced the long term as well as short term problems post operatively. Following urgent abdominal procedures, postoperative respiratory complications are of great concern. After the abdominal surgery a wide variation among the thickness of the postoperative pulmonary complication has been reported. Those with PPCs have a 30-day mortality rate of 18%, compared to 2.5% for individuals without PPCs. In a recent review the strategies for the optimisation of the patient before and after the operation going through the emergency kind of laparotomy has been emphasized. With the following background this study was conducted to find the incidence of various pre-operative pulmonary diseases in our study group and to determine the various surgical complications, morbidity and mortality in these patients. **Background:** Objective of this study was to evaluate the patient Pre-operatively to ascertain the post operative complication in the patient undergoing emergency laparotomy. As it is a concern with early detection of complications to provide appropriate treatment at right time. **Method:** This study was observational- cross sectional study conducted during an 18 months period on patients presenting to the emergency department of Teerthanker Mahaveer Medical College and Research Centre. Patients were included in the study according to the inclusion and exclusion criteria. **Result:** Duodenal perforation with peritonitis is diagnosed with maximum number of cases (41.6%) followed by Ileal perforation with peritonitis with 30.2% of cases. Patients with pulmonary complications had a significantly older mean age than those without. Out of the total patients, 94.8% of the cases have seen improvement while 4.2% of the cases have expired. **Conclusion:** As a result, early detection and immediate intervention, as well as improved postoperative care, can reduce both morbidity and mortality. Pulmonary risk has been observed in the majority of the cases as compared to the conventional risks.

KEYWORDS :**INTRODUCTION**

An explorative laparotomy is a surgical intervention used to gather information that cannot be found through clinical or diagnostic means. Laparotomy, as used in surgery, refers to the investigation of the abdominal and subsequent steps taken in accordance with the found cause. The explorative laparotomy might be carried out like a therapeutic method of operation when the underlying pathology has been determined in certain cases, it might serve to confirm the diagnosis [1]. These conditions are different from laparotomies carried out for a treatment, where the doctor arranges and performs the therapeutic surgery [1].

Postoperative complications can be explained as "as any negative outcome as perceived by the surgeon or by the patient, and it directly affects the outcome of the disease" [2]. Several patients had also experienced the long term as well as short term problems that included cellulitis, having repeated fever, incisional hernia, disruption in the obstruction of the adhesion bowel, wound dehiscence etc.

Following urgent abdominal procedures, postoperative respiratory complications are of great concern. After the abdominal surgery a wide variation among the thickness of the postoperative pulmonary complication has been reported by Stein et al. [4]. Those with PPCs have a 30-day mortality rate of 18%, compared to 2.5% for individuals without PPCs.

PPCs include acute respiratory syndrome (ARDS), pleural effusions, postoperative hypoxia, bronchiectasis, bronchospasm, lung problems, pulmonary infiltration, aspiration pneumonitis, and pulmonary edema. These can be limited to ones that might need the therapies in the ward including a physical therapy or the antibiotics or can even be referred to the management of patient, reintubation, or even result in death, depending on the severity. PPCs include acute respiratory distress syndrome (ARDS), pleural effusions, postoperative hypoxia, bronchiectasis, bronchospasm, pneumonitis, pleural infiltration, aspiration pneumonitis, and pulmonary edema [7]. These can be limited to self that might need the therapies in the ward including a physical therapy or the antibiotics or can even be admission of the

trauma cases, reintubation, or even result in death, depending on the severity.

One of the main determinants of post-operative morbidity is pre-operative risk factors. There are a various risk factors for respiratory impairment following abdominal surgery, both preoperatively and during the operation. Traditionally, variables such lung disease, older age, upper back surgery, intraoperative sepsis, and overweight have been linked to PPCs. Patient pulmo-operative movement status, cardiovascular, respiration, and malignancy are other reason that affect PPCs. Age, chronic lung conditions, smoking, failure of heart, sleep apnea, obesity, asthmatic, and surgical incision's type, duration taken to operate, anaesthetic method, and urgent type of surgery are physician risk factors that could affect PPCs.

In a recent review the strategies for the optimisation of the patient before and after the operation going through the emergency kind of laparotomy has been emphasized [11]. In an effort to focus resources on the patients those who have to identify for being at the high level of risk for them some efforts were made to carry out the diagnosis for a proper identification of the pulmonary issues that comes after the operation. With the following background this study was conducted to find the incidence of various pre-operative pulmonary diseases in our study group and to determine the various surgical complications, morbidity and mortality in these patients.

METHODS

This study was observational- cross sectional study conducted during an 18 months period on patients presenting to the emergency department of Teerthanker Mahaveer Medical College and Research Centre. Patients were included in the study according to the inclusion and exclusion criteria. All conscious patients between 18 years to 60 years undergoing emergency laparotomy in Teerthanker Mahaveer Medical College and Research Centre were included in the study. Those patients undergoing elective laparotomy, unconscious with suspected brain injury and not willing to participate in study were excluded from the study.

The data was collected using profoma which included the clinical

history, examination findings, and investigations required. Investigations such as X ray chest PA view, Erect and supine X ray abdomen, Haematocrit, Leucocytes count (total and differential), serum electrolytes, serum urea and creatinine, liver function test, CECT/ Plain CT (if required), blood gas analysis (if required) were performed on the participants. The patient was monitored post-operative day seven and his condition is evaluated.

Data was entered on excel sheet Microsoft Excel spread sheet and analysed with the help of statistical Package for social sciences (SPSS). All categorical variables have been presented as frequency and percentage and quantitative variables have been presented as mean and standard deviation.

RESULTS

A total of 96 patients were studied among which 18.80% belonged to the age group 10-20 years, 29.20% were observed in 21-30 years age group, 15.60% were reported under 31-40 years age group, 21.90% belonged to the age group of 41-50 years, 10.40% were observed in 51-60 years age group and 4.20% in 60-70 years age group. It was observed that out of 96 participants majority of them were males (71.9%) compared to females (28.1%). From the study it was observed that about 55.20% participants were stable and 44.80% participants were unstable. Majority of the participants (65.60%) were reported with pulmonary risk factors and 30.20% were reported with conventional risk.

Table.1: Representation of frequency distribution of cases with respect to pre-op finding.

PRE OP FINDING	Category	No of Cases	Percentage
CONDITION	Stable	53	55.2
	Unstable	43	44.8
PULMONARY RISK FACTOR	No	33	34.4
	Yes	63	65.6
CONVENTIONAL RISK	No	67	69.8
	Yes	29	30.2

The findings from pre-operative investigation showed that majority of the participants had their readings within normal limit (80.2%), 7.30% had metabolic acidosis, 3.10% participants had metabolic alkalosis and 9.40% had respiratory acidosis. Results from the chest x-ray reported that around 51% of the participants had normal findings, 27.10% participants reported with COPD, 9.40% of the participants had tuberculosis, 5.20% had pneumothorax, 5.20% participants had mild pleural effusion, 1% reported with bronchial prominence and 1% with haemothorax. Reports from plain CT showed that majority of the of the participants had normal finding (51%) followed by COPD (28.10%), tuberculosis changes (7.30%), mild pleural effusion (5.20%), moderate pneumothorax -left (3.10%), mild pneumothorax + on right (1%), and lung collapsed & pneumothorax (1%) (table 2).

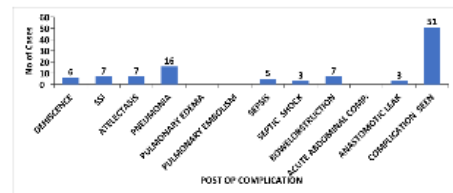
Table 2: The distribution frequency of pre-operative investigation changes

INVESTIGATION CHANGES	Category	No of Cases	Percentage
ABG	M. ACIDOSIS	7	7.3
	M. ALKALOSIS	3	3.1
	R. ACIDOSIS	9	9.4
	WNL	77	80.2
CHEST X RAY	BRONCHIAL PROMINENCE	1	1.0
	COPD	26	27.1
	HAEMOTHORAX	1	1.0
	MILD PLEURAL EFFUSION	5	5.2
	PNEUMOTHORAX	5	5.2
	TUBERCULOSIS	9	9.4
	WNL	49	51.0
PLAIN CT	COPD	27	28.1
	MILD HAEMOTHORAX -R	1	1.0
	MILD PLEURAL EFFUSION ON	5	5.2
	MILD PNEUMOTHORAX + ON R	1	1.0

MODERATE PNEUMOTHORAX -L	3	3.1
R-LUNG COLLAPSED & PNEUMOTHORAX	1	1.0
TB CHANGES +	2	2.1
TUBERCULOSIS CHANGES +	7	7.3
WNL	49	51.0

From figure 1, it can be noted that 51% of the participants reported with post op complication, among which majority of them had pneumonia (16%), 7% reported with atelectasis, 7% had SSI, 7% of the participants had bowel obstruction, 6% reported with dehiscence, 5% with sepsis, 3% of them had septic shock and 3% had anastomotic leak.

Figure 1: Frequency distribution of cases with respect to post op complication.



From the outcome it was noted that around 94.8% participants improved whereas 4.20% expired (table 3).

Table 3: Frequency distribution of cases with respect to outcome.

OUTCOME	Category	No of Cases	Percentage
IMPROVED	No	5	5.2
	Yes	91	94.8
EXPIRED	No	92	95.8
	Yes	4	4.2

DISCUSSION

Emergency surgery has been linked to a significantly increased risk of the pulmonary complications. Patients with pulmonary complications had a significantly older mean age than those without. The highest number of cases were found in the age interval 21-30 years (21.9%). The number of cases in males were found to be higher (71.9%) than those of females (28.1%). Under the preoperative findings, 55.2% of the cases were in stable condition whereas 44.8% of them were unstable. 34.4% of the cases faced the pulmonary risk factors. 69.8% of the cases faced conventional risk.

Duodenal perforation with peritonitis is diagnosed with maximum number of cases (41.6%) followed by Ileal perforation with peritonitis with 30.2% of cases. In contrast with this study, Charokar and Shrikhande [57] found Ileal perforation as the most common diagnosis in their study. The primary goal of meticulous postoperative care is to detect and treat postoperative complications as early as possible. Wound infection is a well-known complication of the surgical treatment that can place a significant strain on the hospital resources [58]. In a study conducted by Finn Gottrup [59] the incidence of post-operative wound infection was 5% in 2000, while it was 9% in another study conducted by Al Hashemy et al. [58]. In our study, wound gapping occurred in 6.3% of patients, while surgical site infection (SSI) occurred in 7.3% of the cases. Chauhan et al. [60] found 2% of the patients observed wound gap post surgery.

Patients recovering from surgery often experience fever. The majority of early postoperative fevers (temperatures over 38°C/100.4°F for 48 hours or longer) are brought on by the inflammatory stimulus of surgery and go away on their own. Postoperative fevers, however, might be a sign of a serious side effect. Within 48 hours of surgery, pulmonary atelectasis is frequently the cause of pyrexia. More than 5 days post surgery, anastomotic breakdown or wound infection needs to be suspected. Pyrexia may occur between 48 hours and five days after surgery as a result of the thrombophlebitis, infection around the urinary tract, the chest, or the abdomen [61]. Deep venous thrombosis and pulmonary embolism are the usual causes, which can last for 7 to 10 days. According to a study on critically ill surgical patients, 26% of them experienced postoperative fever. Computed tomography (CT) of the abdomen may be necessary for patients who have a persistent fever, sluggish clinical improvement, and no obvious external cause. This is

done to look for an intra-abdominal source of infection. In present study, atelectasis has been observed in 7.3% of the cases [62].

Postoperative pulmonary complications account for a significant portion of morbidity and mortality associated with surgery and anaesthesia, and they result in longer hospital stays [63]. There is a wide range of pulmonary complications, including atelectasis, pneumonia, bronchitis, acute respiratory distress syndrome (ARDS), pulmonary embolism and pleural effusion. According to Serejo et al [53] and Deodhar et al. [64], the incidence of post-operative pulmonary complications ranges from 5 to 60%. However in our study 100% of the cases developed pulmonary complication.

Sepsis being a complex, the multifactorial syndrome can advance to a variety of serious conditions. If left untreated, it can cause functional impairment in one or more major organs or the systems. Septicemia developed in 5.2% of postoperative cases in our study. Similar to our study, Levy et al. [65] also observed 8% cases of septicemia in their study.

After a laparotomy involving the small intestine, bands and adhesion may form anywhere the bowel's serosa has been harmed, devascularized, or torn by rough treatment [66]. Bowel obstruction has been observed in 7.3% of the cases.

At the time of the failure of surgical anastomosis the particles of the reconnected body leads from the channel in regards to the surgical connection and forms the leak of the anastomotic. It ranks among the most severe side effects of bowel resection surgery. The present study has observed 3.1% cases of anastomotic leak. Out of the total patients, 94.8% of the cases have seen improvement while 4.2% of the cases have expired.

CONCLUSION

Postoperative complications result in death and suffering, even longer hospital stays and higher costs. Surgeons cannot avoid postoperative complications in any era of surgery. They are an unavoidable part of any surgical procedure, especially in critically ill cases. As a result, early detection and immediate intervention, as well as improved postoperative care, can reduce both morbidity and mortality. Pulmonary risk has been observed in the majority of the cases as compared to the conventional risks.

The incidence of complications following emergency laparotomy is depicted in this study, with duodenal perforation with peritonitis and Ileal perforation with peritonitis being the most commonly encountered complications. The most frequent respiratory complication seen is pneumonia.

The current findings point to the need for additional research aimed at implementing changes to the structure and processes of healthcare in order to reduce postoperative morbidity and mortality.

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