

Pulmonary Complications after Abdominal Surgery Have Significant Post Operative Impacts on Patient Survival

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Submitted for Publication: 22-03-2022

Accepted for Publication 04-11-2022

How to Cite: Malik RA, Khan RAA, Khan SM, Usman M, Lateef A, Ali S. Pulmonary Complications after Abdominal Surgery Have Significant Post Operative Impacts on Patient Survival. *APMC* 2022;16(3):248-251. DOI: 10.29054/APMC/2022.1420

ABSTRACT

Background: Chest Physiotherapy is an effective procedure in chronic pulmonary disorders since introduction in 1915. **Objective:** To observe the effectiveness of active chest physiotherapy in prevention of post operative pulmonary complication. **Study Design:** Prospective observational study. **Settings:** Surgical Unit-I, Allied Hospital Faisalabad Pakistan. **Duration:** Duration of study was 7 months Feb 2019 to Sep 2019. **Methods:** Total 115 patients were included who fulfilled the inclusion and exclusion criteria. All the patients were given active chest physiotherapy and observed till discharge for any pulmonary complications. **Results:** Among 115 patients only 2 male patients who were smoker had atelectasis which resolved after chest physiotherapy no other complication was noted. **Conclusion:** Active chest physiotherapy is quite effective in prevention of post operative pulmonary complications.

Keywords: Pulmonary Complication, Atelectasis, Abdominal surgery.

INTRODUCTION

Abdominal surgeries are done worldwide for different indications. Appendectomy and laparotomy are very commonly performed. Laparoscopic surgery is done with minimal invasive approach to achieve the objective.¹

Pulmonary complications after major abdominal surgery are one of the leading causes of morbidity and mortality.^{2,3,4} According to some studies the frequency of these complications may be equal to or even greater than cardiac complications, making them a significant factor effecting postoperative outcome of patients.^{5,6} Apart from contributing to morbidity and mortality, these complications prolong hospital stay and put a strain on hospital resources.⁷

Active physiotherapy is considered an important part of the post-op management protocol after surgery.⁸ The reported incidence of pulmonary complication after abdominal surgery is 5 percent to 10 percent. Multiple studies were done in past, have identified various pre and

post-operative factors that have a significant role in development of these complications. In this observational study we aim to see the efficacy of active chest physiotherapy after abdominal surgery with an objective to establish its significance in prevention of these complications.^{9,10,11}

Incentive spirometer helps in the expansion of the lungs and is used for chest physiotherapy. It prevents postoperative lung atelectasis, thus decreasing respiratory complications after heart surgery or abdominal surgery. It helps in maintaining the lung capacity and improvement in the patency of lower airways in the lungs.¹² Studies have shown that if chest physiotherapy is done in the post-operative period following bariatric surgery respiratory function showed significant improvement along with improved ABGs O₂ saturation and quality of life, and decreased dyspnea levels.¹³

Many studies have been done to determine the positive effect of active respiratory rehabilitation in patients of cardiac surgery. Studies have showed that significant improvement in arterial blood gases and overall respiratory function was seen in these patients.¹⁴

METHODS

This study was approved from the hospital ethical review committee and data was collected during the study period Feb 2019 to Sep 2019. In this case series type of study conducted in the department of General Surgical (Unit I) of the Allied Hospital/ Faisalabad Medical University, Faisalabad, Punjab, Pakistan, all patients of standard surgical procedure were included in the study after getting fitness from the department of anesthesia.

Patients of adult age group of both male and female gender undergoing only abdominal surgeries were included. Among these patients, those who had emergency surgical procedure, and those with serious co-morbid conditions requiring intervention were not included in the study. Similarly, all the patients of pediatric age group were also excluded from the study.

Post-operative care was the main focus with involvement of Pulmonology and Physiotherapy Department; all patients were given active chest physiotherapy after surgery. Patients were observed till discharge for development of pulmonary complication like Pulmonary Embolism, Pneumonia, Pneumothorax, Pulmonary Edema and Atelectasis. These complications were reported on x-ray by a consultant radiologist.

RESULTS

In this study, total 115 patients were included and the effect of chest physiotherapy was observed in terms of

Table 1: Patient Demographics

Gender	No.	Age	Smoker	Diabetes Mellitus	Hypertension	COPD
Male	85	45 ± 12.5 Years	49	30	20	32
Female	30		None	15	10	None

Table 2: Pulmonary Complications

Gender	No.	Age in Years	Atelectasis	Pulmonary Embolism	Pneumonia	Pneumothorax	Pulmonary Edema
Male	85	45 ± 12.5	2	None	None	None	None
Female	30		0	None	None	None	None

DISCUSSION

Limited data is available currently regarding evidence-based chest physiotherapy done after surgery for early recovery and to avoid pulmonary complications. Our

development of pulmonary complications after abdominal surgery. The mean age of the patients included in the study was 45 ± 12.5 years. Among 115 patients, 85 patients were male and 30 were female.

While evaluating the risk factors of development of respiratory complications, among the 85 male patients, 49 (57.6%) were smoker and 32 (65.3%) had COPD – chronic obstructive pulmonary disease. None of the female patients were smoker or had COPD.

Out of the total 85 male patients, 30 (35.3%) male patients had diabetes and 20 (23.5%) were hypertensive, whereas among the female patients, 15 (50%) were having diabetes mellitus and 10 (33.3%) were having hypertension.

All these patients of elective abdominal surgery, 65 patients (56.5%) were those in which surgeries were done involving intestines, 35 (30.4%) patients had cholecystectomy and 15 (13%) had gastric surgery.

Among all the patients included in the study, pulmonary complication developed in only 2 (1.78%) patients. Both these patients were male and were smokers. Both these patients developed atelectasis. Chest physiotherapy was continued in these patients, and atelectasis resolved after a few days of active chest physiotherapy.

All the post-operative patients who had chest physiotherapy were followed till discharge. Neither of the patient developed Pulmonary embolism. There was no observation of pneumonia, pneumothorax, pulmonary edema or respiratory failure. All the patients had smooth postoperative course and had safe discharge to home and no mortality was reported.

surgical floors are also lacking in proper standardized post-operative programs for physiotherapy. Few well designed studies done in the world have concluded that proper physiotherapy treatment protocols should be designed for post op cases in all fields including cardiac

surgery, thoracic surgery and abdominal surgery.¹⁵ No local data is available in this regarding for our country. Very few review articles are written regarding the role of chest physiotherapy in preventing pulmonary complications in the post- op period.

The study was designed to determine the incidence of post-op pulmonary complication after regular chest physiotherapy and to explore the role of physiotherapy in fast recovery after abdominal surgery. This study will highlight the significance of postoperative physiotherapy in prevention of pulmonary complications.

Pulmonary complications are a dreadful sequel of surgery. Due to the effect of anesthesia and prolonged surgical procedures the incidence of these complications increases manifold.¹⁶ Various complications like pulmonary embolism, Pneumonia, Atelectasis, Pneumothorax, Pulmonary Edema etc. adversely affect the outcome of successful surgical procedures.¹⁷ These complications are one of the major causes of morbidity and mortality after surgery however these can be addressed successfully as proven by multiple previous studies.¹⁸

In our study we tried to observe the role of active chest physiotherapy in the post-operative period in prevention of these complications. All the patients irrespective of associated co morbidities were subjected to active chest physiotherapy in the post-operative period till discharge. Among the total 115 patients only 2 male patients who were smoker developed Atelectasis which recovered a few days later with this practice. There was no observation of any other complication namely Pulmonary embolism, Pneumothorax, Pneumonia, Pulmonary Edema or Respiratory failure.

So, from the above-described observation it is wise enough conclude that active chest physiotherapy is very effective in prevention the development of post-operative pulmonary complications. It is our suggestion that this practice should be a routine in all post-surgical patients if they can tolerate it.

Physiotherapy oriented post- operative management can lead to significant improvement in the morbidity of the patients and decrease the stay in the hospital, which is the main purpose. The main focus of these chest exercises is to promote the movement of respiratory muscles leading to improved bronchial hygiene. Along with the exercises of the respiratory muscles, early mobilization and deambulation of the patient with postural correction exercises should be added.¹⁰

A systemic review included 35 studies on respiratory physiotherapy and 9 of 13 trials with controlled groups reported no significant difference in the development of pulmonary complications, and 4 of 13 showed significant

results. It was reported that incidence of patients developing pneumonia decreased from 37 to 13% with regular chest physiotherapy (deep breathing and coughing). Similarly, atelectasis developed in 39% patients in control group and only 15% in physiotherapy group. Overall incidence of pulmonary complications among post-op patients decreased from 48% to 22% with intermittent chest physiotherapy. This systemic review of studies showed that 22 studies collected data without any control group and the results of these studies were inconclusive.¹⁹

A large clinical trial is under way on lung cancer patients treated with surgery and post op pulmonary rehabilitation exercises were done with long-term follow-up for documentation of the outcome variables. This study protocol would be a major evidence-based practical experience of our research question.²⁰

Boden I, *et al* reported in a study that incidence of post-operative pulmonary complications after 14 days of surgery decreased to half due to physiotherapy in the post op period as compared to that in the control group of patients. It was concluded that if patients of abdominal surgery have a half an hour session of physiotherapy, 50% decrease in the post-op pulmonary complications included pneumonia can occur. Study should be done at a larger scale with control group to see effect on mortality and hospital stay.²¹

In a study, Duymaz T, *et al* reported after analyzing adult patients in post-op period with chest physiotherapy (CP) done as a protocol of patient care after the surgery. All the respiratory functions and lungs volumes improved significantly in these patients as compared to the control group. Quality of life (QOL) score also showed significant change.¹²

A study done to know the effect of physiotherapy on pain and respiration, reported that physiotherapy done after surgery lead to increase in the respiratory rate and rise in the pain. to an abnormal level. Both methods increased the pain perception to a mild level and HR in the normal range.²²

CONCLUSION

With active chest physiotherapy after the abdominal surgery, pulmonary function and complications can be controlled. Further study should be done on larger scale.

LIMITATIONS

- Small sample size was taken.
- Only cases admitted for abdominal surgery were taken.
- Those admitted in ward were only included.

- Delayed pulmonary complications were not monitored after discharge of the patients.
- Only elective cases were included, emergency surgical patients were not included.
- No control group was taken in the study.

SUGGESTIONS / RECOMMENDATIONS

Based upon this study it is suggested and recommended that chest physiotherapy should be our routine in all surgical patient.

CONFLICT OF INTEREST / DISCLOSURE

None.

ACKNOWLEDGEMENTS

This study is dedicated to patient who were enrolled in this research.

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