Original Research Paper

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General Surgery

"POST-OPERATIVE PULMONARY COMPLICATIONS IN PATIENTS OF EMERGENCY ABDOMINAL SURGERIES IN A TERTIARY CARE HOSPITAL"

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ABSTRACT **Background:** Postoperative pulmonary complications (PPC) occur in 2% to 40% of patients and are associated with increased morbidity, mortality, and length of hospital stay. **Subjects and Methods:** It is a retrospective case control study, carried out in 56 (28 cases and 28 controls) patients in World College of Medical Sciences and Research, India; according to inclusion & exclusion criteria. Cases comprised of those patients who underwent emergency laparotomy and developed Post-operative pulmonary complications. **Results:** Post-operative SpO2 levels; These were monitored daily for 5 days. 64.3% of the Cases recorded low SpO2 levels in contrast to 21.4% in pre-operative period. **Conclusion:** The emergent abdominal surgery, increasing age, and cardiac comorbidity increase the risks of PPC. PPCs were associated with increased length of ICU and hospital stay and mortality.

KEYWORDS : Abdominal surgery and postoperative pulmonary complications(PPC).

INTRODUCTION:

The term postoperative pulmonary complication (PPC) encompasses almost any complication affecting the respiratory system after anaesthesia and surgery. These complications are defined heterogeneously, occur commonly, have major adverse effects on patients, and are difficult to predict. Post-operative pulmonary complications are common, serious and expensive.[1] The outcomes after abdominal surgery are influenced by postoperative complications (PPC), and pulmonary complications are associated with increased morbidity and length of hospital stay.[2] Postoperative pulmonary complications (PPC) occur in 2% to 40% of patients and are associated with increased morbidity, mortality, and length of hospital stay. [3,4] While cardiac complications are related directly to cardiac status,[5] postoperative pulmonary complications combine infectious causes such as pneumonia, respiratory failure as well as exacerbation of chronic obstructive pulmonary disease (COPD). To assist with resource allocation, efforts have been made to identify risk factors for Post-operative pulmonary complications in an effort to direct efforts toward patients identified to be at high risk.[6,7] The lack of specificity for respiratory symptoms makes it more difficult to individually evaluate PPC although unequivocal evidences are pneumonic changes on chest X-ray or positive sputum microbiology for pulmonary infections. Patients with COPD are at greater risk for the development of Post-operative pulmonary complications.[8] Preoperative risk factors are a major determinant of postoperative morbidity. Several risk factors both preoperatively and intraoperatively have been identified with respiratory impairment after abdominal surgery. This present study was to evaluate the post-operative pulmonary complications in patients of emergency abdominal surgeries in a tertiary care hospital.

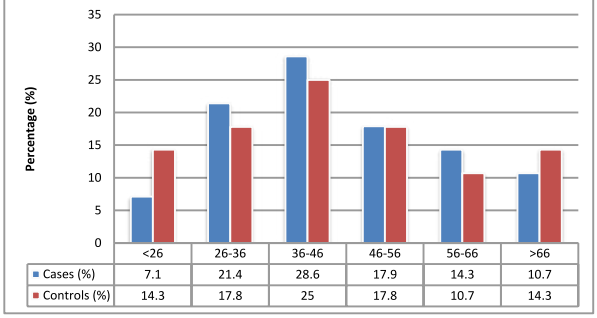
SUBJECTS AND METHODS:

This retrospective case control study was conducted in the Department of General Surgery, World College of Medical Sciences and Research, Jhajjar, Haryana. It is a retrospective case control study, carried out in 56 (28 cases and 28 controls) patients in World College of Medical Sciences and Research, India during the period from December,2019 to April,2020; according to inclusion & exclusion criteria. Cases comprised of those patients who underwent emergency laparotomy and developed Post-operative pulmonary complications. Controls were selected from group who didn't develop Post-operative pulmonary complication.

RESULTS AND DISCUSSION:

We aimed to evaluate the post-operative pulmonary complications in patients of emergency abdominal surgeries at our center. Emergency surgery was associated with a significantly higher risk for pulmonary complications. The mean age of patients with pulmonary complications was significantly higher than those without fig.1; however, on regression analysis, age was not a predictor for postoperative complication. Gender distribution between both groups was comparable. Patients were classified as obese or nonobese based on the BMI ≥30. There was no association with increasing BMI and pulmonary complications. Patients having upper abdominal pathologies had more chances of developing post-operative pulmonary complications. Like many prospective studies, age ≥66 years was found to be an important risk factor for PPCs. Hall et al published in Chest journal (1991) that ASA classification>1 and age>59 could predict 88% of the patients who will develop PPCs.[9]

Fig.1: Age Distribution



ACP guideline, 2006 have also placed advanced age in the category of Risk factors which are supported by good evidence. Most of the studies couldn't associate obesity with PPCs. ACP guidelines, 2006 also find good evidence against being a risk factor. Present study couldn't compare this risk factor as most of the patients were not obese. It was 3 times more common in Case group, COPD being most common. ACP guidelines also place COPD in Risk factors of good evidence category.[10]

Table 1: Distribution of surgeries in cases and control group:

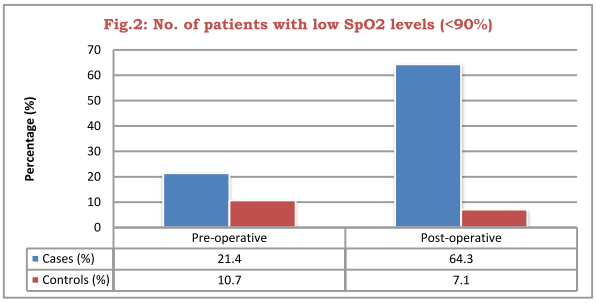
Parameters	Cases (n=28)	Controls (n=28)
Duodenal and gastric perforation	17 (60.7)	10(35.7)
Small bowel perforation	5 (17.9)	12 (42.9)
Colonic perforation	NA	1 (3.6)
Bowel gangrene	4(14.3)	2(7.1)
Rectal prolapse	2(7.1)	NA
Ileal band	NA	1(3.6)
Ileal stricture	NA	1(3.6)
Irreducible umbilical hernia	NA	1(3.6)
Duration of surgery		
1-1.9 hrs	NA	2(7.1)
2-2.9 hrs	7(25.0)	18(64.3)
3-3.9 hrs	17(60.7)	8(28.6)
≥4 hrs	4(14.3)	NA

Table 2: Postoperative pulmonary complications (two or more of the following criteria)

Symptom/sign	**Value**
Respiratory rate	>25/min
Saturation	< 90% room air, <94% on oxygen for >2 h
Cough with sputum + fever	Suggestive of chest infection
Abnormal breath sounds	Rhonchi/rales/decreased breath sounds

X-ray consolidation/infiltrates/effusion	New findings
BAL/sputum culture positive	Infective cause confirmed
Intensivist judgment of respiratory cause	Clinical supportive evidence

But the duration of illness before surgery was not specified by most of the studies. This may get clear in time to come. It was abnormal in 2/3rd of present cases (crepts being most common) while 93% of the Controls had normal chest examination. Valerie et el Chest, 2006 did a case-control study in 164 patients and found abnormal clinical findings to be a risk factor (p=0.045). But, chest examination is a very subjective criterion.[11] So, authors tried Respiratory rate and SpO2 as comparison variables. More than half of cases had tachypnea, while 93% of the control had normal respiratory rate. SpO2 ≥86 fared equally in both groups but patients having SpO2 <86 were from case group only.



So, it is inferred that many patients with subclinical lung compromise in pre-op period may show normal saturation levels due to increase RR compensation. So, counting RR precisely over 1min fully is important. These were 3 times more common in case group, COPD being most common. Valerie et el Chest 2006 also found abnormal chest findings to be a significant risk factor (p value=0.038).[11] So, chest X-ray must be done along with abdominal x-rays in emergency scenarios. ACP guidelines place prolonged surgeries in Risk factor of good evidence category but what duration increases the risk is not mentioned.[10] In present study, in surgeries lasting >4 hours chances of PPCs increased. Brunn et al Chest 1997 found that duration>4hrs was a significant risk factor (p=0.0062).[12] Present study found that those patients who had to be shifted to ventilator or T-piece in ICU had more chances of developing PPCs. This variable has not been considered in studies so far. It is a subjective criterion as sometimes recovery of patients from anesthesia is prolonged regardless of lung compromise. Post-operative abnormal clinical findings; Nine percentage of the cases had crepitations, most probably due to increased secretions. Decreased air entry was found in 21% of cases, may be due to atelectasis. Post-operative SpO2 levels; These were monitored daily for 5 days. 64.3% of the Cases recorded low SpO2 levels in contrast to 21.4% in pre-op period. It shows that physical stress during intra operative period aggravated subclinical respiratory compromise which couldn't be detected preoperatively. So, SpO2 measurement was found to be easy and effective way to monitor PPCs. It must be done pre-operatively to set a baseline. Limitations of this study were sample size (56) could have been more if study span extended few more years. Small sample size decreased the significance of statistical analysis. Population mostly consisted of males (88%). Pulmonary function tests via spirometer were not possible in emergency cases. Anesthetic parameters- type of anesthesia, post op analgesia could not be compared as they remained same in most of the patients. Pulmonary complications have been contributory to postoperative morbidity and mortality in abdominal surgery.[13] In this study, authors had taken into account cognitive dysfunction as a variable as impaired cognitive functions could predispose to pulmonary complications by increasing susceptibility to aspiration.[14] We documented a 14% incidence in complications although the reported incidence is variable between 7% and 38%.[15] The variations result on account of the differences in the quantification of respiratory problems and patient profiles and nature of surgeries. We proposed this study to evaluate incidence of pulmonary complications at our center with a view to improve correctable causes and quality of care. We did not identify correctable causes but were able to identify some predispositions. These data fields could be used to provide ongoing monitoring of PPC incidence. High incidences of PPC, following patient stratification and risk adjustment, may be used to indicate deficiencies in the perioperative care of patients undergoing major surgery.

CONCLUSION:

These findings suggest that, the emergent abdominal surgery, increasing age, and cardiac comorbidity increase the risks of PPC. PPCs were associated with increased length of ICU and hospital stay and mortality. Standardised care bundles and other novel strategies need to be considered to reduce PPC across all surgical patients.

REFERENCES:

1. Smetana GW. Postoperative pulmonary complications: an update on risk assessment and reduction. Cleveland Clinic J Med. 2009 Nov 4;76(4):S60.
2. Smentana GW, Lawrence VA, Cornell JE. Preoperative pulmonary risk stratification for non-cardiac surgery. Systematic review for the American College of Physicians. Ann Intern Med 2006;144:581-95.
3. McAlister FA, Bertsch K, Man J, Bradley J, and jacka M. Incidence of and risk factors for pulmonary complications after nonthoracic surgery. The American Journal of Respiratory and Critical Care Medicine. 2005;171(5):514-517.
4. Dimick JB, Chen SL, Taheri PA, et al. Hospital costs associated with surgical complications: a report from the private-sector National Surgical Quality Improvement program. J Am Coll Surg.2004;199:531-537.
5. Smetana GW. Postoperative pulmonary complications: An update on risk assessment and reduction. Cleve Clin J Med 2009;76 Suppl 4:S60-5.
6. Scholes RL, Browning L, Sztendur EM, Denehy L. Duration of anaesthesia, type of surgery, respiratory co-morbidity, predicted VO2 max and smoking predict postoperative pulmonary complications after upper abdominal surgery: An observational study. Aust J Physiother 2009;55:191-8.
7. Epstein SK, Faling LJ, Daly BD, Celli BR. Predicting complications after pulmonary resection. Preoperative exercise testing vs. a multifactorial cardiopulmonary risk index. Chest 1993;104:694-700.
8. Wong DH, Weber EC, Schell MJ, Wong AB, Anderson CT, Barker SJ.Factors associated with postoperative pulmonary complications in patients with severe chronic obstructive pulmonary disease. Anesth Analg 1995;80:276-84.
9. Bluman LG, Mosca L, Newman N, Simon DG. Preoperative smoking habits and postoperative pulmonary complications. Chest. 1998 Apr 1;113(4):883-9.
10. Smetana GW, Lawrence VA, Cornell JE. Preoperative pulmonary risk stratification for noncardiothoracic surgery: systematic review for the American College of Physicians. Annals Internal Med. 2006 Apr 18;144(8):581-95.
11. Lawrence VA, Dhanda R, Hilsenbeck SG, Page CP. Risk of pulmonary complications after elective abdominal surgery. Chest. 1996 Sep 1;110(3):744-50.
12. Brooks-Brunn JA. Predictors of postoperative pulmonary complications following abdominal surgery. Chest. 1997 Mar 1;111(3):564-71.
13. Tablan OC, Anderson LJ, Arden NH, Breiman RF, Butler JC, McNeil MM. Guideline for prevention of nosocomial pneumonia. The Hospital Infection Control Practices Advisory Committee, Centers for Disease Control and Prevention. Infect Control Hosp Epidemiol 1994;15:587-627.
14. Craven DE, Barber TW, Steger KA, Montecalvo MA. Nosocomial pneumonia in the 1990s: Update of epidemiology and risk factors. Semin Respir Infect 1990;5:157-72.
15. Scholes RL, Browning L, Sztendur EM, Denehy L. Duration of anaesthesia, type of surgery, respiratory co-morbidity, predicted VO2 max and smoking predict postoperative pulmonary complications after upper abdominal surgery: An observational study. Aust J Physiother 2009;55:191-8.