

Effect of Pranayama (Ancient Indian Breathing Techniques) in Laparoscopic Cholecystectomy Patients: A Prospective Randomized Control Trial

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Abstract

Pranayama is an art of prolongation and control of breath, which helps the person to bring his conscious awareness in breathing; to reshape his breathing habits and patterns these in turn produce various biochemical and physiological changes in the body milieu which need no proof.

Materials and Methods: A total of 40 patients having cholelithiasis which consisted 34 females and 6 males (All were nonsmoker) with age varying from 18years to 82years were recruited from our hospital, Uttar Pradesh University of Medical sciences, Saifai. Etawah.

Results: In our study we found that the mean alertness level at 1 hour post op in subject groups was 7.2 in respect to 5.8 in the control group, which has a significant value.

Keywords- Pranayama, Laparoscopic Cholecystectomy patients, Breathing, Physiological environment, Stress

Introduction

Yoga is one of the most ancient Indian science as well as the way of life, which includes practice of specific postures (asanas), regulated breathing (pranayama) and other austere Vedic practices including dietary and life style modifications and regulations. Breath is the dynamic bridge between body and mind and pranayama (breathing techniques) is one of the most important yogic practices, which produces different physiological responses in the practitioner. Pranayama is an

art of prolongation and control of breath, which helps the person to bring his conscious awareness in breathing; to reshape his breathing habits and patterns these in turn produce various biochemical and physiological changes in the body milieu which need no proof. The mental changes modify the practitioners physiological responses to various trauma and also alters the pain tolerance threshold. The persistent conditioning of breathing pattern of pranayama increases the pulmonary function, improves other physiological hemodynamic functions, besides improving the physical and mental status of the individuals¹.

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Though, there are various pranayama: yogic practices, the Bhramari Pranayama (humming bee

breath) is one of the yogic practice, which involves sitting in Sukhasana position (ease pose the subject should inhale through both nostrils and while exhaling produce sound of female humming bee Combination of A, U (O) and me..." OM" is one of the fundamental symbols used in the yoga tradition, which symbolizes the three states of consciousness i.e., waking state, dream ate and deep sleep. Though, the sound of OM presents a vibration and the OM chanting is an important exhalation exercise.^{2,3}

There have been tremendous studies on yoga and its effects on physical functions, autonomic variables, stress etc on healthy individuals, the popularity of yogic pranayama is increasing astonishingly in the past few years⁴ both in the Indian sub-continent and abroad. However, there is lack of documented studies on pranayama (yogic breathing exercises) and its effects on patients experiencing stress the present study entails surgery as a form of physical stress. To the best of our knowledge there is limited randomized control trial representing the effect of pranayama on patients undergoing surgery(Cholecystectomy), which made us to select this present study with the aims and objective to evaluate the effect of Pranayama and Anulom –Vilom (a yogic breathing practice and exercise) in post op Patients:

Technique

Nadhi - Sodhana/ Anulom -Vilom also known as alternative nostril breathing, is a very relaxed, balancing breath that is used to help calm the nervous system and aid in a restful night's sleep. By increasing the amount of oxygen taken into the body, it's believed that this breath can also purify the blood, calm the mind, reduce stress, and promote concentration and alters the Practioners physiological response to stress which include

greater tolerance to pain, emotional trauma and maintaining the body vitals within normal physiological limits despite stress.

We advised patients Nadhi - Sodhana (a yogic breathing practice and exercise) which can be done seated or lying down. To start, empty all the air from your lungs. Using the thumb of their dominant hand, block their right nostril and inhale through their left nostril only. Be sure to inhale into their belly, not their chest. Once they are full of breath, seal their left nostril with the ring finger of the same hand, keeping their right nostril closed, and hold the breath for a moment. Then release their thumb and exhale through their right nostril only. Seal both nostrils once they have inhaled on the right side and exhaled through the left side. A complete cycle of breath includes an inhalation and exhalation through both nostrils. This was taught to the patient by physical demonstration by the doctors of our team, who were well trained in this yogic breathing exercises

We advised the patients to perform up to ten cycles of this breathing exercises and notice how their body responds in respect to a generalized feel of well-being.

Patient were monitored at 3 day interval regularly.

Materials and Methods

A total of 40 patients having cholelithiasis which consisted 34 females and 6 males (All were nonsmoker) with age varying from 18years to 82years were recruited from our hospital, Uttar Pradesh University of Medical sciences, Saifai. Etawah. Though, the patients were from different background they all were managed in the similar atmosphere, diet and treatment. As laparoscopic

Cholecystectomy is the gold standard^{5, 6} for the treatment of Cholelithiasis. We decided to conduct a study of, yogic breathing techniques pre operatively 2 weeks prior to the surgery and postoperatively on patients undergoing elective laparoscopic cholecystectomy. Out of 40 patients, 36 were unaware of breathing techniques and were termed as non-yoga practitioners, 2 patients were self-inherited practitioners of yoga who picked it up by watching television and two were practitioners who did not practice since 6-7 months with reasons not documented. The study was conducted in the Department of Surgery in our University of medical sciences and hospital. The study was explained to all subjects and their written informed consent had been obtained. The sample size was determined based on the number of subjects who volunteered to participate in the trial.

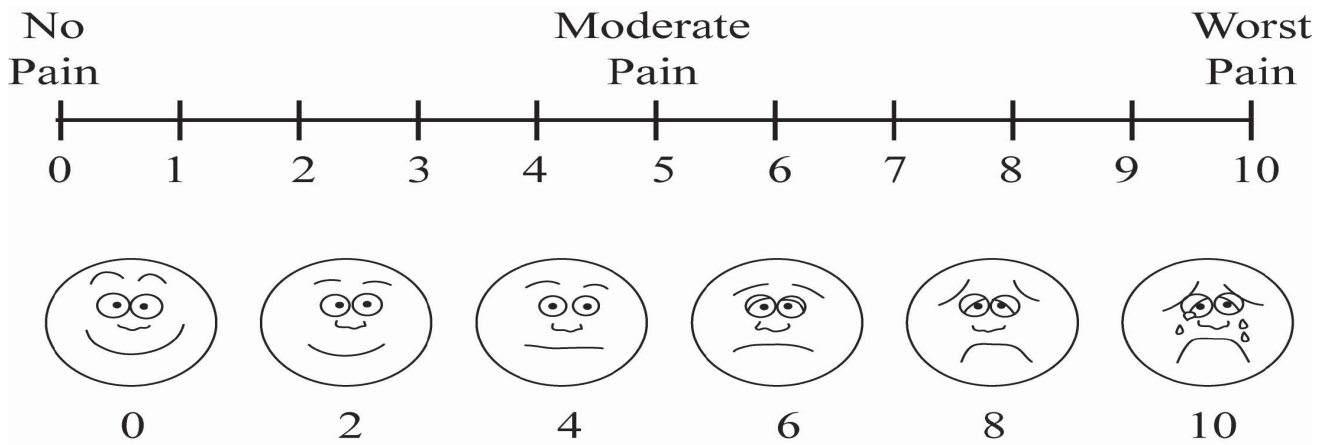
The cohort of 40 patients was divided into the subject of 20 patients and 20 patients as the control group, which was randomly assigned by the computer generated software system. Note of comorbid condition was also made. In our institution, the average waiting time from reporting to the OPD to undergoing the knife is around 2 week the control group was taught about the technique of *Nadhi sodhana/ anulom vilom* for around 5 minutes by the doctors of our team who were aware of these techniques and practicing it for around 4 to 5 years. The patient of the subject group were advised to do these breathing exercises 10 minutes each every day. When they were admitted for surgery 48 hour earlier as per our institutional protocol.

They performed these exercises twice daily for 10 minutes each. Under supervision of the surgical staff. On the day of surgery also, they should practice it for 20 minutes before the surgery. All the 40 patients were operated by a same operating unit/ teams and the same anesthetic team, with an aim of minimizing the bias. The preoperative and postoperative care was provided by the same team which includes JR, Intern and Paramedics. In the Postoperative period, the subject group was advised for gentle deep breathing exercises for 10 minutes at 2 hrs, then next 4 hrs and then next 4 hour, and from the next day *Anulom Vilom*, was also encouraged as a routine in morning and evening till discharge. The patients were also followed 10 days after the surgery at the time of suture removal for the assessment of any complication, generalized well-being and other parameters.

Exclusion criteria; patient with type II diabetes mellitus and neurological problems were excluded because of altered perception to pain.

Results

The results are evaluated in a tabular form .The tolerance of pain at 2,6 and 10 hours in postoperative period was also tabulated and it was analysed that there was no significant difference in the first 2 hour of assessment, but at the end of 6 hour there was a significant difference in the two group respectively, with the study group reporting less pain and consequently the analgesic requirement was lessened. At the end of 10 hour there was a marked difference in the pain score. Pain assessment was done as per Visual Analog Scale⁷.



Control group

Mean weight (kg)	Mean age(year)
71.4	37.30

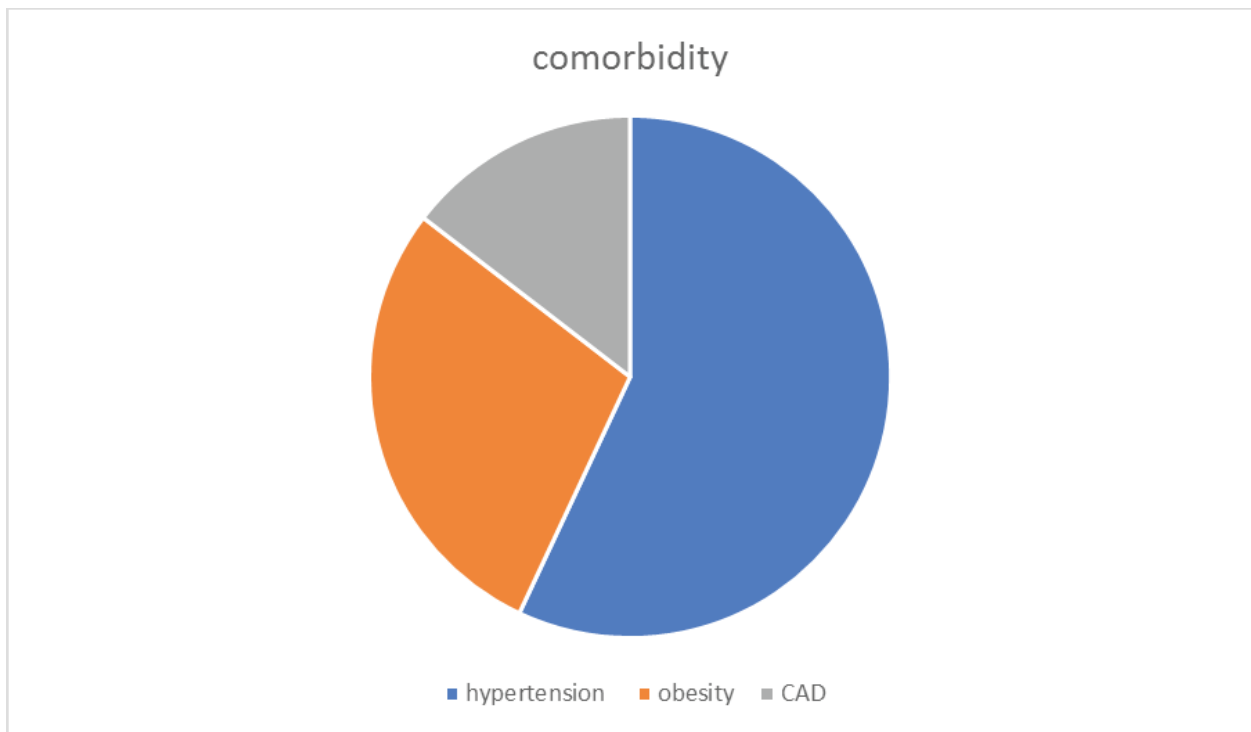
Subject group

Mean weight (kg)	Mean age (years)
76.55	35.45

Male to female ratio;

	Control group	Subject group
Male	3	17
Female	3	17

The most common comorbidity associated was hypertension accounting for more than half of the comorbidities (57.14%, approximately 17.5%) of the patients are having comorbid conditions



The return of the bowel sound in the both group assessed by auscultation for 2 to 3 minutes of the abdomen was recorded and it was found that mean time for return of bowel sound in the study group was 5 hour and 57 minutes which has a significant value in comparison to 8 hour in the control group.

	Mean time for return of bowel sound
Control	8 hours
Subject	5 hour 57 minutes

In the post-operative chest auscultation, air entry was found normal in all the patients. In association the postoperative fluctuation in the BP and RR in the HDU ward was observed to be less in the subject group in contrast to the control group.

ensuring similar modified Aldrete score in the post op patient. In our study we found that the mean alertness level at 1 hour post op in subject groups was 7.2 in respect to 5.8 in the control group, which has a significant value.

The level of alertness was evaluated by the standard P strike test, which was done after

MODIFIED ALDRETE SCORE

Criteria	Point value
Oxygenation	
SpO2 > 92% on room air	2
SpO2 > 90% on oxygen	1
SpO2 < 90% on oxygen	0
Respiration	
Breathes deeply and coughs freely	2
Dyspnoeic, shallow or limited breathing	1
Apnoea	0
Circulation	
Blood pressure \pm 20 mmHg of normal	2
Blood pressure \pm 20–50 mmHg of normal	1
Blood pressure more than \pm 50 mmHg of normal	0
Consciousness	
Fully awake	2
Aousable on calling	1
Not responsive	0
Activity	
Moves all extremities	2
Moves two extremities	1
No movement	0

	Mean alertness level 1 hour postop
Control	5.8
Subject	7.2

s. no	age/sex	weight(kg)	Comorbidity	operating time(min)	chest auscultation	alertness level	pain at 2/4/8 hours	return of bowel sound(hours)	complications
1	24/f	56	-	15	0	6	8,7,4	4	Nil
2	23/f	49	-	15	0	7	8,6,4	6	0
3	34/f	59	-	16	0	8	8,7,6	6	0
4	78/m	68	Hypertension	17	0	7	8,7,7	7	0
5	31/f	83	-	15	0	8	8,6,4	5	0
6	49/f	94	-	15	0	9	8,8,6	8	0
7	23/f	58	-	14	0	7	8,6,5	5	0

8	20/f	56	-	17	0	8	8,6,4	6	0
9	35/f	69	-	15	0	7	8,6,4	6	0
10	51/f	86	Obesity	18	0	6	8,6,3	8	0
11	18/f	64	-	16	0	6	8,6,4	8	0
12	76/f	68	HTN	18	0	7	8,7,4	8	0
13	33/F	65		14	0	6	8,3,3	7	0
14	21/F	56	CAD	16	0	7	8,6,4	6	SEROMA
15	32/F	35	-	15	0	7	8,6,4	7	0
16	42/f	67	-	18	0	6	8,6,4	7	0
17	38/f	65	-	15	0	7	8,6,6	6	0
18	29/F	76	-	16	0	7	8,6,4	7	0
19	20/f	54	-	18	0	7	8,7,5	6	0
20	32/F	64	-	18	0	5	8,6,3	6	0
21	20/F	48	-	19	0	5	8,6,3	7	SEROMA
22	23/F	66	-	20	0	6	8,7,5	7	0
23	29/M	72	-	20	0	5	8,6,4	7	0
24	54/F	75	HTN	22	0	5	8,7,7	7	0
25	53/F	71	0	25	CREPTS	4	887	7	0
26	65/F	69	-	20	0	5	886	7	0
27	20/F	48	-	14	0	6	865	6	0
28	38/F	78	-	18	0	7	866	7	0
29	30/M	88	-	17	0	6	863	7	0
30	23/F	88	-	19	0	7	864	7	0
31	31/F	71	-	17	0	5	864	8	0
32	51/F	69	-	20	0	7	863	7	0
33	37/F	74	-	25	0	7	866	7	0
34	82/F	77	HTN	22	0	8	864	6	0
35	69/F	69	OBESITY	23	0	8	864	7	0
36	29/F	81	-	22	0	8	863	7	0
37	19/F	80	-	25	0	7	863	7	0
38	29/F	79	-	22	0	8	863	8	0
39	21/F	69	-	23	0	7	866	8	0
40	23/M	79	-	23	0	8	863	7	0

Master chart

Discussion

In the modern Era, there has been tremendous research work done for the better outcome of post op patients, but the effectiveness of yoga and its role in postop recovery has been sparingly documented, hence this study is devoted to correlate and pass on the benefits to the patients.

Our study was very simple and cost effective, it required no specialized training or equipment or technique, and only requirement was motivation of the patient and his /her commitment.

In our scenario, training was provides by trained members of our team, the learning phase is also very short and better patient compliance hence

making the study more feasible. No specialized equipment are required. The parameter for training are replicable and doable without any absolute contraindications.

In our study the mean age of the patient undergoing Laparoscopic Cholecystectomy matches with standard literature and irrespective of the comorbid conditions. Yogic exercises commenced preoperatively definitely improved the post-operative alertness level of the patient. Thus, configuring the advantage of aspiration pneumonitis, perception of pain in the subject was significantly reduced in comparison to the control group and it helps in reducing the administration of analgesics to the patients.

Table 1 Post-operative analgesia requirement (injection diclofenace 75 mg IM)

Analgesia requirement	2 hour	4hour	8hour
Control	90%	85%	55%
Subject	80%	60%	25%

Thus, saving the patients of the ill effects of the analgesic agent and statistically reducing the cost component, besides reducing the workload of already overburdened nursing staff.

Table 2 comparison of post-operative pulse rate in control and subject

Pulse rate	2 hour		4 hour		8 hour	
	control	subject	control	Subject	control	Subject
>100/min	20%	15%	10%	5%	5%	0
90-100 /min	35%	25%	25%	15%	15%	10%
<90/min	45%	70%	75%	80%	80%	90%

Table 3 comparison of post-operative systolic blood pressure

Systolic blood pressure	2 hour		4 hour		8 hour	
	control	subject	control	Subject	control	Subject
Variation of +/- 20 mmHg from preoperative values	30%	15%	15%	5%	5%	0

Table 4 comparison of post-operative diastolic blood pressure

Diastolic blood pressure	2 hour		4 hour		8 hour	
	control	subject	control	Subject	control	Subject
Variation of +/- 5mmHg from preoperative values	20%	5%	5%	0%	0%	0%

The variations of the vitals like blood pressure, pulse and bowel sound in the study group was significant better than the control group. In the long term follow up, the patient in the study group practicing yogic exercises, reported a generalized feeling of well-being and besides lesser requirement of dosage for drug for blood pressure control and better sleeping pattern without any drug dependency and better digestive systems. The physiological body function was also better in the study group after a period of 10 days, Thus, the study concludes that preoperative breathing yogic exercises two weeks prior to surgery has a positive impact in the outcome of surgery. This study has opened a vista for further undertaking research on long term effects on control of obesity, coronary artery disease, pulmonary functions and generalized well-being in post-operative patients the authors have been convinced by these encouraging results and are now actively practicing yogic breathing

exercises.

Ethical Clearance- Taken

Source of Funding- Self

Conflict of Interest - Nil

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