

Effect of yoga therapy in reversible inguinal hernia: A quasi experimental study

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ABSTRACT

Background: Hernia is an abnormal protrusion of an organ or tissue through a defect in its surrounding walls which most commonly involves the abdominal wall, particularly the inguinal region. The treatment options for hernia ranges from simple exercises to modern surgeries. The effect of yoga therapy is not scientifically examined for reversible inguinal hernia and hence this study is undertaken with the aim to test the effect of selected asanas in reversible inguinal hernia.

Materials and Methods: A quasi experimental trail of 19 males through consecutive sampling was done with selected asanas for three months and the outcome was measured by a questionnaire focusing on pain, aggravating factors, relieving factors and frequency of occurrence of symptoms of hernia.

Results: The pre and post interventional data were compared statistically and found significant reduction of symptoms with $P \leq 0.001$ in pain, frequency of occurrence and aggravating factors. The relieving factors showed significant increase with $P \leq 0.001$.

Conclusion: Yoga therapy with selected asanas is effective in the treatment of reversible inguinal hernia.

Key words: Inguinal hernia; reversible; yoga therapy.

INTRODUCTION

“Hernia” is derived from the *Latin* word for rupture. It is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls.^[1] It may be operationally defined as the abnormal protrusion of a structure through a defect in the tissues that normally contain that structure.^[2] Although hernia can occur at various sites of the body, these defects most commonly involve the abdominal wall, particularly the inguinal region. Abdominal wall hernias occur only at sites when the aponeurosis and fascia are not covered by striated muscle. These sites most commonly include the inguinal, femoral, and umbilical areas, the linea alba, the lower portion of the semilunar line, and sites of prior incisions. The “neck” or orifice of a hernia is located at the innermost musculoaponeurotic layer whereas

the hernia sac is lined by peritoneum and protrudes from the neck. There is no consistent relationship between the area of hernia defect and the size of hernia sac.^[1]

Inguinal hernia is due to weakness of the abdominal muscles which holds the organs in their original positions. So the organ gets protruded through inguinal canal and sometimes to scrotum. The causes for inguinal hernia are congenital weakness or the developmental defect in the abdominal muscles or ligaments, unexpected pull while handling heavy item, which split the muscles and ligaments, elevated intra-abdominal pressure, flabbiness of the abdominal muscles and obesity.

Incidence and prevalence

Hernias are a common problem; however, their true incidence is unknown. It is estimated that 5% of the population will develop an abdominal wall hernia, but the prevalence may be even higher. Approximately 75% of all hernias occur in the inguinal region. Based on national operative statistics, incisional hernias account for 15% to 20% of all abdominal wall hernias, umbilical and epigastric hernias constitute 10% of hernias, femoral hernias for

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about 5%, and unusual hernias for the remainder. The prevalence of hernias increases with age, particularly for inguinal, umbilical, and femoral hernias. Men are 25 times more likely to have a groin hernia than women.^[1]

Treatment

Reversible inguinal hernia may be treated non-surgically or surgically. The non-surgical intervention includes special type of belt, called a truss, to support the hernia and keep it from bulging out. The subjects will be advised to avoid any activities that cause abdominal strain. Surgical intervention is done by pushing the piece of intestine back into place and repairing the abdominal wall and so the intestine cannot push through again. Surgery is preferred to avoid the possibility of a strangulated hernia.^[3]

Need for the study

The treatment options for hernia range from simple exercises to modern surgeries. There are various research literatures^[4-7] listing the use of surgeries and their complications. The yoga therapy is suggested by various yoga practitioners through awareness magazines/articles, but not yet proved by any scientific research; hence this study was aimed at testing the effect of selected asanas on reversible inguinal hernia which is not an acute medical problem but need to be treated.

MATERIALS AND METHODS

Research design

The study was a quasi-experimental design and ethical clearance was obtained from institutional review board. Consecutive sampling was followed in selection of the samples. All males diagnosed with reversible inguinal hernia in the age range between 24 years and 46 years were included in the study. Subjects with hypertension, heart problems, recent fractures, arthritis or vertebral problems, where special care is needed or yoga therapy might pose risk were excluded from the study. Subjects diagnosed between 23rd July 2009 and 22nd Feb 2010 in study setting as reversible inguinal hernia fulfilling inclusion and exclusion criteria and willing to participate in the research were recruited for the study. The total number of participants was 19. All the subjects included in the study were treated with yoga therapy for duration of 3 months.

Procedure

Individuals who fulfilled the inclusion criteria were selected for the study by consecutive sampling method after obtaining informed consent from them. Pre-intervention assessment was done by using hernia questionnaire. After pre-intervention assessment, selected asanas were given

for ten repetitions with corresponding breathing pattern followed by relaxation for 1 h daily for duration of three months. Initially asanas were done under the supervision of a trained yoga professional till the subjects become familiar with asanas. All subjects got familiarized with asanas in about two-weeks duration. Later they practiced the asanas at their home and follow up was once in a week. Yoga therapy was continued for three months and post intervention assessment was taken.

Vajrasana, ushtrasana, paschimottanasana, pawanmuktasana, utthanpadasana, matsyasana and sarvangasana were selected based on its effects to compress inguinal canal, strengthen the abdominal muscles and to reduce the intra-abdominal pressure, because weakness or flabbiness of abdominal muscles and elevated intra-abdominal pressure may be the causes for the hernia in non-congenital subjects included in this study.

Vajrasana is a meditative asana not involving much of muscle work and was used as a preparatory for yoga therapy with added benefits of compressing inguinal canal which will prevent protrusion of abdominal contents.

Ushtrasana and paschimottanasana were included based on the principle of proprioceptive neuro muscular facilitation technique namely repeated stretch^[8] i.e. the stretch reflex elicited from muscles under the tension of elongation will facilitate muscles to contract. Ushtrasana will facilitate abdominal muscles to stretch and paschimottanasana will facilitate them to contract along with compression over inguinal canal.

Pawanmuktasana strengthens abdominal muscles, compresses inguinal canal and also reduces intra-abdominal pressure by releasing air from gastro intestinal tract and utthanpadasana has got direct strengthening effect over abdominal muscles.

Matsyasana is complementary to sarvangasana included to neutralize the flexion force created over the normal neck and sarvangasana is to move abdominal contents toward thorax thereby reducing abdominal pressure and to prevent protrusion of abdominal contents or to facilitate replacement of herniated contents.

Data analysis and results

The pre-intervention and post-intervention assessments were carried out by using the hernia questionnaire designed for this study. This includes the details about intensity of pain, relieving factors, aggravating factors and frequency of occurrence in last two weeks which were used for analysis along with the general information. Schedule method of data collection was used. Data analysis including descriptive analysis and inferential analysis were done

by using computerized software (SPSS-11.5) Statistical package for social sciences, Version 11.5 for windows.

Descriptive statistics

Descriptive statistics includes measures of central tendency specifically the median and measures of dispersion namely minimum, maximum, first quartile, third quartile and quartile deviation for all the studied dependent variables before and after intervention.

Inferential statistics

Inferential statistics of significance testing was done by using Wilcoxon signed-rank test with asymptomatic two tailed z test for paired observations i.e. before and after intervention for all studied variables.

General information

Nineteen subjects participated in the study. General information like age, side of bulge, first occurrence of symptoms, activity during first occurrence and effect of rest were also recorded for all participants as applicable.

Age group

Age of the subjects ranged from 24 to 46 years, with the mean of 36.26 years and standard deviation of 7.43 years.

Side involved

Out of nineteen subjects studied, ten presented with left side hernia, eight with right side hernia and remaining one presented with hernia on both sides.

First occurrence of the problem

Out of nineteen studied, eleven subjects were not able to retrieve any detail about first occurrence of the problem. For six subjects, the problem occurred during activity and taking rest relieved it. Remaining two was not clear about the exact activity during occurrence, but they gave the approximate duration of their problem. For all the subjects, there was no history of previous hernia.

Pain

Intensity of pain was measured with numeric pain rating scale starting from zero to ten where zero indicates no pain and ten indicates maximum tolerable pain, which was a part of the hernia questionnaire.

Pain intensity before intervention ranged from three to eight with median of six and quartile deviation of one.

Pain intensity after intervention was from zero to three with median of one and quartile deviation of one [Table 1, Figure 1]. The z value of Wilcoxon signed-rank test which is equal to -3.864 with P value <0.001 denotes that there is statistically significant reduction in pain after intervention.

Aggravating factors

The participants were asked which of the five most common activities exacerbate the problem. The activities are exercise/walking, bowel movement, bladder activity, lifting and coughing/sneezing.

Out of nineteen participated, 9 showed the presence of three activities, 6 showed the presence of four activities and remaining 4 showed the presence of all five activities before intervention.

After three months of intervention with selected yogasanas, 14 subjects presented with the presence of two activities to increase the problem, 1 presented with one activity and the remaining 4 subjects presented with no activity to increase the problem out of the five commonly found activities.

Wilcoxon signed-rank test z value of -3.875 with $P < 0.001$ denotes that there is statistically significant reduction in aggravating factors after yogic practice [Table 2, Figure 1].

Relieving factors

The symptoms of inguinal hernia may be relieved by three activities which reduce the intra-abdominal pressure viz.

Table 1: Data analysis for pain before and after intervention

Pain	n	Median	Min.	Max.	Q1	Q3	QD	Z value	P value
Before	19	6.00	3.00	8.00	5.00	7.00	1	-3.864	$<.001$
After	19	1.00	0.00	3.00	0.00	2.00	1		

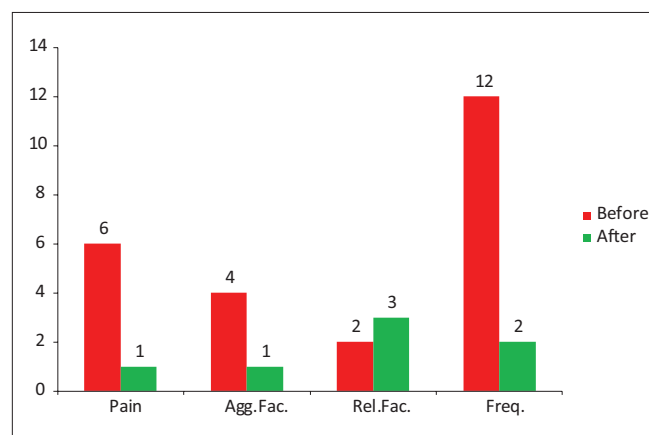


Figure 1: Pre-treatment and post-treatment values of pain, aggravating factors, relieving factors and frequency of occurrence of symptoms. Pain - Maximum score 10; Agg. fac. (aggravating factors) - Maximum score 5; Rel. fac. (relieving factors) - Maximum score 3; Freq. (frequency) - Depending on individual

sleeping, lying down and sitting which were also asked for its presence.

Out of nineteen subjects participated, seven showed the presence of one relieving factor, another seven showed the presence of two relieving factors and the remaining five showed the presence of all three relieving factors before intervention. All nineteen subjects showed the presence of all three relieving factors after intervention [Table 3, Figure 1].

The z value of Wilcoxon signed-rank test which is equal to 3.391 with $P < 0.001$ denotes that there is statistically significant increase in relieving factors of inguinal hernia after intervention.

Frequency of occurrence

Frequency of occurrence of the hernia i.e. number of times in last two weeks were also analyzed before and after intervention. The median for frequency of occurrence before intervention is twelve times with range from nine to fourteen times per two weeks. Frequency of occurrence reduced from zero to six times with median of two times after practise of yoga.

The z value of Wilcoxon signed-rank test which is equal to -3.835 with P value < 0.001 denotes that there is statistically significant reduction in frequency of occurrence of symptoms of hernia after intervention [Table 4, Figure 1].

DISCUSSION

This quasi-experimental trial studied the effect of yoga therapy in subjects with reducible inguinal hernia. The result shows that yoga therapy is significantly effective in the management of reducible inguinal hernia in males.

Taylor *et al.*, concluded that surgical site infection after groin hernia repair is common and large clinical trials are required to determine whether the use of prophylactic antibiotics reduces the incidence of infection.^[4]

Kalliomaki *et al.*, concludes that the possibility of long-term pain as an outcome after hernia operations should be taken into consideration in the decision making prior to operation for hernia since in majority of patients pain in the operated groin interfered with daily activities.^[5]

Bay-Nielsen, *et al.*, concluded that one year after inguinal hernia repair pain is common and is associated with functional impairment in more than half of those with pain. The question of postoperative pain needs to be discussed with patients when considering surgical intervention for an inguinal hernia.^[6]

Table 2: Data analysis for aggravating factors before and after intervention

Agg. fac.	n	Median	Min.	Max.	QD	Z value	P value
Before	19	4.00	3.00	5.00	0.5	-3.875	<.001
After	19	1.00	0.00	2.00	0		

Table 3: Data analysis for relieving factors before and after intervention

Rel. fac.	n	Median	Min.	Max.	Q1	Q3	QD	Z value	P value
Before	19	2.00	1.00	3.00	1.00	3.00	1	3.391	<.001
After	19	3.00	3.00	3.00	3.00	3.00	0		

Table 4: Data analysis for frequency of occurrence of hernial bulge before and after intervention

Freq.	n	Median	Min.	Max.	Q1	Q3	QD	Z value	P value
Before	19	12.00	9.00	14.00	10.00	14.00	2	-3.835	<.001
After	19	2.00	0.00	6.00	1.00	3.00	1		

Bay-Nielsen, *et al.*, concluded that chronic pain is common after primary inguinal hernia repair in young males and there is no difference in the pain associated with open and non-mesh repair.^[7]

The results of some studies^[4-7] explain the complications associated with surgical repair of hernia. So hernia can be better treated without surgery if it is not an acute health threat. Ancient health science will be much helpful, cost effective and can be used as an adjunct to physiotherapy or medical practise. The results of current study are also supported by the following articles.

Millikan K and Deziel D concluded in their study on the cost-effective management of hernia that exercises are more beneficial than any kind of modern surgery available for the management of hernia. When compared with cost effectiveness and complications, exercises are the best methods of treatment for hernia.^[9]

Yoga practices are very useful in reducing the symptoms of hernia such as heaviness, fullness and pain. Yoga can help only in early stage of hernia when it is just a small bulge and reducible. When it is irreducible and large, yoga cannot help.^[10]

Staff concluded in his article that, being diagnosed with a hernia does not mean the end to yoga practice. He also adds that a gentle yoga practice can help bring strength to the musculature where the hernia is occurring, thereby useful in reducing hernia.^[11]

Current study focuses on selected asanas only and it is further recommended to experiment with more number of asanas, pranayama, bandhas and mudras in large randomized sample with control group in more homogeneous sample including both sexes for long term follow-up effects.

CONCLUSION

Yoga therapy with selected asanas is effective in the treatment of reversible inguinal hernia.

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