Evaluation of Role of Chest Physical Therapy in Thoracic Surgery

M S NABI* S A CHEEMA** H RAZA *MONA KHALID.*
Department of Thoracic Surgery & Maxillofacial Surgery, Services Institute of Medical Sciences, Lahore
** Assistant Professor, Department of Thoracic Surgery*
***Assistant Professor, Department of Plastic & Maxillofacial Surgery*
Correspondence to Dr. Muhammad Shoaib Nabi, Assistant Professor Thoracic Surgery

Study was conducted to evaluate the efficacy of post operative chest physiotherapy in cases of thoracic surgery. Eighty patients who underwent various surgical procedures were divided into two groups: one where adequate physiotherapy was carried out and the other where adequate physiotherapy could not be carried out. It was found that rate of postoperative complications was double in the group where chest physiotherapy could not be carried out due to any reasons.

Key words: Chest physical therapy, thoracotomy, thoracic surgery

Knowledge about the physiology and pathophysiology of the lung and their relationship to the heart in effecting oxygen transport has advanced exponentially over the past 60 years. However the practice of cardiopulmonary physical therapy has not paralleled the advancements in the fields of cardiac and thoracic surgeries.

It was nearly a century ago, when Nicholson[1] first described deep breathing exercises "to strengthen the chest, lungs, stomach." In 1901, Ewart[2] described the use of tipping patients with bronchiectasis head down to facilitate the removal of lung secretions. In the early 1900s, Pasteur[3] drew attention to factors other than mucous plugging that contribute to lung collapse. The notion that pulmonary secretions were not necessarily the primary or only factor contributing to pulmonary dysfunction was a pivotal advance.

Based on his experience of World War I and the large number of casualties, MacMahon[4] described the use of breathing exercises in the treatment of patients with traumatic chest injuries. In 1933, Jackson and Jackson[5] described the combined use of pulmonary drainage and coughing in the management of respiratory conditions. One year later, Linton[6] proposed the use of localized breathing exercises for thoracic surgical patients. Linton's work at the Brompton Hospital, London, laid the foundation for chest physical therapy in the management of acute and chronic lung conditions. The procedures, including postural drainage, percussion, breathing exercises, and coughing, were based on the belief that they could improve ventilation by removing secretions from the airways[6].

Even though the role of chest physical therapy in postoperative patients to reduce postoperative complications is well established; still is it not being practiced effectively? The objectives of therapy are to facilitate removal of secretions (thus preventing complications secondary to accumulation of secretions), to allow early mobility (thus preventing muscle weakness and stiff shoulder), and to facilitate expansion of lungs. This paper analyzes the role of chest physical therapy in prevention of the complications in immediate postoperative period and hence reducing the morbidity of the patient.

Materials and methods:

The study was carried out at the Department of Chest Surgery, Mayo Hospital, Lahore & Surgimed Hospital, Lahore from 01-01-2002 to 31-12-2003. It was a single blind, prospective and investigator initiated study. Eighty patients, who underwent surgery for different reasons were selected for the study. These patients were divided into two groups: (Group A) one with adequate postoperative CPT and other (Group B) where adequate physiotherapy was not possible because of patient's poor cooperation.

All patients in this study had adequate analgesia. Both of the groups were then followed up for post operative complications. Postoperative complications taken as parameters for evaluation of these patients included: development of atelactasis, pneumonia, poor lung expansion, stiff shoulder and muscular weakness. The results of both groups were then compared.

Results:

Study period in this series was two years and a total of eighty patients, 41 females and 39 males were included in the study. These patients underwent various surgical procedures at Department of Chest Surgery, Mayo Hospital Lahore and Surgimed Hospital Lahore from 01-01-2002 to 31-12-2003. Table 1

Two groups were constituted. Group A had patients where adequate postoperative chest physiotherapy was carried out while in group B chest therapy could not be carried out either because of poor patient compliance or due to lack of interest on part of the members of the treating medical team. A total of forty patients were included in each group. Table 2

All these patients were evaluated for various postoperative complications and these included atelactasis, pneumonia, poor lung expansion, stiff shoulder and muscular weakness. Analysis of the data revealed that rate of these complications was more than double in cases where adequate postoperative chest physiotherapy was not

carried out. Analysis also revealed that p value for all of them was statistically significant (i.e. less then 0.5). Table3

Table 1. Various surgical procedures performed

Operation	n=
Decortication	34
Mediastontomy	17
Lobectomy	15
Pneumonectomy	6
Thymectomy	4
Chest wall resection	3
Excision of dermoid cyst	1
Total	80

Table 2. Group distribution.

	Male	Female
Group A	24	16
Group B	15	25

Table 3. Postoperative complications.

Complications	Group A	Group B	Total	P Value
Atelactasis	8	18	26	<0.3
Pneumonia	2	9	11	<0.5
Poor lung expansion	6	15	21	<0.5
Stiff shoulder	2	12	14	<0.005
Muscular weakness	2	5	7	<0.5

Discussion:

Uneventful and smooth recovery in the postoperative period is main goal after any surgical intervention. Guiding the patient safely and efficiently through this post-operative course is the main objective shared by the entire healthcare team. Unfortunately, postoperative pulmonary complications frequently defeat this objective. These complications not only contribute to increased morbidity and mortality but also make a major factor in driving up total medical expenditures – especially in terms of intensive care unit utilization. The most common of these complications, namely, atelactasis and bronchopulmonary infections, are related directly to ineffective clearance of airway secretions[7,8]. Too often, patients with clinically significant excess or retained airway mucus are caught in a vicious cycle of respiratory decline. Although the imperative for intervention is well understood, practical options for secretion management are not. Traditional methods including chest physiotherapy and other technique dependent technologies are supported empirically and by clinical trials. Unfortunately, effectiveness shown in controlled trials is rarely replicated in the 'real world' conditions of acute care medicine.

In the post operative care of any patient, one of the main problems faced is the inability to clear secretions normally produced in the lungs; due to decreased mobility and post operative pain, both of which inhibit the normal secretion clearing mechanisms.[9] So chest physical therapy is employed as an essential component of postoperative care of any patient. There are many modalities included in physical therapy, which should be individualized in every patient. Among these important ones are postural drainage, percussion and vibration, coughing and incentive spirometry[10,11,12,13]..

Postural drainage consists of patients positioning so that secretions drain from segments and lobes of lungs towards gravity dependent central airways where they can be more readily removed with cough or mechanical aspiration[10].

Percussion therapy is a technique involving rapid clapping, cupping or striking the external thorax directly over the lung segment being drained. Vibration therapy is manually performed by pressing in the direction that the chest wall normally moves during exhalation. Percussion and vibration are usually used adjacent to postural drainage[12].

In coughing, the patient is asked to take deep breaths and then to cough out the secretions. In patients who are unable to generate effective cough, sharp forced exhalations without glottis closure (huff coughing) is employed. Incentive spirometry is a technique designed to mimic natural sighing or yawning maneuvers, the patient is asked to inhale so that the volume indicator is raised.

It was found during the study that female patients were less cooperative for chest physical therapy and even medical team members showed poor delivery of chest physiotherapy in female patients as compared to male patients. There was inadequate coordination between medical team regarding that who will deliver chest physiotherapy on regular basis. It is important to realize that uneventful and smooth recovery during the post operative period is a team effort.

A good preoperative counseling regarding the chest physiotherapy makes the patients more cooperative during the execution of this therapy postoperatively. Although physiotherapist may be a best person to demonstrate and advise these exercises but whole of the medical team which consists of surgeon, resident surgeons, nursing staff, paramedical staff and physiotherapist have their role to play in the post operative period and getting physiotherapy done by the patient.

During this study, it was observed that chest physical therapy was advised (documented on treatment charts) in only 30% of all operated patients. More unfortunately, practically chest physical therapy was delivered to only 11% of patients which were advised chest physical therapy on postoperative period .This statistic showed that chest physiotherapy was advised in small number of patients in routine surgical practice and delivered in few of them. It was interesting to note that during teaching and clinical rounds in surgical wards benefits of chest physical therapy were discussed quite frequently but practically it was advised in a small percentage of the patients and practiced in even a smaller percentage of the patients.

The decision to use chest physical therapy (CPT) requires assessment of the potential benefits versus potential risks and limitations. CPT depends heavily upon precise execution of technique and patient positioning. Although majority of the patients tolerate several daily CPT sessions requiring arduous physical manipulation and breathing techniques very well, a few critically ill/post surgical patients may experience transient hypoxaemia associated with postural drainage and inducement of gastro-esophageal reflux posing additional risks. It is here that nursing and respiratory therapist shortages may preclude choice of CPT.

Present study showed that there is a significant decrease in postoperative complications, decrease in hospital stay, treatment cost and early return to work with adequate chest physiotherapy in the postoperative period.

Conclusion:

Chest physiotherapy is a team effort and first step in its execution is good preoperative counseling of the patient to make him more comfortable and cooperative during the postoperative period. Therapy has many modalities and they must be individualized in every case. Physiotherapy may help to minimize the morbidity, hospital stay and economic burden of the patient.

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