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# Clinical profile of patients undergoing laparotomy at a tertiary care hospital

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**Abstract**
Postoperative fever, wound infection, nausea and vomiting are the most commonly encountered complications but postoperative pulmonary complications (PPC'c) contribute significantly to overall perioperative mortality and morbidity. Post-operative pulmonary complications (PPC's) are commonly understood as failure to wean from mechanical ventilation within 48 hours of surgery or unplanned intubation / re-intubation postoperatively. Detailed clinical history about co-morbid factors like diabetes, Hypertension, Coronary artery disease, cerebrovascular accident, pulmonary disease, and Kidney disease is taken. Clinical examination include recording of vitals, Respiratory system, cardiovascular system, Central nervous system and GIT. Pulmonary complications seen in 44 patients of which 4 patients was found to have hemo/pneumothorax, Cardiac co-morbidities was found in 47 patients, signs of acute abdomen found in 90 patients and features of abdominal mass in 67 patients. Of the 47 patients with cardiac comorbidities 33 patients were NYHA grade II and 4 patients with NYHA grade III.

**Keywords:** Laparotomy, postoperative fever, wound infection

## Introduction
Laparotomy is a commonly performed procedure in any surgical unit. Postoperative complications directly affect the outcome of the disease. Postoperative fever, wound infection, nausea and vomiting are the most commonly encountered complications but postoperative pulmonary complications (PPC'c) contribute significantly to overall perioperative mortality and morbidity [1].

Post-operative pulmonary complications (PPC's) are commonly understood as failure to wean from mechanical ventilation within 48 hours of surgery or unplanned intubation / re-intubation postoperatively [2].

In a study of patients undergoing elective abdominal surgery, as an example, pulmonary complications occurred more than cardiac complications and were associated with significantly longer hospital stays. In another study involving 15,059 cases 329 cases required postoperative critical care admission and mechanical ventilation, of these 75% was due to respiratory aetiology. It has been reported that 5 to 10% of all surgical patients and 9 to 40% of those undergoing abdominal surgery developed at least one PPC's. Hypoxemia complicates the recovery of 30 to 50% of patients after abdominal surgery; endotracheal intubation and mechanical ventilation may be required in 8 to 10% of cases, prolonging intensive care and hospital stay and increasing mortality. These data suggest that PPC's occur at the same rate as cardiac complications in non-cardiac surgery. Most importantly, in-hospital death rate for patients with PPC's is 40% to 42% where as it is 6% for those without PPC's [3].

Other factors which mandates post-operative ventilation / prolong post- operative ventilation are cardiac (e.g. Pulmonary oedema, hypotension, myocardial ischemia), central causes (e.g., reduced respiratory drive, cerebral / brainstem ischemia), musculoskeletal (e.g., neuromuscular disease, thoracic restriction, abdominal pain after laparotomy), systemic (e.g., acidosis, septic shock, electrolyte abnormality) [4].

Although there are many complications associated with laparotomy, this study includes only those complications which are associated with post-operative invasive mechanical ventilation requirement, as they are associated with longer hospital stay and increased mortality and morbidity.

## Methodology

### Study population

All patients undergoing laparotomy under the department of general surgery.

### Inclusion criteria

All patients undergoing laparotomy under the department of general surgery.

### Exclusion criteria

- Patient already on ventilator support.
- Terminal malignancy; palliative procedures.

### Study design

A prospective observational study

### Sample size and technique

All patients undergoing laparotomy under the department of general surgery, for a period of two years and fulfilling the inclusion criteria were enrolled for the study. Informed written consent was taken from patients or close relatives. For this study census method also called complete enumeration survey method of data collection is used. In census method each and every person fulfilling inclusion criteria is taken and selected for data collection.

### Methodology

Whenever a patient is posted for laparotomy, a detailed clinical history followed by clinical examination and routine lab investigations will be done. If needed special investigations also will be done. Patient is categorised according to ASA classification and NYHA classification whenever applicable. After laparotomy details, of surgery were also collected.

### History and clinical examination

Detailed clinical history about co-morbid factors like diabetes, Hypertension, Coronary artery disease, cerebrovascular accident, pulmonary disease, and Kidney disease is taken. Clinical examination include recording of vitals, Respiratory system, cardiovascular system, Central nervous system and GIT. For the purpose of analysis patients are grouped into below 60 yrs. and above or equal to 60yrs and odds ratio of each group is calculated. Frequency of comorbidity in the study population is calculated and odds ratio for post-operative invasive ventilation is calculated. From temperature, heart rate, respiratory rate, total leukocyte count a composite SIRS score is calculated. A score of two or more, if present, then the patient is considered to have SIRS. Number of patients with SIRS and odds ratio for SIRS patients to have post- operative ventilation is calculated.

## Results

On admission 126 patients had systolic B.P above 120mmHg, 61 patients had systolic. B.P between 90 and 120mmHg and 4 patients had systolic B.P less than 90mmHg.

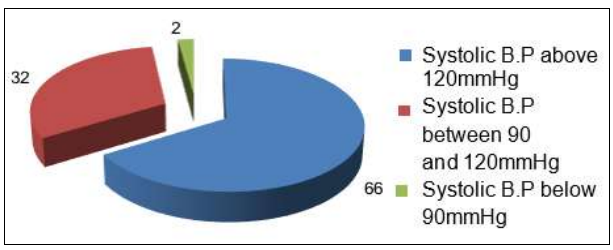


**Fig 1:** Systolic BP of patients on admission.

An SIRS composite score is made from temperature, TLC, respiratory rate and heart rate. Each of the components is given a score of 1 if an aggregate score of two or more is present then that patient is considered to have SIRS. 56 patients came under the category of SIRS.

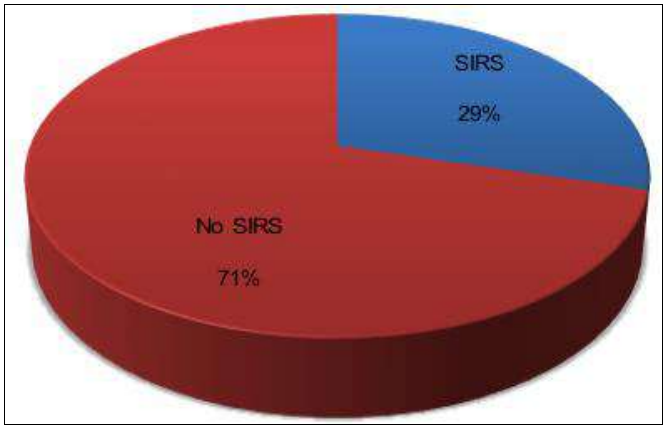


**Fig 2:** Percentage of patients with SIRS on admission.

Of the total 191 patients 65 (34%) patients had diabetes, 72 (37%) patients had systemic hypertension, coronary artery disease in 43 (22%), cerebrovascular accident in 12, Chronic obstructive airway disease in 41, and chronic kidney disease in 9 (4.7%) patients.

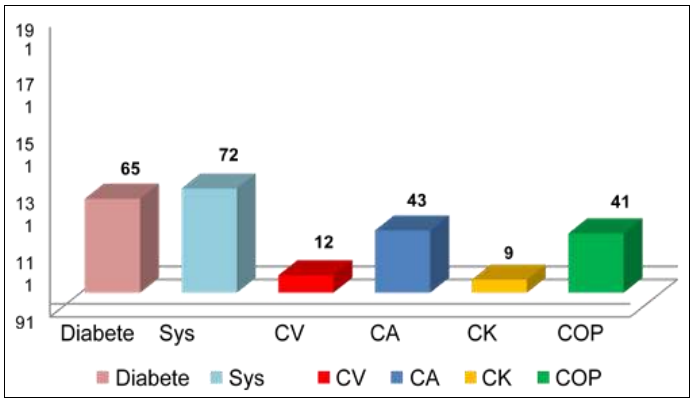


**Fig 3:** Different comorbidities present in the study population

Pulmonary complications seen in 44 patients of which 4 patients was found to have hemo/pneumothorax, Cardiac co-morbidities was found in 47 patients, signs of acute abdomen found in 90 patients and features of abdominal mass in 67 patients. Of the 47 patients with cardiac comorbidities 33 patients were NYHA grade II and 4 patients with NYHA grade III.

**Table 1:** Pulmonary system examination findings

| | Pulmonary findings on systemic examination | Number of patients |
|---|---|---|
| 1 | Obstructive airway disease | 40 |
| 2 | Restrictive disease /Hemopneumo thorax | 4 |
| 3 | Pneumonia/Consolidation | 0 |

**Table 2:** Patients with cardiac comorbidities

| Patients with cardiac co-morbidites | 47 |
|---|---|
| NYHA class I | 0 |
| NYHA class II | 43 |
| NYHA class III | 4 |
| NYHA class IV | 0 |

**Table 3:** Abdominal examination findings

| Patients with abdominal findings | No of patients |
|---|---|
| Acute abdomen | 90 |
| Abdominal mass | 67 |
| Total | 157 |

After examination by anaesthetist, the patients are classified according to their ASA class. The number of patients in each ASA class is mentioned below.

**Table 4:** ASA class of patients

| ASA class | No of patients |
|---|---|
| Class I | 55 |
| Class II | 91 |
| Class III | 42 |
| Class IV | 0 |
| Class V | 3 |
| Class VI | 0 |

All the patients who required post-operative invasive ventilatory support were class III patients. Serum electrolytes were checked in all 191 patients. 146 patients had normal serum sodium, in 42 patients it was found to be low and in 3 patients it was high. In case of potassium, 143 had normal potassium, 44 patients with low potassium and 4 patients with high potassium.

**Table 5:** Serum electrolyte of patients

| Serum electrolyte | Low | Normal | High |
|---|---|---|---|
| Se sodium | 42 | 146 | 3 |
| Se potassium | 44 | 143 | 4 |

## Discussion

An SIRS composite score is made from temperature, TLC, respiratory rate and heart rate. Each of the components is give a score of 1 if an aggregate score of two or more is present then that patient is considered to have SIRS. 56 (29%) patients came under the category of SIRS. According to my study SIRS on admission is found to be an important risk factor for postoperative invasive ventilation. Patients with SIRS have
3.58 times more chance for going in for postoperative invasive ventilation than patients without SIRS. Odds ratio of 3.58 and P value of 0.029.

Systemic inflammatory response syndrome (SIRS) is a pathologic reaction triggered by a variety of insults, including infection, trauma, burns, and acute pancreatitis.

In a study by MárcioSoares *et al*., they found all patients fulfilled the criteria for SIRS on presentation to the ICU and had at least three distinct organ dysfunction required ventilator support conventional mechanical ventilation was used in four patients, while non-invasive ventilation was used in one patient [5]. Prevalence of SIRS was found to be 35% among acutely hospitalized medical patients [6]. In another study by Ting PC, *et al*. they found that patients with preoperative COPD, pneumonia, ascites and systemic inflammatory response syndrome (SIRS) were more likely to be subjected to reintubation after planned extubation [7].

Of the total 191 patients 65 (34%) patients had diabetes, 72 (37%) patients had systemic hypertension, coronary artery disease in 43 (22%), cerebrovascular accident in 12, Chronic obstructive airway disease in 41, and chronic kidney disease in 9 (4.7%) patients. Chronic obstructive airway disease is found to have increased risk for postoperative invasive ventilation. Odds ratio of 4.36 and P value of 0.01.All the other co-morbidities like CVA, diabetes, hypertension, CAD were absent in those who required ventilator support. So odds ratio was not calculated for them.

According to literature a diagnosis of chronic obstructive pulmonary disease (COPD), congestive heart failure, or chronic liver disease are independent risk factors for postoperative pulmonary complication. COPD was associated with increased risk for postoperative pneumonia, respiratory failure, myocardial infarction, cardiac arrest, sepsis, return to the operating room, and renal insufficiency or failure. In a study conducted by Fields AC, *et al*., COPD was present in 12,491 patients (3.8%) undergoing the abdominal operations he surveyed. The 30-day morbidity and mortality rates and hospital duration of stay for patients undergoing all abdominal procedures reviewed was greater for patients with COPD compared with patients without COPD.

Based on the study by JaumeCanet, *et al*., history of cardiac disease in an important risk factor for postoperative respiratory failure as the NYHA class of patient increases the risk for postoperative respiratory complications also increases [8].

Study by Krolikowska M, *et al*., found diabetic patients undergoing non-cardiac surgery had a significantly higher incidence of short-term post-operative and long-term mortality compared with non-diabetic subjects [9]. The major causes of death among diabetic subjects were diseases of the cardiovascular system compared with non-diabetic patients.

Stephen Serio, *et al*. in their study "Outcomes of Diabetic and Non-diabetic Patients Undergoing General and Vascular Surgery" [10] says insulin dependent diabetic patients undergoing general surgery and vascular surgery have an increased risk for any morbidity when compared to non-diabetics.

Chronic kidney disease (CKD) is increasing in prevalence and is associated with adverse cardiovascular events and mortality in asymptomatic and post-operative populations. In a study by Currie A, *et al*., they found patients with CKD were more likely to develop cardiovascular morbidity and 30-day mortality than the non-CKD patients [11].

Limited information is available on the association between a medical history of stroke and postoperative outcomes. Using Taiwan's National Health Insurance Research Database, a nationwide cohort study was conducted of patients who underwent non-neurological surgery between 2008 and 2010 with a medical history of stroke in the 24-month period before operation. Patients with previous stroke had a higher risk of adverse postoperative outcomes; their 30-day in-hospital mortality rate was nearly twice that of patients without previous stroke [2].

In this study ASA class is found to be a significant risk factor post-operative invasive ventilatory support. Odds ratio of 1.45 for class III or above patients compared with below class II patients and a P value of 0.000.

## Conclusion

After examination, the patients were classified according to their ASA class. There were 55 class I patients, 91 class II patients, 42 class III patients and 3 class V patients.

All the 14 patients who required post-operative invasive ventilation were class III or above.

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