RESEARCH ARTICLE

Comparison between Vibration and Standard Exercises on Shoulder Pain for Patients Post Laparoscopic Cholecystectomy: A Comparative Study

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ABSTRACT:-

Background: Laparoscopic cholecystectomy is one of the most commonly performed general surgical procedures worldwide, especially in Arab countries. About 35%–60% of patients experience shoulder pain after laparoscopy.

Objective(s): To compare the effects of vibration and standard exercises on shoulder pain in patients after laparoscopic cholecystectomy.

Methodology: A comparative study was carried out on the surgical wards of the Al-Kindi Teaching Hospital and the Baghdad Teaching Hospital. It started from 16 November 2022 to 20 June 2023. Seventy patients participated in this study to achieve the study objective. The interview method was chosen to collect the data.

Results: The data results showed that all seventy patients with shoulder pain after laparoscopic cholecystectomy had a severe pain level in the pre-test, while the results of the post-test of the application were at a statistically significant high level through the application of vibration and exercise, which effectively decreased shoulder pain.

Conclusion: In this application, both vibration and exercises had a positive relationship in decreasing the intensity of shoulder pain, but vibration played a more significant and obvious role in relieving shoulder pain than exercise.

Recommendations: The researcher recommended generalizing the results of the experiment to hospitals and surgical wards by applying the vibration and exercise trial to all patients after laparoscopic cholecystectomy.

Keywords: Vibration, Exercise, Shoulder Pain, Laparoscopic Cholecystectomy

INTRODUCTION

Cholelithiasis, defined as a gallbladder stone, is a disease that can be treated surgically (Ahmed et al., 2018). Laparoscopic cholecystectomy (LC) remains one of the most popular abdominal surgical operations in the United States (Kadhim, 2014). In the United States, approximately 750,000 laparoscopic cholecystectomies are performed yearly, and the trend is predicted to increase (Goh et al., 2017).

LC offers several advantages, including shorter operation time, positive surgical vision, reduced trauma, reduced bleeding, rapid recovery, and a reduced infection rate. It has found favor and acceptance among physicians and patients and has become the standard procedure for cholecystectomy (Barazanchi et al., 2018; Ibrahim et al., 2021).

Postoperative pain is still the most common complaint. Depending on the location, it can be divided into three main groups: incisional pain (somatic pain), visceral pain (deep intra-abdominal pain), and shoulder pain (Kim et al., 2018; Kadhim et al., 2021). Post-Laparoscopic STP shoulder tip pain may be correlated with inflammatory damage that results from pneumoperitoneum or phrenic nerve stretching from surgical incision after surgery and associated neuropraxia (Sao et al., 2019; Atiyah et al., 2012).

Hajati et al. (2022) stated that Some people experience shoulder tip pain for over 72 hours following surgery.

The abdominal wall is punctured by a trocar that causes initial pain. Pain following surgery is also caused by nervousness and peritoneal inflammation. The primary cause of shoulder pain after LC is unclear; however, in theory, high pressure CO_2 insufflation during surgery and gas buildup in the subhepatic region may result in the conversion of residual gas into carbonic acid and diaphragmatic acidosis. This irritates the diaphragm and stretches the fibres, stimulating the phrenic nerve, which results in pain in the shoulder tip (Vafaei et al., 2021).

The first therapy approach is vibration, which is frequently used for massage and applies directly to the shoulder (Veqar & Imtiyaz, 2014).

The range of motion exercises (ROM) measure movement around a specific joint or body part. It reduces pain significantly and shoulder pressure (Srinayanti et al., 2021). Active exercise has significant physiological advantages in that it promotes blood and lymphatic flow to joints and soft tissues, which can avoid the shortening and weakening of the surrounding muscles and connective tissues that can occur after immobilization after surgery (Scott et al., 2021).

METHOD

A Comparative Study for patients suffering from shoulder pain after LC. It started from 16th November 2022 to 20th June 2023. The study was carried out in the surgical wards of Al-Kindi Teaching Hospital and Baghdad Teaching Hospital.

A sampling technique not based on the probability of 70 patients with shoulder pain (LC) after surgery on the teaching hospital ward was selected to achieve the objective of the study. The data collection technique used was the interview method. In the intervention group, vibration and exercise were applied to patients with shoulder pain after LC.

THE STUDY INSTRUMENT: The researcher constructed a questionnaire as a checklist, which consisted of two parts: Part I: Demographical characteristics of the patients This part consists of the sociodemographic characteristics of the patients by interview using questions such as age, sex, and chronic disease.

Part II: The researchers used the numerical pain scale to measure shoulder pain after LC, which consists of four ratings (no pain, mild, moderate, severe) and scores (from 0-10). The questionnaire items were scored as 0 for no pain, 1–3 for mild pain, 4–6 for moderate pain, and 7–10 for severe pain.

Data were collected using a questionnaire through direct interviews with patients from December 13, 2022, to March 15, 2023. Study participants were interviewed and informed about the study's purposes and objectives, and demographic data was collected from all participants. The researcher got permission from all participants to record their responses and saved those responses for data analysis.

Statistical analysis

SPSS (Statistical Package for Social Sciences) version 24.0 is used to analyze the data. The following statistical data analysis techniques (frequency, percentage, mean score, and paired t-test) were used to analyze and evaluate the study findings.

RESULTS

Table (1.) presented that the mean age of the intervention group was 42.85 years. Regarding gender, the majority of the study group (60%) was female. At the same time, 51.4 percent of patients (51.4%) have chronic diseases.

Table (1): Distribution of the intervention sample according to demographic data (N = 70).

Variable	Groups	Intervention group	
		F.	%
Age	19-28	4	11.4
	29-38	14	40
	39-48	6	17.1
	49-58	3	8.6
	59-over	8	22.9
	Mean ± SD	42.85± 13.69	
Gender	Male	14	40
	Female	21	60
chronic diseases	Yes	18	51.4
	No	17	48.6

F.: frequency, %: percentage, SD: standard deviation

Table (2.) presented highly significant differences in the pain level between the pain level before and after exercise of the intervention group at the value of P =.000, and also a highly significant difference between the pain levels before and after the test of the intervention group at P value=. 000.

Table (2): Differences in Pre and Post-test Pain Scores for the Intervention (Exercise and Vibration)

Score	N	Mean	t	df	P.value	Sig.
Pre-test and Post-exercise pain	35	9 6.68	18.059	34	.000	H.S.
Pre-test and post-vibration pain	35	9 4.05	29.92	34	.000	H.S.

N= number, M = mean score, SD= standard deviation, NS = nonsignificant at P>0.05, S= significant at P<0.05

DISCUSSION

The findings of the present study have indicated that the demographic characteristics of the patients are shown in Table 1. The mean age of the study group was 42.85 years and the most frequent age group was between 29 and 38 years. About gender, the results showed that more than half of the study group was female.

The result is supported by the study by Rashid (2019), which stated that in Al-Kindi Teaching Hospital, 920 participants underwent LC; the mean age of the patients was 40.43 years old; 38 of the participants converted to open surgery; most of the sample was female (96.6%); and about 4.1% of the individuals had an open cholecystectomy.

A single-blind randomized controlled trial was conducted by Hajati (2022), which asserted that 64 people participated in this study; Half of the study sample were women. The mean age was 46 to 48 years.

A comparative clinical study by the researchers Ibrahim and Ali (2020) confirmed that the study compared the effects of warm versus massage therapies on shoulder pain in postoperative laparoscopic surgery. Pain intensity measured using a visual analog scale explained that, among patients in the massage group, approximately 50% had severe pain before the intervention, while 60% had mild pain after the intervention. Found that massage significantly relieved the pain, particularly in the short term. (p =.000).

The results in Table 2 show that the comparison of pain levels before and after exercise and vibration showed that the mean score for exercise was 6.68 while the mean score for vibration was 4.05, presenting highly significant differences in exercise and vibration (P value =.000).

Wang et al. (2022) confirmed that in Shanghai, the study examined whether a vibration massage intervention affected the upper trapezius muscles and then compared the effects of 2 different levels (36 Hz and 46 Hz) of vibratory massage for 5 minutes each. A total of 23 participants were randomly divided into intervention and control groups. The results found the mean score before intervention at 49.04 and the mean score after intervention at 38.98. Both the right and left lateral muscles showed a significantly lower percentage of maximal voluntary contractions during the 90-s fatigue task.

In the study carried out in Taiwan, a total of 48 patients with frozen shoulder were randomly classified into one of two groups: the experimental group received joint mobilization apparatus (posterior and inferior glide, 80 N, 5 Hz, 30 min) in addition to regular therapy, while the control group received only regular therapy three times a week. Shoulder range of motion (ROM) and pain level were evaluated using the VAS score before, during, and after the duration of treatment. The result showed that the shoulder flexion, abduction, internal rotation, and external rotation of the experimental group improved significantly by 88%, while VAS pain scores decreased by 62%. The experimental group performed 34% better on shoulder range of motion and pain measures than the control group (Wu et al., 2021).

CONCLUSIONS

The study concluded that there was a statistically significant difference in patients with shoulder pain before and after the application of vibration and exercise. The shoulder pain in the patients was minimized and reduced after applying vibration and exercise.

Ethical Approval Statement

This research study, titled " Comparison between Vibration and Standard Exercises on Shoulder Pain for Patients Post Laparoscopic Cholecystectomy: A Comparative Study " conducted by [Noorah Mahmoud Ali[1], Alaa Jawad Kadhim[2], Alice Khachian[3]], has received ethical approval from the [The Ethics Committee Of Nursing College] at [Baghdad University] under approval reference number [code: 428, 28-11-2022].

AUTHOR'S CONTRIBUTIONS

All authors contributed equally to the conception and design of the study, data collection, and analysis, and drafted the initial manuscript. All authors critically reviewed and edited the manuscript. All authors approved the final version of the manuscript for submission.

DISCLOSURE STATEMENT:

The authors report no conflict of interest.

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