

Case Report

Effects of chest physiotherapy and cognitive behavioral therapy in preventing post-operative complications in a patient who has undergone double barrel ileostomy: a case study

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ABSTRACT

Bowel obstruction is a common complication in advanced ovarian cancer with a reported obstruction rate between 5–42%, which is treated with resection and anastomosis. Post-operative complications (PPCs) generally occur due to immobility, decreased chest expansion, reduced thoracic mobility, weakness of respiratory muscles, severe pain at the suture site, and bandaging, making it difficult for the patient to cough. Thick and sticky mucus and depressed mucociliary clearance as an effect of anesthesia, cause accumulation of secretions in the lungs and can lead to PPCs. All this leads to prolonged hospital stays for the patient and delays recovery. Hence, our study aims to study the effects of chest physiotherapy and cognitive behavioral therapy in preventing post-operative complications in a patient who has undergone double barrel ileostomy. A 47-year-old female presented with the chief complaint of pain in the abdomen, for 2 months, which was dull aching and did not relieve with medication. She underwent double barrel ileostomy surgery. Following surgery, a 1-week exercise program was designed for the patient, which included the combination of chest PT and cognitive behavioral therapy with pre- and post-assessment of 3 scales, HAM-A, MGS-2, and POP DST, which showed remarkable differences in the pre and post values of the patient. Our present study concluded that post-operative physiotherapy intervention of chest PT and cognitive behavioral therapy was effective in preventing post-operative complications in the patient and promoted her early discharge from the hospital.

Keywords: POP DST, MGS-2, HAM-A, PPCs, Cognitive behavioral therapy

INTRODUCTION

Ovarian cyst is the most common problem in females due to various types of hormonal changes. Ovarian cysts are closed, sac-like structures within the ovary that are filled with a liquid or semi-solid substance.¹ Ovarian cysts are much more common in young women of childbearing ages as noted in the current series and are rare before puberty or after menopause. Screening studies have shown that around 7% of both premenopausal and postmenopausal women have ovarian cysts. These cysts can be either cancerous or non-cancerous. In women's life, ovarian tumors can occur at any stage.¹ The lifetime risk of ovarian cancer in women with no affected relatives is 1 in 60

(1.7%).² The relative risk to first-degree relatives is 3.1, and the relative risk increases to 7.18 in women, who have two or more first-degree relatives.² Diagnosis of cysts is confirmed by ultrasonography (USG) and computed tomography (CT) or magnetic resonance imaging (MRI) abdomen; which reveals the size, site, and contents in the cyst.¹ It also helps us to find out whether the cyst is cancerous or not. Further, a biopsy is done to confirm whether the cancerous cyst is benign or malignant. The management of ovarian cysts depends upon the age of the patient, the size of the cyst, and whether it is cancerous or not. The huge size of ovarian cysts causes pressure on pelvic anatomy which causes pressure symptoms of

gastro-intestinal and urinary tract. For the management of such tumors, exploratory laparotomy is the best choice.¹

An ileostomy, a type of laparotomy, involves exteriorization of the ileum on the abdominal skin. In a standard ileostomy, surgeons use a laparoscope to create a small opening (stoma) and then bring a loop of the ileum through the incision. The ileum is turned inside out to expose the inner surface. Small bowel pathology is a significant cause of morbidity and mortality in developing countries and the creation of ileostomy to correct it is a frequently performed surgery worldwide.³ Ileostomies are designed to divert the flow of feces in cases of intestinal obstruction, typhoid/tubercular perforation, blunt trauma to the abdomen, or when a distal disease process needs to be rested or a distal surgical site needs to be healed. They can also be used as a permanent ileostomy when the distal bowel is removed due to cancer, and inflammatory bowel disease.³ Bowel obstruction is a common complication in advanced ovarian cancer with a reported obstruction rate between 5–42%, which is treated with resection and anastomosis. Surgeons generally prefer the double barrel ileostomy procedure to correct this problem of obstruction. In a double barrel ileostomy, the surgeon removes the problem areas in the bowel; the portion that's blocked, in a procedure called resection. Then, they bring the two healthy ends of the bowel to openings made in the wall of the belly. To produce two stomas, the bowel's borders are sewn to the skin. One stoma drains waste and the other drains mucus. This artificial connection made by a surgeon is called surgical anastomosis.

Surgery is a great stressor to patients and causes large physiological changes, ranging from tissue trauma, immobility, and systemic effects to psychological distress and reduced quality of life.⁴ Surgery and general anesthesia directly affects the respiratory system.⁵ It is known that surgical procedures in the abdominal area promote changes in pulmonary function and respiratory mechanics, leading to post-operative pulmonary complications (PPCs).⁶ The post-operative pulmonary complications (PPCs) include atelectasis, pneumonia, trachea-bronchitis, bronchospasm, exacerbation of the chronic obstructive pulmonary disease, acute respiratory failure, prolonged mechanical ventilation (longer than 48 hours), and hypoxemia.⁷ Reduced diaphragm mobility, a depressed central nervous system, alterations in the ventilation-perfusion ratio, decreased cough efficiency, elevated respiratory rate, and diminished pulmonary volumes and capacities are some of the primary abnormalities that result in PPCs.⁶ The most common complications due to these changes are atelectasis, hypoxemia, and pneumonia, which further increase the length of hospital stay and treatment costs and may contribute significantly to mortality.⁶ PPCs present high rates of morbidity, mortality, increased hospital costs, and prolonged hospital stay predominantly in abdominal surgery.⁷ Major surgeries with increased duration, immobility, anesthesia, nociception (pain at the suture site), mucociliary clearance depression, increased mucus

secretions, more sticky mucus, making it difficult to cough up, shallow breathing and suppressed cough reflex due to splinting and bandaging will lead to secretion retention in the lungs and reduced lung volumes, thereby contributing to atelectasis and the development of infection.⁸ The closer the incision is to the diaphragm, the greater the reduction in post-operative lung volumes and the greater the chance of PPCs.⁹

Chest physiotherapy has been used to prevent PPCs, particularly in high-risk patients with pulmonary disease, obesity, smoking history, old age, and neuromuscular or musculoskeletal disorders that reduce lung function.⁹ Breathing exercises, given as a part of chest PT, can counteract the pathophysiological effects of anesthesia and surgery on the respiratory system.¹⁰ The first PT appointment is frequently scheduled more than 30 hours after surgery, which may be too late as 15% of PPCs occur within this window period.¹⁰ Thus, physiotherapy should start immediately after surgery, in the ICU itself; to reduce the chances of PPCs.

It has been demonstrated that prolonged immobility after surgery increases the risk of venous thromboembolism, causes edema, and bedsores causes a loss of muscle mass and strength, increases insulin resistance, decreases pulmonary function and tissue oxygenation, and raises levels of hospital-associated depression.¹¹ Therefore, post-operative PT management also includes ROM exercises, elevation of limbs, application of crepe bandage, using a pneumatic compression unit or pressure stockings, water beds or air beds, effleurage, and proper positioning from time to time.

Cognitive behavioral therapy (CBT) is a form of psychological treatment that has been demonstrated to be effective for a range of problems including depression, anxiety disorders, alcohol and drug use problems, marital problems, eating disorders, and severe mental illness.¹² It is a type of talking therapy. It is a common treatment for a range of mental health problems. It focuses on how your attitudes, ideas, and beliefs influence your emotions and behavior. CBT is very important in post-operative patients to deal with post-operative anxiety and depression, especially when they are admitted to hospitals and have prolonged hospital stays. Numerous research studies suggest that CBT leads to a significant improvement in functioning and quality of life.¹²

Hence, our study aims to study the effects of chest physiotherapy and cognitive behavioral therapy in preventing post-operative complications and promoting early discharge; in a patient who has undergone double barrel ileostomy because of cystic neoplasms in the ovary, causing bowel obstruction; and is prone to have PPCs.

CASE REPORT

A 47-year-old female presented with the chief complaint of pain in the abdomen, for 2 months, which was sudden

in onset, dull aching, non-radiating type, and did not relieve with medication. She was having the associated complaints of Regurgitation of food, vomiting, anorexia, weight loss, nausea, and fatigue. There was no history of fever, trauma, burning micturition, and bowel and bladder complaints. She also had a history of polypectomy of the cervix, done in 2014, and had PCOS since she was 20 years old. She has also reached menopause at the age of 45. As she was having unbearable pain in her abdomen, her USG and CT scan of the abdo-pelvis was done, which revealed cystic neoplasms in the left ovary of size 22 by 12 cm, extending up to umbilicus. This large cyst also caused bowel obstruction. Thus, her surgery was done by exploratory laparotomy of left cystic neoplasms in the ovary with resection and anastomosis of the adhered sigmoid colon with resection of the gangrenous middle segment by double barrel ileostomy. After the ileostomy, she was kept in the ICU, under observation for 24 hours, and then was shifted to the ward. As she was admitted to the ward, she started developing edema in bilateral lower limbs, increased secretions in lungs, sticky and thick sputum (mucus) with difficulty coughing up, decreased SpO₂, shallower and noisy breathing, increased respiratory rate (RR), difficulty in coughing due to bandage and pain at the suture site, worries and anxiety.



Figure 1: Operative.

USG findings show that there is a large solid cystic complex heterogeneous mass lesion of size 22×12 cm seen in the pelvis region extending up to the umbilicus. The solid part is vascular. The mass is obstructing the entire pelvic organs including the urinary bladder, uterus, and ovaries. Visualized bowel loops show mild edema. There is mild turbid-free fluid seen in the abdomen and pelvis. The cyst shows neoplastic etiology and characteristics. CT scan findings show the possibility of neoplastic mass lesion noted arising from the pelvic cavity. Possibility of hepatic metastasis. Mildly dilated bowel loops with air-fluid levels within, with small bowel obstruction.

Outcome measures

Post-operative physiotherapy discharge scoring tool

The post-operative physiotherapy discharge scoring tool (POP-DST), is used to assess a patient’s readiness for

discharge from post-operative PT care. The five subcategories of mobility, breath sounds, secretion clearance, oxygen saturation, and respiratory rate combine to form the composite score. A POP-DST score of >13 indicates discharge readiness; the score ranges from 6 to 15. Interrater reliability was moderately high (correlation coefficient =0.76; r=0.77). The instrument demonstrated strong content validity and predictive validity, as well as high levels of inter-observer agreement.

Melbourne post-operative pulmonary complications criteria

One diagnostic tool, the Melbourne group score (MGS), has recently been used to identify those PPCs that are considered potentially responsive to physiotherapy interventions, for example, severe atelectasis and pneumonia. Patients are classified as having a PPC using the eight-item MGS assessment if they test positive for four of the eight criteria within 24 hours. Diagnosis is confirmed when four or more of the following are present.

Hamilton anxiety rating scale (HAM-A)

The HAM-A was one of the first rating scales developed to measure the severity of anxiety symptoms, and is still widely used today in both clinical and research settings. The 14-item scale assesses both somatic anxiety (physical problems associated with anxiety) and psychic anxiety (mental agitation and psychological distress). Each item on the scale is defined by a set of symptoms. This scale’s primary objective is to evaluate the intensity of anxiety symptoms, and it takes 10 to 15 minutes to administer. A total score range of 0–56 is assigned to each item, with a range of 0 (not present) to 4 (severe). A score of less than 17 denotes light severity, 18–24 mild to moderate severity, and 25–30 moderate to severe.

Intervention

After surgery, a 1-week exercise program was designed for the patient with pre- and post-assessment done by using MGS-2, POP DST, and HAM-A.

Table 1: Exercises by day.

Day	Exercises
Day 1	Breathing exercises, CBT, ATMs
Day 2	Breathing exercises, CBT, heel slides
Day 3	Breathing exercises, CBT, AROM
Day 4	Breathing exercises, CBT, AROM, FEEs
Day 5	Breathing exercises, CBT, AROM, FEEs
Day 6	Breathing exercises, CBT, AROM, incentive spirometry
Day 7	Breathing exercises, CBT, AROM, incentive spirometry

Table 2: Exercises description.

Exercise	Description
CBT	Cognitive behavioural therapy, a part of CBT is restructuring your negative distorted thoughts. And the start of that process is by asking the patient to keep a therapy journal, wherein she can write her negative thoughts in just a couple of words. And then ask the patient to question herself on its validity, like, is that true? Ask the patient to say it to herself that, this thought she can reconstruct to something positive. Thus, we can change the patients thought process by changing her mindset.
	Teach patient to do, “self- talk”. Talk to yourself and bring in positivity by deleting the negative statements in mind.
	Mindfulness therapy- ask patient to just imagine, recall these memories and past experiences had with these things so as to divert the patient’s thoughts/mind. Try to make the patient concentrate on something else, so that the anxious moment passes away. Trick your mind and ask your mind to think on the following: 5 things that you can see, 4 things that you can hear, 3 things that you can touch, 2 things that you can smell and 1 thing that you can taste.
Breathing exercises	Diaphragmatic breathing and Thoracic expansion exercises. 5 reps x 2 sets with rest of 2 mins in between the sets, performed twice a day.
AROM	Active ROM exercises of bilateral all the joints of the body. 10 reps, twice a day.
FEEs	Forced Expiratory Exercises that includes paper, balloon or soap bubble blowing exercises. 5 reps x 2 sets, performed twice a day.
Incentive spirometry	Inspiratory exercises. 5 reps x 2 sets with 5seconds hold and 5 mins rest period in between the sets, performed thrice a day.

Table 3: Pre and post values of POP-DST, MGS-2 and Hamilton.

Scales	Pre	Post
POP-DST	7/15	15/15
MGS-2	5/8	1/8
Hamilton	27/56	11/56

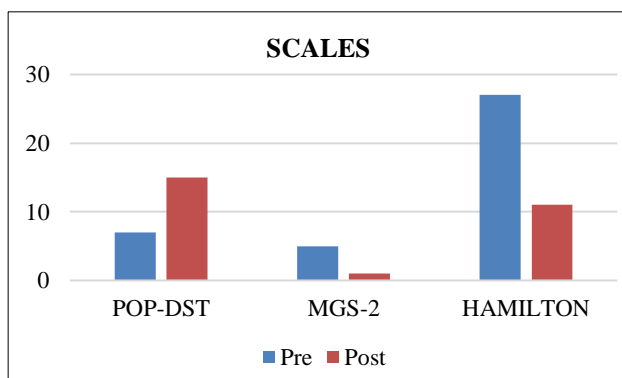


Figure 2: Pre and post values of POP-DST, MGS -2 and HAM-A (Hamilton).

Results

There was a remarkable difference seen in the pre-and post-values of the patient. Immediately after 24 hours of surgery, when the assessment was done, it showed only a 7 on 15 score on the POP DST, but after giving the 1week PT protocol, through chest PT in the form of breathing exercises, FEEs, and incentive spirometry, the score changed and became 15 on 15. Similarly, even the Melbourne PPCs criteria (MGS-2) showed more symptoms of PPCs, when taken immediately after 24 hours of surgery but it got reduced to almost nil chances of

PPCs when checked after the 1-week intervention of chest PT. The patient showed extreme anxiety and post-operative worries in the beginning when assessed on the HAM-A, but the values improved after the PT management, given in the form of CBT, within a week.

Now, the patient has been discharged from the hospital and is completely fine. Her hospital stay was reduced and her quality of life has also improved after this PT management. She has also advised some home exercise protocols to follow at home after getting discharged from the hospital. The patient benefitted from the combination of CBT and chest PT sessions, in the PT intervention given to her. Even after 6 weeks of discharge, the patient was called back and was assessed again. The results were as same as the post-PT intervention assessment results. Thus, we can conclude that with this combination of PT interventions used for the patient, the recovery was sustained.

DISCUSSION

PPCs significantly increase morbidity, mortality, hospital utilization, cost, and length of hospital stay. Physiotherapy aims to address well-known pathophysiological effects of abdominal surgery on the respiratory system including atelectasis, reduced mucociliary clearance, diaphragm dysfunction, reduced lung volumes, and reduced respiratory muscle as well as cough strength. Breathing exercises can reverse the respiratory pathophysiological effects of anesthesia and surgery.

Breathing exercises involve breathing patterns that can be coupled with upper limb, trunk, and thoracic cage motions. They are frequently utilized by physical therapists in clinical practice. Through improved breathing patterns, increased lung expansion, thoracic mobility, respiratory

muscle strength, functional residual capacity, and inspiratory reserve volume, PPCs are intended to be prevented or treated. Breathing exercises include diaphragmatic breathing, which improves the diaphragmatic excursion and relaxes the accessory muscles of respiration. They also include thoracic expansion exercises, which improve thoracic mobility, which in turn improves the gaseous exchange, ventilation-perfusion ratio, lung volumes, capacities, SpO₂, and decreases RR, dyspnoea, and V/Q mismatch.

Along with breathing exercises, chest PT also involves a few specific expiratory and inspiratory exercises. FEEs (forced expiratory exercises) include paper/ balloon/ soap bubble blowing exercises, which facilitate secretion clearance from the lungs and reduce the chances of lung collapse. The use of incentive spirometry is an inspiratory exercise, which strengthens the inspiratory muscles of breathing and prevents alveolar collapse. SMI is sustained maximal inspiration, it is slow deep inhalation from FRC to TLC, followed by a 3 to 5 secs hold, which proves to be of great help for the patients after surgeries when practiced with incentive spirometry.

Many studies state the beneficial effects of chest physiotherapy to prevent PPCs in patients who have undergone abdominal surgeries. Taha et al conducted a study on, "Adding autogenic drainage to chest physiotherapy after upper abdominal surgery: effect on blood gases and pulmonary complications prevention, Randomized controlled trial," in 2021. This study showed that adding AD to routine chest physiotherapy after UAS provided a favorable blood gas outcome and reduced the length of hospital stay. It tended to reduce the incidence of PPCs.¹³ Likewise, our study also concluded that the use of routine chest physiotherapy after abdominal surgery has reduced the incidence of PPCs and has decreased the length of the hospital stay of the patient.

CBT has been very beneficial in reducing post-operative anxiety and depression in patients who have undergone surgeries. It was beneficial for this patient as it helped trick patients mind into thinking about the best memories and not thinking about the present situation, diverting her mind to doing some other activities, so that the anxious movement passes away, giving positive hopes to the patient, converting negative thoughts to positive. This, in turn, helped the feelings and actions of the patient to be positive and improved the patient's willpower and confidence in the treatment offered to her. All this motivated the patient to take good care of herself by doing regular exercises, eating medicines on time, having a nutritious diet, maintaining hygiene, following the instructions given by the doctor, and not giving up. Thus, CBT boosted the patient's recovery and promoted her early discharge from the hospital.

A study was done by Hashemvarzi et al in 2020, on "The effects of religion-based cognitive-behavioural therapy on the quality of life and self-efficacy of colostomy patients."

This study showed the positive effects of RCBT on the QoL and self-efficacy of the explored patients undergoing colostomy, this study was beneficial and thus they recommended to use this approach in planning mental health measures, especially in colostomy patients.¹⁴ Similarly, our study also showed the beneficial effects of using CBT to reduce post-operative anxiety and depression in a patient who has undergone double barrel ileostomy.

CONCLUSION

Our present study concluded that post-operative physiotherapy intervention of chest PT and cognitive behavioural therapy was effective in preventing post-operative complications in the patient and promoted her early discharge from the hospital.

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