Original Article

The Effects of Early Mobilization Protocol on Pre and Post Operative Functional Performance for Individuals with Post Abdominal Surgery

Muthu Lakshmi T[1], Rekha K[2], Saravan kumar J[3], Kabilan R[4], Preethi G[5], Yogeshwaran L[6]

[1,6]Post Graduate, [2]Associate professor, [3]Assisstant Professor, [4,5]Tutor, Saveetha college of physiotherapy, Saveetha Institute of Medical & Technical Sciences, Chennai, Tamil Nadu, India.

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Abstract

Background: The post surgical period of abdominal incision was accompanied with respiratory muscle dysfunction and diminished physical capability. Limited upright mobilisation, exhaustion, and restricted lung abnormalities, among other functional issues, are linked to the early postoperative days. Improving pre-operative levels of physical functioning in individuals might be beneficial for post operative outcome.

Aim: Aim of the study was to find out on which post-operative day the abdominal surgery participants get to the same functional status as pre-operative status.

Method: 40 Individuals hospitalized for abdominal surgery at Saveetha Medical College and Hospital were chosen for the study based on the inclusion and exclusion criteria. The selected participants were treated with diaphragmatic breathing exercise, Incentive spirometry, thoracic expansion exercise, splinted coughing technique, active range of motion exercise for upper extremity and lower extremity for pre-operative abdominal surgery participants. Post operative participants were treated with physiotherapy from POD 1 till the time their functional status become same as the pre-operative status. Six- minute walk test, hospital anxiety and depression scale were used in this study. Their scores were calculated and analysed.

Result: Similar pre-operative mean (365.25±25.92) was attained at POD-7 (350.75±25.46). Day of POD-5, the HADS score was normal (0 to7) in depression.

Conclusion: This study shows the post-operative status is attained back on POD-7 with using 6MWT. Depression was relieved at POD-5 with a value of mean and standard deviation in HADS.

Key Words: Abdominal surgery, Functional status, Six- minute walk test.

Introduction

Gastric incision can involve disparate approaches contingent on the organ that needs an incision, such as the liver, stomach, or kidneys. Gastric surgery is consistently suggested for sufferers who have conditions that impact the countless organs in the gastric cavity. The causes are inexplicable abdominal bleeding, appendix inflammation, fetal demise or miscarriage, and inexplicable gastric symptoms. The adjusted intra-abdominal incision assess was 43.8% in mortal over the age of 60, With the exception of the age group 21 -40. The presence of pre-surgical issues

Corresponding Author: Muthu Lakshmi T, Post Graduate, Saveetha college of physiotherapy, Saveetha Institute of Medical & Technical Sciences, Chennai, Tamil Nadu, India.

E-mail: yamini.maha010@gmail.com

such as agedness, emitting fumes, malnourishment, being overweight, respiratory diseases, and ailment is linked to the presence of Post surgical Pulmonary Complications in these people. Indignation and tenderness produced by injury from manipulation close to the diaphragm, instinctive suppression of afferent gastric receptors, and post surgical discomfort are all possible causes of diaphragmatic dysfunction.[1] Preoperative aerobic fitness programmes have been investigated as a possible technique for preventing postoperative functional impairment.[3] Postoperative complications and certain pre-operative therapies may also have an impact (eg, opioid analgesia). Participants who are recuperating withdraw from domestic, recreational, and economic activities and frequently need support.[2] Postoperative abdominal surgery is linked to respiratory muscle dysfunction and decreased physical capability, both of which are linked to the development of postoperative pulmonary problems.[3] The severity of initial postoperative pain has been associated with chronic pain development.[4] Utilization of mechanical hand-held breathing device for decreasing the occurence of postoperative pulmonary complications further on cardiac or upper abdominal incision, even though there may be some advantages of pre-surgical deep breathing exercises, respiratory physiotherapy, and mechanical hand-held breathing device in fall off postsurgical pulmonary complications further on major gastric incision.[5] The necessity for mobilisation programmes with a multidisciplinary team and the most efficient way to undertake early mobilisation programmes in critical care units. It has been demonstrated that early ambulation, a crucial component of the Enhanced Recovery After Surgery protocol, reduces the length of critical care and hospital stays.[6] In this study we are going to find out on which post operative day abdominal surgery participants who achieve the same functional status as before surgery.

AIM

Aim of the study was to find out on which post-operative day the abdominal surgery participants get to the same functional status as pre-operative status.

Materials and Method

The Quasi experimental study was conducted on 40 in-patients who underwent abdominal surgery at Saveetha Medical College And Hospital, Thandalam. Participants were chosen according to the inclusion and exclusion criteria. Simple random sampling technique was used in this study. This study was conducted between August 2022 to November 2022.

Inclusion criteria:

- Both genders were included.
- Age – 30 to 55 years.
- Participants planned for abdominal surgery and underwent abdominal surgery for the causes of appendicitis,cholecystitis, recurrent incisional hernia, carcinoma of pancreas.
- Participants with stable vitals.

Exclusion criteria:

- Individuals with cardio- vascular conditions
- Individuals associated with any kind of orthopedic surgery.
- Individuals immobile due to any prior loco-motor or neurological conditions.
- Individuals undergoing gynecologic surgery.

Outcome Measures:

The assessment was performed on pre-surgery and post- surgery days 1,3,5,7

- Six-minute walk test
- Hospital Anxiety and Depression scale.

Study Procedure

A total of 40 samples were selected based on specific inclusion and exclusion criteria. Prior to the intervention, it was essential to obtain written consent from the participants for both pre-operative and post-operative treatment. Written consent ensures that the patient is fully informed about the procedure, its potential risks and benefits, and any alternative options available. The pre-operative phase involved administering various exercises to the participants, specifically targeting the upper extremities and lower extremities with active range of motion exercises. In addition, participants were guided through incentive spirometry exercises, thoracic expansion exercises, diaphragmatic breathing exercises, and the splinted coughing technique. These exercises were tailored specifically for participants scheduled to undergo abdominal surgery.

Following the surgical procedure, post-operative participants received physiotherapy starting from Postoperative Day 1 until their functional status matched that of the pre-operative period. The aim was to restore their functional capabilities to the same level as before the surgery.

In this study, two specific assessment tools were utilized: the Six-Minute Walk Test and the Hospital Anxiety and Depression Scale. The Six-Minute Walk Test was employed to evaluate the functional capacity of the participants. This test measures the distance an individual can walk in six minutes, serving as an indicator of their overall physical endurance and cardiovascular fitness.

On the other hand, the Hospital Anxiety and Depression Scale was used to assess the participants' levels of depression. This scale is a standardized questionnaire consisting of several items that evaluate symptoms of anxiety and depression.

Both the six-minute walk test and the Hospital Anxiety and Depression Scale were administered to the participants on various days throughout the study, including pre-surgical and post-surgical days 1, 3, 5, and 7. These assessments enabled data gathering at different stages of the surgical and recovery process.

All the collected data was carefully recorded, tabulated, and analysed.

Treatment Protocol

Pre- Operative Therapy

- Patient education (explained about the importance of exercise).
- Diaphragmatic breathing exercise- 10 repetitions of three sets of deep breaths each, with a three-second hold on the inhalation and a pursed lip exhalation, thrice a day.
- Thoracic expansion exercise (5 reps of 2 sets, thrice a day.
- Incentive spirometry- 10reps – three sets/ session, 3 sessions/day.
- Splinted huffing and coughing technique encouraged by the patient.
- Active range of motion exercise for bilateral upper extremity and lower extremity (ankle pumps, ankle toe movements, heel sliding, finger , elbow and shoulder range of motion exercise) – Five sets of five repetitions , thrice a day.
- Ambulate the patient out of bed (10 to 15 minutes, thrice a day).

Post Operative Therapy

POD 1

- Diaphragmatic breathing exercise – four sets of five deep breaths each, with a three-second hold on the inhalation and a calm expiration from POD-1, (twice a day).
- Incentive spirometry – 10reps – three sets/ session, 3sessions/day.
- Splinted huffing and coughing from POD 1 (twice a day).
- Active range of motion exercise for upper extremity and lower extremity (ankle pumps, ankle toe movements, heel sliding, finger , elbow and shoulder range of motion exercise - three sets of five repetitions from POD 1 (twice a day).
- Ambulate the patient out of bed with maximal support for 5 to 10 feets (twice a day).

POD 2

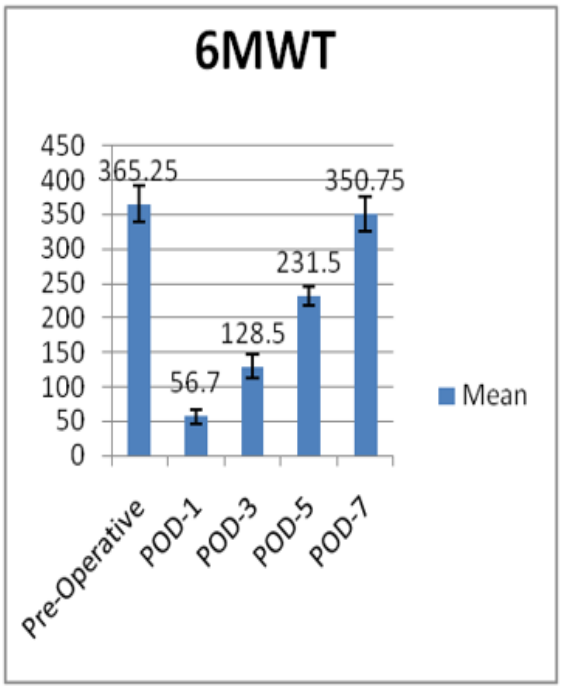
- Same exercise of POD 1.
- knee rolling (5 reps of 3 sets, twice a day).
- Thoracic expansion exercise (5 reps of 3 sets, twice a day).
- Shoulder bracing exercise (5 reps of 3 sets, twice a day).
- Shoulder shrugging (5 reps of 3 sets, twice a day).
- Walking without support from POD2.

POD 3

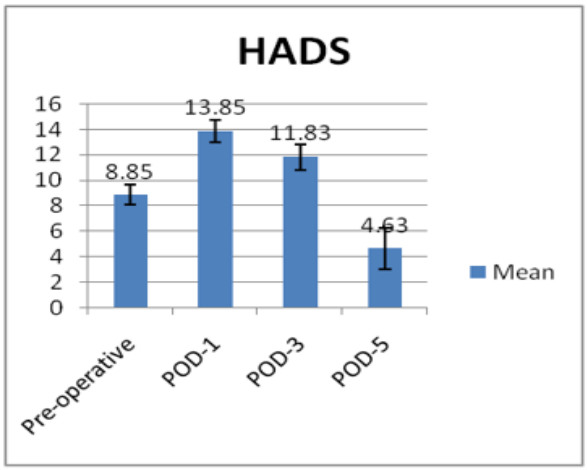
- Same exercise of POD 1 and POD 2
- Resisted exercise for bilateral upper extremity and lower extremity(1RM, 5 reps of 3 sets per day).

From POD 4 to until the day the post functional status same as pre functional status same exercise followed.

Data Analysis



Graph 1: Shows 6MWT values in pre and Post-Operative abdominal surgery participants.



Graph 2: Shows depression scores in Pre and Post- Operative abdominal surgery participants.

Result

Total of 40 abdominal surgery participants were assessed and data was calculated and tabulated. Mean±SD age of the participants was 42.8±6.9years. Mean±SD BMI of the participants was 23.5±1.5kg/ m^2.In 6MWT, the Pre- operative abdominal surgery participants Mean±SD was 365.25±25.92 meters. On the day of POD-1 Mean±SD was 56.7±0.97meters. Day of POD-3 Mean±SD was 128.50±17.18meters. Day of POD-5 Mean±SD was 231.50±13.88meters. Day of POD-7 Mean±SD was 350.75±25.46meters. The distance they were covered in 6MWT at Pre-surgical and post surgical days- 1,3,5,7 were presented in Graph-1.Similar pre-operative Mean (365.25±25.92) was attained at POD-7 (350.75±25.46).

According to HADS, Pre-operative abdominal surgery participants, mean±SD depression score was 8.85±0.80. Day of POD-1 mean±SD depression score was 13.85±0.86. Day of POD-3 Mean±SD depression score was 11.83±1.03. Day of pod-5 Mean±SD depression score was 4.63±1.58. On pre-operative HADS scores was in borderline abnormal (8to10) in depression because of operative procedure. Day of post- operative 1 and 3 it was abnormal score (10to13) in depression. Day of POD-5, the HADS score was normal (0 to7) in depression. The values of depression scores in HADS at Pre-surgical and post surgical days- 1,3,5,7 were presented in Graph-2.

Discussion

The current study utilized quasi- experimental study to find out the effect of early mobilization protocol in pre and post operative functional performance in participants who were planned and underwent abdominal surgery. This study ensured that all participants provided with written informed consent before their inclusion in the study.

The both male and female participants who were scheduled for abdominal surgery between the ages of 30 to 55 years were included. The scheduled for abdominal surgery due to conditions such as appendicitis, cholecystitis, recurrent incisional hernia, and carcinoma of the pancreas. Participants with stable vitals were included, while those undergoing cardiac or orthopedic surgery, Participants with immobility due to prior locomotor or neurological conditions, and Participants undergoing gynecologic surgery were excluded from the study.

The treatment protocol involved pre-operative and post-operative physiotherapy interventions. Pre-operative therapy included exercises such as diaphragmatic breathing exercises- 10 repetition of five sets for thrice a day, incentive spirometry-10reps – three sets/session, splinted coughing and

huffing technique was taught to the patient, active range of motion (AROM) for the upper and lower extremities (ankle pumps, ankle toe movements, heel sliding, finger , elbow and shoulder range of motion exercise) - five sets of five repetitions for thrice a day, 3sessions/day, and ambulation for 10 to 15 minutes -thrice a day.

Post-operative therapy started from post-operative day 1 (POD 1) and included activities such as diaphragmatic breathing exercises- four sets of five repetition for twice a day, incentive spirometry-10reps – three sets/session, 3 sessions/day, splinted huffing and coughing were encouraged for twice a day, AROM exercises for the upper and lower extremities (ankle pumps, ankle toe movements, heel sliding, finger , elbow and shoulder range of motion exercise) - three sets of five repetition for twice a day, ambulate the patient out of bed with walking with support for twice a day. The same exercise of POD-1 followed and walking without support from POD-2. Additional exercises such as knee rolling- five reps of three sets for twice a day, thoracic expansion exercises- five reps of three sets for twice a day, shoulder bracing exercises- five reps of three sets for twice a day, and shoulder shrugging- five reps of three sets for twice a day. The post-operative exercises were gradually increased in intensity and complexity as the patient progressed, and resistance exercises for upper extremity and lower extremity- 1 RM, five repetition of three sets per day were introduced from POD 3 onwards. From POD-4 to until the day post functional status same as pre functional status same exercise followed.

The study utilized two outcome measures to assess the effects of the intervention. The first outcome measure was the 6-Minute Walk Test (6MWT), which evaluated the functional performance of the participants through sub-maximal exercise. The second outcome measure used in the study was the Hospital Anxiety and Depression Scale (HADS), which assessed the levels of anxiety and depression in the Participants. The HADS consists of 14 items, with 7 items each for anxiety and depression.

Another study by fadime koyuncu RN et al., (2021) examined the effects of mobilization programme schedule on mobilisation starting time, maintenance of mobilisation and Participants care outcomes in individuals who underwent major gastric incision. The results demonstrated that the early mobilization significantly decreased the length of critical care and hospital stays and mobilization protocol has a good impact on early mobilization and participant care outcomes.[6]

Another study by I Boden et al., (2021) explored the Effects of Pre-surgical education and breathing exercise training by a therapist minimizes respiratory problems after abdominal incision. The results demonstrated that the likelihood of a Post-surgery respiratory problems following major abdominal incision is cut in half by the single preoperative physical therapy session. Preoperative physical therapy reduces the signs and symptoms of lung collapse/consolidation,air-passage infection, and post-surgery pulmonary problems.[7]

Furthermore a systematic review and meta analysis by Jonathan Moran BS et al., (2016) examined to assess the ability of prehabilitation to influence post-surgical outcome after intra-gastric incisions. The review encompassed various types of physiotherapy intervention, including inspiratory muscle training, aerobic exercise, and/or resistance training. The findings suggested that prehabilitation appears to be helpful in reducing the incidence of post-surgical problems. Our meta-analysis did not reveal whether prehabilitation can reduce post-surgical length of stay since there were few studies that looked at length of stay. No post surgical mortality was reported in any study.[8]

Although the current study did not specifically measure post- surgical problems, other studies have reported that the deep breathing exercise and coughing exercises with physiotherapist-supervised program of early mobilisation did not significantly decrease the incidence of clinically significant postsurgical respiratory problems in high risk open gastric incision participants (Margaret R Mackay et al., 2005).[9]

Hence, the current study adds to the existing body of literature by demonstrating the potential benefits of pre and post operative exercise in improving functional performance and the participants got to the same functional status as pre-operative status on POD-7 and relieving depression status in participants underwent abdominal surgery on POD-5.

Conclusion

The conclusion of this study was that cardio-pulmonary exercise has a better impact in increasing functional capacity of participants who underwent abdominal surgery. This study shows the post-operative status is attained back on POD-7. Depression was relieved at POD-5 with a value of mean and standard deviation in HADS. Hereby we states that pre-operative assessment of the participant and early post operative rehabilitation helps in planning the physiotherapy management for abdominal surgery participants.

Ethical Clearance: Taken from the Institutional Science Review Board.

Funding: Self.

Conflict of Interest: There is no funding source.

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