''A RANDOMIZED CONTROL STUDY TO EVALUATE THE EFFECT OF POSITIVE END-EXPIRATORY PRESSURE AND POST-OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTION OF RIGHT SHOULDER TIP PAIN AFTER LAPAROSCOPIC CHOLECYSTECTOMY AND APPENDECTOMY.''

BY

REG NO - BH0121014

DISSERTATION

Submitted to

KAHER, Belagavi, Karnataka,

In partial fulfillment of the requirements for the degree of

MASTER OF SURGERY[M.S]

IN GENERAL SURGERY

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JAWAHARLAL NEHRU MEDICAL COLLEGE,KAHER ,

BELAGAVI - 590010.

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ENDORSEMENT

This is to certify that the dissertation entitled 'A RANDOMIZED CONTROL STUDY TO EVALUATE THE EFFECT OF POSITIVE END EXPIRATORY PRESSURE[PEEP] and POST-OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTION OF RIGHT SHOULDER TIP PAIN AFTER LAPAROSCOPIC CHOLECYSTECTOMY AND APPENDECTOMY. is a bonafide research work done by [REG NO BH0121014].

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The softcopy of thesis entitled: " **A RANDOMISED CONTROL STUDY TO EVALUATE THE EFFECT OF PEEP AND POST OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTIKN OF RIGHT SHOULDER TIP PAIN AFTER LAP CHOLE AND LAP APPENDIX"** has been submitted for anti-plagiarism check through Turnitin software. The scan has been carried out and the scanned output reveals a match percentage of **08%** which is within the acceptable limits of **10%** as per the guidelines given by UGC.

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Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"A RANDOMIZED CONTROL STUDY TO EVALUATE THE EFFECT OF POST OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTION OF SHOULDER TIP PAIN AFTER LAPAROSCOPIC PROCEDURE- A ONE YEAR STUDY AT TERTIARY CARE CENTRE."** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee.

(Dr. Nayana Hashilkar)
Basic Medical Scientist & Alternate Chairperson
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Chairman,
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UNDERTAKING

I, [REG NO BH0121014] Here by declare that the information and the data mentioned in my dissertation entitled 'A RANDOMIZED CONTROL STUDY TO EVALUATE THE EFFECT OF POSITIVE END EXPIRATORY PRESSURE[PEEP] AND POST OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTION OF RIGHT SHOULDER TIP PAIN AFTER LAPAROSCOPIC CHOLECYSTECTOMY AND APPENDECTOMY.' belongs to me and is original. I am aware of the definition of plagiarism as detailed below;

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ABSTRACT

Introduction: Laparoscopic surgery is the mainstay of treatment for the diseases of the appendix and gallbladder.Although laparoscopy has proved its superiority over laparotomy in terms of postoperative pain scores,Postoperative right shoulder tip pain remains a major concern.Post-laparoscopy right Shoulder tip pain is reported to occur in 35 to 70 percent of the patients. The pain can be severe and disturbs the patient's quality of life on the first postoperative day. The mechanisms behind the post laparoscopic right shoulder tip pain are due to the Residual carbon dioxide present in the abdominal cavity which causes irritation of the phrenic nerve and referred pain to the shoulders. With the help of Positive end-expiratory pressure [PEEP] and Incentive spirometry [IS], The incidence of post laparoscopy Right shoulder tip pain can be reduced.

Aims and Objective: To find the Postoperative Right shoulder pain reduction with the use of Positive end-expiratory pressure and incentive spirometry and The incidence of the Right shoulder tip pain post-Laparoscopy.

Materials and Methods: A Total of 60 Patients who were admitted to KLES.DR.PRABHAKAR.KOREHOSPITAL.and, Belagavi undergoing elective Laparoscopic Cholecystectomy and Laparoscopic appendectomy from January 2023 to December 2023 were included in the study. Both males and females above 18 years who are consenting were included in the study.

Patients excluded were those conversion to laparotomy, Bleeding disorders, Patients who already have chronic shoulder pain preoperatively, Immunocompromised patients, and diabetic patients.

After admission, a detailed history and clinical examination were done for all the patients, For Patients in Group A, 5 cycles of PEEP were given before the laparoscopy ports removal with ports in situ with the valves opened and in the postoperative period, Incentive spirometry was used every 4th hourly for 48 hrs and the Shoulder pain has been measured with Visual Analog score[VAS].In group B, PEEP and Incentive spirometry were not used, and the shoulder pain was measured with the Visual Analog Score [VAS].

Statistical analysis: Descriptive analysis was carried out by mean and standard deviation for quantitative variables and frequency and proportions for categorical variables. Data was also represented using appropriate diagrams like bar diagrams and pie charts.

The association between explanatory variables and categorical outcomes was assessed by cross-tabulation and comparison of percentages. The chi-square test was used to test statistical significance.

P value <0.05 was considered statistically significant. Data was analyzed by using coGuide software V.1.01.

Results: A total of 60 patients were included in the study and were divided into two groups.

Group A has patients with PEEP and spirometry has 3 patients who have right shoulder tip pain, of which 2 have mild and 1 has moderate pain which lasted for 6-24 hrs.

Group B has patients without PEEP and no spirometry has 18 patients with Right shoulder pain of which 9 has mild pain, 8 with moderate pain, and 1 has severe pain which lasts for 24 - 48 hours.

The incidence of Right shoulder pain in a patient with PEEP and spirometry [group A] is 10 percent[3 out of 30 patients] .

The incidence of post-laparoscopy Right shoulder pain without PEEP and no Spirometry is 60 percent [18 out of 30 patients].

Conclusion: Postoperative Right shoulder pain is the most common thing that the patient complains about after the laparoscopic procedure. According to our study, the use of PEEP before laparoscopic port removal with valves open and Spirometry reduced the right shoulder pain in group A.

HENCE, The use of Positive end expiratory pressure [PEEP] before laparoscopic port removal with the valves open and post operative incentive spirometry for 48hrs can be used as the routine practice in laparoscopy cases to relieve post-operative Right shoulder tip pain.

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INTRODUCTION

Laparoscopic surgery is the mainstay of treatment for the diseases of the appendix and gallbladder. It has evolved from usage for diagnostic purposes to the gold standard treatment method.Although laparoscopy has proved its superiority over laparotomy in terms of postoperative pain scores, post-operative Right shoulder tip pain remains a major concern.Post-laparoscopy right Shoulder tip pain is reported to occur in 35 to 70 percent of the patients. The pain can be severe and disturbs the patient's quality of life on the first postoperative day. It gets usually relieved in 48hrs and it rarely persists after 72 hrs.

The mechanisms behind the post laparoscopic right shoulder tip pain are due to the Residual carbon dioxide present in the abdominal cavity which causes irritation of the phrenic nerve and referred pain to the shoulders.

Various intraoperative preventive measures have been proposed to reduce shoulder pain by using low insufflation rate and pressure, Valsalva maneuvers,Filling the abdominal cavity with a lactated ringer, and active deflation of the abdomen

However, all the methods were reported with some disadvantages as the surgeon has to operate at low pressure and this leads to increased operative time.

Positive end-expiratory pressure [PEEP] is a pressure used at the end of the expiration to keep the small airways open which helps in the expulsion of the CO2 gas used intraoperatively during the laparoscopic procedure.As the residual CO2 has been expelled actively by this maneuver, the patients experience less or no shoulder pain post-procedure which makes the post-operative period healthier.

Incentive spirometry is a handheld device that helps the patient to mimic slow deep breaths which cause increased inspiratory volume. thereby helping in the passive expulsion of the residual CO2 by stretching the diaphragm.

In our study, we have evaluated the incidence and the severity of the Right shoulder tip pain post laparoscopy.In this study risk variables are evaluated and pain scores were calculated to assess the post-operative right shoulder tip pain thereby improving the quality of life in the post-operative period.

AIMS AND OBJECTIVES

The aim of this study was to find the

1. Postoperative Right shoulder pain reduction with the use of Positive end-expiratory pressure [PEEP] and incentive spirometry.

2. The incidence of the Right shoulder tip pain post-Laparoscopy.

Review of Literature

Anatomy

The anatomy of the anterior abdominal wall is important in the case of laparoscopic surgery for selecting the port site. There is one long vertically oriented segmental muscle [Rectus Abdominis] on each side and three large flat muscles [External oblique, Internal oblique, and Transverse abdominis]

The arterial supply of the anterior abdominal wall is by 4 artery

1 Musculophrenic artery.

2 Deep circumflex Iliac artery.

3 Superior epigastric artety.

4 Inferior epigastric artery.

The Inferior epigastric artery is an important vessel in laparoscopic surgery as it is less variable than the superior epigastric and bleeding from the inferior epigastric is disastrous because of its large diameter compared to the superior epigastric.

Between the transversus abdominis and the internal oblique muscle, there is a course of nerves that supply the anterior abdominal wall.The umbilicus and the surrounding area are supplied by 7th Thoracic to 1st Lumbar nerve roots.

The umbilicus is the landmark of choice for access into the abdominal cavity in the laparoscopic procedure. It is the scar after the umbilical cord is obliterated.

Skin, fascia, and the peritoneum are fused with minimum fat.

The midline of the abdomen is free from muscle Fibres, nerves, and vessels except at the inferior edge where the pyramidalis muscle is sometimes found.

The phrenic nerve is a mixed nerve arising from the anterior rami of c3, c4, and c5 which are the main components of the cervical plexus.

It starts the course in the neck, descends vertically through the thorax, and ends in the diaphragm. The main function of the phrenic nerve is to provide innervation to the diaphragm Which is the important muscle for breathing.

The right shoulder tip pain post laparoscopy is due to the referred pain due to the Irritation of the diaphragm as the phrenic nerve has the sensory innervation to the shoulders.

Pneumoperitoneum

At the invention of laparoscopy, filtered Room air was used in the creation of the pneumoperitoneum Now, carbon dioxide and nitrous oxide are the preferred gases used for laparoscopy as the room air is associated with the increased risk of air embolism.Co2 is used for insufflation because it is 200 times more diffusible than oxygen.It is cleared easily from the lung and it will not support combustion.

Nitric oxide has the advantage of being a mild analgesic and the post-operative pain is less when used for creating pneumoperitoneum.But nitric oxide supports combustion better than air hence it should not be used for the longer procedure

Co2 has the advantage of allowing concomitant use of electrocoagulation and laser irradiation.Co2 when it comes in contact directly with the peritoneal fluid converts to carbonic acid. Carbonic acid irritates the diaphragm causing shoulder tip pain and some discomfort in the abdomen.

Carbonic acid has an antiseptic effect.

Helium has been used in some centres but it has no added benefit over Co2.

Quadro manometric indicators of insufflators

These are the four most important readings of the insufflators.

1. Preset insufflation pressure.

2. Actual pressure.

3. Gas flow rate.

4. Volume of gas consumed

Preset insufflation pressure

It is the pressure which is used by the surgeon to insufflate the abdominal cavity.This pressure is set before insuffalating the abdomen..This is the command that is given by the surgeon to the insuffalator to keep the pressure at this level.The ideal preset pressure should be 12 mm hg.In any of the circumstances, this pressure should not cross the level of 18 mm hg.Good quality insuffalator machines will always keep intra-abdominal pressure at the preset pressure throughout the procedure.When there is some gas leak, the insuffalator senses this and injects some gas into the abdominal cavity to maintain the preset pressure.When the intraabdominal pressure increases due to some external pressure,The insufflator ejects out some gas to maintain the preset pressure.

Actual pressure.

This is the actual pressure within the abdominal cavity which is sensed by the insuffalator.Depending on the actual pressure,insuffalators maintain the pressure automatically.There are some disadvantages to the hemodynamic stability of the patients.When the actual pressure is more than 20 to 25 mmHg.

1 Increased intra-abdominal pressure, increased pressure leads to vena cava compression leading toIncreased chances of DVT.

2 Hidden cardiac ischemia which is due to low cardiac output due to reduced venous return.

3 Decreased Tidal volume because of Diaphragmatic excursion.

4 Increased Risk of Surgical Emphysema

5 Increased risk of air embolism due to venous intravasation of gas.

Flow rate.

This value represents the rate of flow of CO_2 through the tubing of the insuffalator.This should be adjusted to 1 liter per minute.As this value prevents the risk of air embolism when the veress needle is inadvertently inserted into the vessel.If the flow rate when used directly through the ports is more than 7, this can lead hypothermia to the patient.

Total gas used.

A normal abdominal cavity requires 1.5 liters of CO2 to fill the entire abdominal cavity to the preset pressure of 12 mmHg.Sometimes in multipara and obese individuals, this can reach up to 3 litres.This value should be checked.Whenever the amount of the gas which is required to inflate the abdominal cavity is high or low then the surgeon should suscept the fault in the insuffalating device. Or there is a kink in the tube

These errors can happen due to

Preperitoneal space creation.

Leakage.

Extravasation of the gas.

Harmful effects of pneumoperitoneum.

Hypothermia, Cerebral edema, Ischemia, Venous thrombosis, Gas embolism, Pulmonary insufficiency, Cardiac arrhythmia, Cardiovascular collapse, Ocular hypertension and Extraperitoneal insufflation.

PHYSIOLOGICAL EFFECTS OF LAPAROSCOPY.

The introduction of the CO2 gas into the abdominal cavity under pressure has many physiological changes in the patient's hemodynamics

pain, respiratory distress and cardiac embarrassment

Pneumoperitoneum leads to upward displacement of diaphragm reduction in lung volume including important parameters such as [functional residual capacity].Pulmonary compliance is reduced and airway resistance is elevated due to increased intra-abdominal pressure.The anesthetist often uses high airway pressure to overcome the high intra-abdominal pressure for a given tidal volumeWhich increases the risk of hemodynamic changes and barotrauma.

Diaphramatic mobility is impaired resulting in ventilation perfusion mismatch.

This leads to hypercarbia and hypoxemia. Increased intra-abdominal pressure leads to the risk of regurgitation of gastric contents and pulmonary aspiration.

The increased right heart afterload causes acute right failure with arrhythmia, ischemia, hypotension, and elevated central venous pressure. Sometimes paradoxical embolus can occur through the patent foramen ovale.

Systemic venous return increases when the intra-abdominal pressure is increased.The venous return and the cardiac output depend on the intra-abdominal pressure.Venous return increases when the intra-abdominal pressure is less than 10 mm hg.This paradox is due to the decrease in the blood volume sequestrated in splanchnic vasculature which increases arterial pressure and cardiac output.

When the pressure reaches 20mm hg the inferior vena cava is compressedVenous return from the lower half of the body is compressed resulting in Massive decrease in cardiac return.

The blood supply to the kidney is compromised due to the low cardiac output. Renal blood flow reduces the GFR which in turn reduces the cardiac output.
Stretching of the peritoneum due to the pneumoperitoneum sometimes causes stimulation of the vagus nerve and can result in arrhythmias like
av dissociation, Nodal rhythm, sinus bradycardia, and asystole.

Faulty pneumoperitoneum can lead to subcutaneous emphysema, pneumomediastinum, pneumopericardium, and pneumothorax.Although gas can dissect through the existing defects in the diaphragm or through the surgically created planes and can reach the retroperitoneum, diaphragm, or falciform ligaments

MONITORING OF LAPAROSCOPIC PATIENTS

1 ECG

2 RATE OF RESPIRATION

3 SATURATION OF OXYGEN

4 NIBP

5 TEMPERATURE

6 PULSE RATE

7 CARDIAC OUTPUT

8 ETCO2

Surgeons and anesthetists should keep these points in mind during laparoscopy procedures.

- Monitoring the PeTCo2 is mandatory during the laparoscopic procedure.
- Airway pressure monitoring is mandatory in all patients receiving IPPV [intermittent positive pressure ventilation]
- Ventilation with a large tidal volume [12-15ml/kg] helps prevent alveolar atelectasis and hypoxemia and allows adequate alveolar ventilation and CO2 elimination.

POST-OPERATIVE CARE

- INCENTIVE SPIROMETRY.
- Chest physiotherapy.
- Oxygen therapy.
- Early ambulation.

Recent articles related to the present study.

E.KIHLSTEDT PASQUIER [2021] performed the study on patients undergoing laparoscopic cholecystectomy In reduction of the shoulder pain and nausea By using the pulmonary recruitment maneuver. Patients having elective cholecystectomy were randomized to either ordinary Exsufflation or ventilator piloted PRM. A questionnaire with a numeric rating scale was utilized to evaluate pain and nausea on five occasions during 48 hours. In this study, 64.3 percent of the control suffered from shoulder pain and the cases have 44.7 percent. Their study indicates that a one-minute, ventilator-pivoted PRM reduces the incidence of shoulder pain after laparoscopic cholecystectomy. It further suggests that the PRM results in reduced incidence and intensity of postoperative nausea and decreased need for analgesics and antiemetics. [1]

DENZIL GARTIEZ -MARTINEZ [2020] Has performed a study on pulmonary recruitment that can reduce residual pneumoperitoneum and shoulder pain in conventional laparoscopic procedures. Patients undergoing laparoscopic appendectomy, cholecystectomy, and hernia procedures were randomly grouped into pulmonary recruitment groups and instillation of intraperitoneal anesthetic installations. A total of 84 patients was included in the study and concluded that the PRM group had the lower incidence of subdiaphragmatic gas present in the chest x-ray and less volume of residual pneumoperitoneum and it is correlated with the lesser incidence of shoulder pain post-procedure.[2]

Vinod K. Malik and Ashish Dey[2015] have conducted the study to determine the cause of the shoulder pain post-laparoscopic procedure by using low-pressure pneumoperitoneum in one group [10-12 mmh20] and standard pressure [13-15].

In their study they concluded that the low-pressure group has 20 patients with shoulder pain compared with the standard-pressure group has only 4 stating that the duration of the surgery and the pressure used have no role in the incidence of shoulder pain.[3]

AMIT .D. RAVAL and SOHAN DESHPANDE [2020] have performed a study involving patients undergoing laparoscopic cholecystectomy using low, standard, and high intraabdominal pressures. In their trial, they concluded that the low, as opposed to the standard IAP, may reduce patients' post-operative pain, including shoulder pain and length of hospital stay.[4]

SETAREH SOLTANY, HAMID REZA HEMMATI [2020] has conducted a study on the CO2 insufflation rate on shoulder pain after laparoscopic cholecystectomy. The study included 26 patients, one group had an insufflation rate of 2.5 l/ min and the other group had an insufflation rate of 7.5 l/ min. The postoperative shoulder pain scores were calculated, the patients in the control group who had a high insufflation rate had higher pain scores. From their study, they concluded that the patients feel less shoulder pain if carbon dioxide is injected at a low - speed.[5]

XINYOU LI, KEZHONG LI, et al [2021] has conducted a prospective clinical observation on the incidence of shoulder pain post laparoscopic gynecological procedure in 442 patients and evaluated the visual analog scale to evaluate the pain of the patients at different time points after the procedure. Results in their study showed that there was an incidence of shoulder pain in 68 percent. More than 90 percent of the patients feel shoulder pain on the first day after surgery and not on the day of the surgery. The shoulder pain peaked on the 12 - 24 hours or the first day after the procedure. [6]

DOAA RIYADH ABD-ALJABBAR, SALAH HADI AL JANABY et al [2020] has performed a study comparing the incidence of post laparoscopy shoulder tip pain post laparoscopy cholecystectomy and the effect of the intraperitoneal instillation of the local anesthetic [bupivacaine 20 ml of 0.5 percent] in 500ml normal saline at the end of the procedure after the resection of the gallbladder. From their study, they have concluded that the intraperitoneal instillation of local anesthetic has significantly lowered the intensity of postoperative shoulder tip pain as well as decreased analgesic consumption, the time to mobilize after surgery, and the time of hospitalization.[7]

XIAO DENG, HOA LI, YANTONG WAN [2023] has conducted the study which includes the meta-analysis of 14 studies involving 1504 patients among which 607 patients were offered Pulmonary recruitment manuever[PRM] alone or in combination with intraperitoneal instillation of saline and 573 patients were treated with passive abdominal compression in patients undergoing laparoscopy procedures. In their study, they concluded that the Administration of the PRM significantly reduced the post-laparoscopy shoulder tip pain 12, 24, and 48 hrs after surgery. However, in their study, they mentioned that the optimal pressure to be used has to be studied in detail. [8]

AMORNRAT TEMTANAKITPAISAN [2023] performed a study on patients undergoing the laparoscopic gynecological procedure and the effect of additional low-pressure pulmonary recruitment maneuver for racing post laparoscopy shoulder pain, 40 patients were included in the study and the patients in the study group have low-pressure PRM post-procedure, they concluded that there was no statistical significance in the reduction of the shoulder in the patients.[9]

SAREMIRAD [2021] in his study concluded that Incentive Spirometry decreased the severity of shoulder tip pain after Laparoscopic cholecystectomy with no complications. Thus, IS may be considered as a viable alternative to other laparoscopic interventions.One group had incentive spirometry and the other group did not have spirometry. The group without spirometry has a higher requirement for analgesics.[10]

METHODOLOGY

Materials and Methods

Source of Data:

Patients who were admitted to KLES DR PRABHAKAR KOREHOSPITAL AND MRC, BELAGAVI, and undergoing elective Laparoscopic Cholecystectomy and Laparoscopic appendectomy.

Study Design: RANDOMISED CONTROLLED TRIAL

Study Period: 1YEAR - 1st JANUARY 2023 -31st DECEMBER 2023

Sample Size: 60 patients [30 in each group]

Group A - With PEEP and Spirometry -30 patients.

Group B - Without PEEP and No Spirometry -30 patients

The mean dl and standard deviation S1 for group A are 3.80 and 3.163.

The mean d2 and standard deviation S2 for group Bis 6.23 and 4.031. Z alpha= 1.96 at 5% alpha error

Z beta = 0.842 at 20% beta error

Sis average of S1 and S2 dis the difference between dl and d2.

N = 2S2 {z alpha +z beta }2/ d2

N is 30.3 participants in each group Rounding off to 30 Substituting these values in the formula, N= 30, and the enrollment ratio is 1:1 hence, the sample size estimated will be a minimum of 60 patients.

Accordingly, 30 patients were included in group A & group B.

Sampling technique: Randomization Technique: Sequentially Numbered Opaque Sealed Envelopes (snose)

Inclusion Criteria:

Patients undergoing

1. laparoscopic cholecystectomy
2. laparoscopic appendectomy
3. In the age group of 18- 70 years.
4. willing to participate in this study

Exclusion Criteria:

1. Conversion to laparotomy
2. Bleeding disorders.
3. Patients who already have chronic shoulder pain preoperatively.
4. Immunocompromised patients and diabetic patients.

Study protocol:

Method:

After admission, a detailed history and clinical examination will be done for all the patients.The following investigations were done for all the admitted patients for pre operative work up:Hemoglobin, Total and Differential Leucocyte count, Platelet count, Blood grouping bleeding time, clotting time, Urine Routine, Blood Urea and S. Creatinine, HIV and HBsAgECG, Chest Xray, USG-Abdomen and Pelvis.Informed consent was taken from all the patientsThe patients were divided into two groups preoperatively (allocated by sampling - SNOSE),:Rescue analgesics [paracetamol] [8th hourly] were given for both groups of patients for 24 hrs.The amount of rescue analgesics given was measured post-surgery.

Group A

1. Patients undergoing laparoscopic cholecystectomy and laparoscopic appendectomy,

2. [5 cycles of peep] wer given before the closure of the port site, with all the ports in situ and valves open.

3. Incentive spirometry was given to all the patients postoperatively every 4 hours for 48 hours.

4. Right shoulder pain was measured using the visual analog score and measured at 8, 16, 24, 48 hrs

Group B

1. Patients undergoing laparoscopic cholecystectomy and laparoscopic appendectomy.

2. no peep was given.

3. patients with no use of incentive spirometry

4. Right shoulder pain was measured using the visual analog score and measured at 8, 16, 24, 48 hrs

Data collection procedure:

Pain score is calculated from the visual analog score for both the groups at 8, 16,24, and 48 hours post-surgery. Data will be entered and analyzed in Microsoft Excel

Data processing and analysis/statistical analysis:

All the baseline variables will be compared between the two study groups, using mean and SD for quantitative variables; and numbers, and percentages for categorical variables.

RESULTS

The present study was conducted among 60 patients who have undergone laparoscopic appendectomy and cholecystectomy.

They were made into two groups.

GROUP A has patients undergoing either laparoscopic cholecystectomy / laparoscopic appendectomy,[With 5 Cycle of PEEP before the laparoscopic port removal with valves open and operative incentive spirometry]

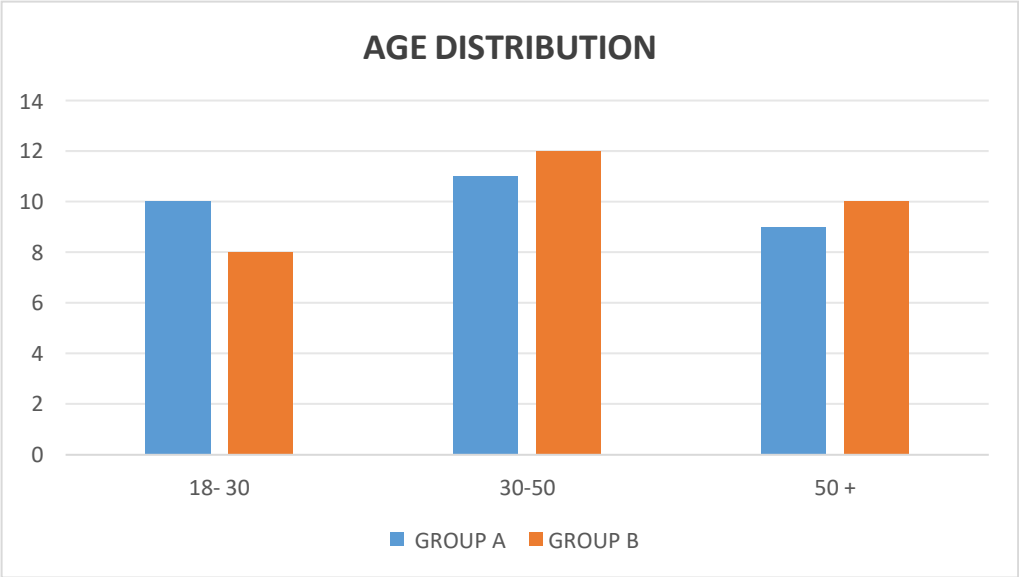
GROUP B has patients undergoing either laparoscopic cholecystectomy / laparoscopic appendectomy.[Without PEEP and with NO spirometry].

The results are discussed below.

1 AGE DISTRIBUTION.

AGE	GROUP A	GROUP B
18- 30	10	8
30-50	11	12
50 +	9	10

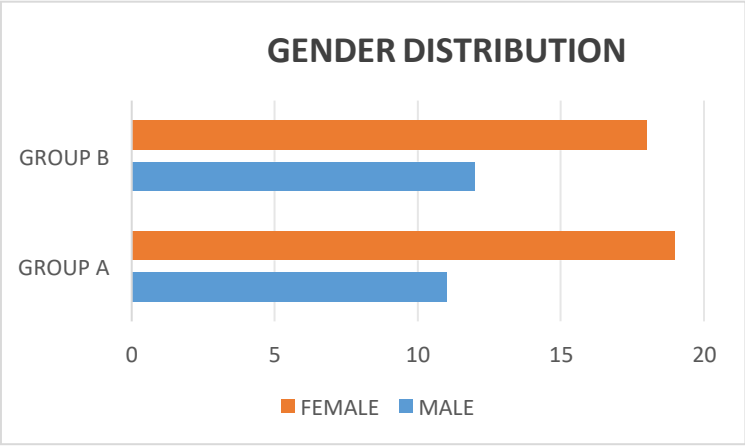
AGE	GROUP A	GROUP B
Mean age	41.8	40



This data indicates that the average age of the patients in both the groups was similar and it is around 42 in Group A and 40 in Group B.

2 . Gender distribution.

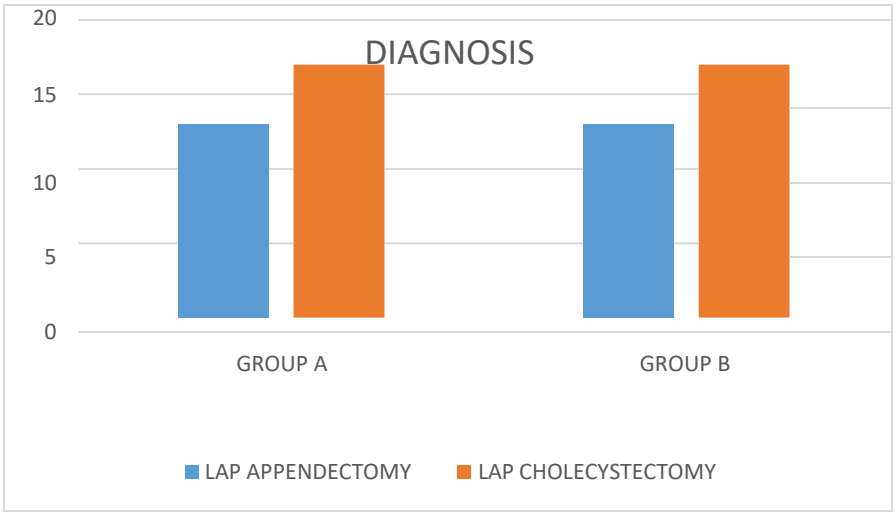
GENDER	GROUP A	GROUP B
MALE	11	12
FEMALE	19	18



Both groups have a similar number of males and females.

3. Diagnosis.

DIAGNOSIS	GROUP A	GROUP B
LAP APPENDECTOMY	13	13
LAP CHOLECYSTECTOMY	17	17

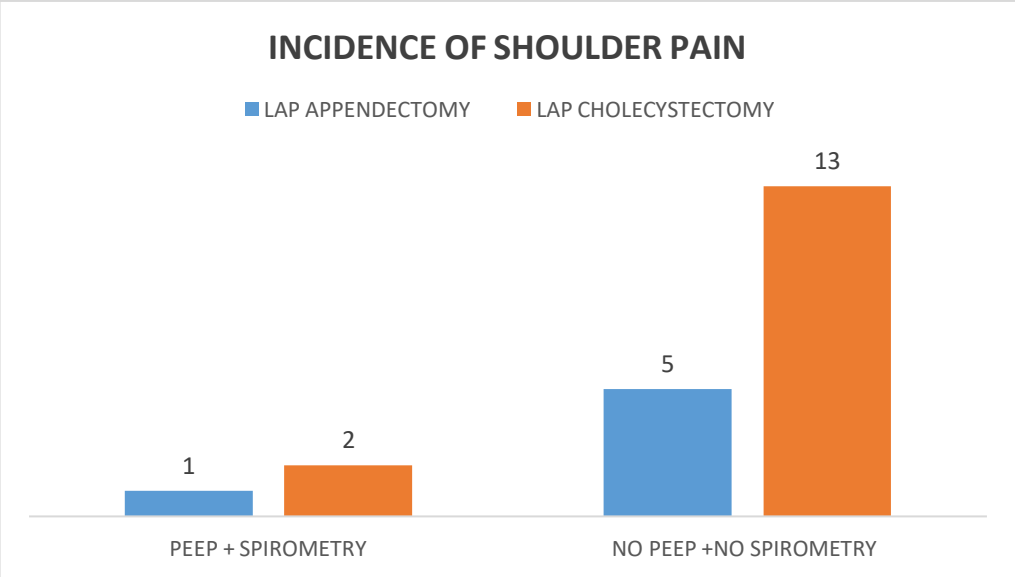


Patients in both groups were diagnosed as a case of cholelithiasis and appendicitis and were planned for the elective procedure.

Both the groups were similar

4. Incidence of shoulder pain.

INCIDENCE OF SHOULDER PAIN	GROUP A PEEP + SPIROMETRY	GROUP B NO PEEP +NO SPIROMETRY
LAP APPENDECTOMY	1	5
LAP CHOLECYSTECTOMY	2	13



The incidence of shoulder pain is significantly higher in GROUP B when compared to Group A.

In **GROUP A**, only **3 out of 30** patients have developed shoulder pain.

The incidence of shoulder pain was around 10 percent.

In **GROUP B**, total of **18 out of 30** patients developed shoulder pain

The incidence of shoulder pain was around 60 percent.

5 . GRADE of SHOULDER PAIN

Shoulder pain has been graded as mild[0-3], moderate[4-7], and severe[8-10].

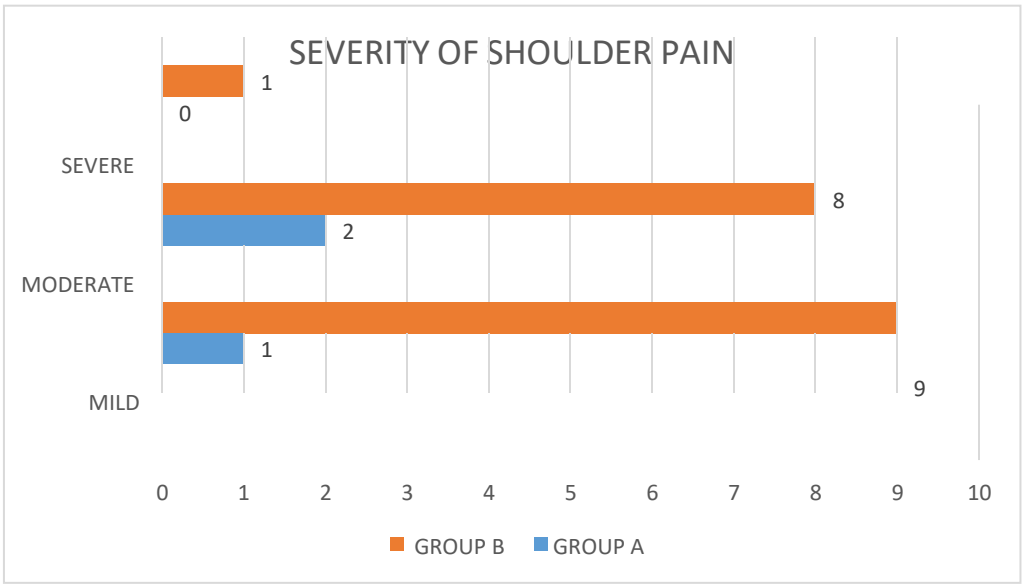
Visual analogue score was used for assesing the severity of pain

In GROUP A- 3 patients had shoulder pain out of which 2 patients had moderate pain and 1 had mild pain.

In GROUP B- 9 patients had mild pain, 8 patients had moderate pain and 1 patient had severe pain which required a higher dose of analgesics

[paracetamol] [thrice daily]

SEVERITY	GROUP A	GROUP B	TOTAL
MILD[0-3]	1	9	10
MODERATE [4-7]	2	8	10
SEVERE [8-10]	0	1	1



6. VISUAL ANALOG SCORE.

Visual Analog scores were calculated in both the groups and the results are as follows.

Pain At 8 hr	Case	Control
Mean ± SD	6.30 ± 1.179	7.33 ± 1.322
Median	6	7
Interquartile Range	1.25	1
Z Score	3.75	
p Value	<0.001	

Mann Whitney U Test

Pain At 16 hr	Case	Control
Mean ± SD	4.27 ± 1.202	5.4 ± 1.714
Median	4	5
Interquartile Range	1.25	1
Z Score	3.62	
p Value	<0.001	

Mann Whitney U Test

Pain At 24 hr	Case	Control
Mean ± SD	3.30 ± 1.29	4.23 ± 1.716
Median	3	4
Interquartile Range	1	2
Z Score	2.79	
p Value	0.005	

Mann Whitney U Test

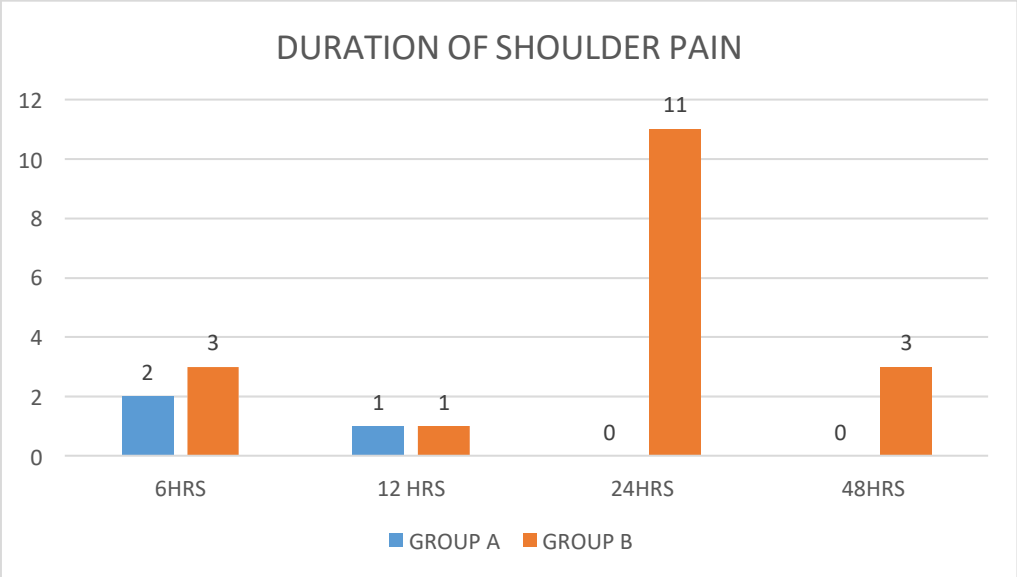
Pain At 48 hr	Case	Control
Mean ± SD	1.67 ± 0.844	2.87 ± 1.795
Median	2	3
Interquartile Range	1	3
Z Score	2.797	
p Value	0.005	

Mann Whitney U Test

The patient in group A experienced a lesser mean pain score compared to the patients in group B.

7. Duration of the shoulder pain.

DURATION OF PAIN	GROUP A	GROUP B
6 HRS	2	3
12 HRS	1	1
24HRS	0	11
48HRS	0	3



In GROUP A, 3 patients developed shoulder pain and it lasted for 6-12 hrs after the procedure.

In group B, 18 patients developed shoulder pain, and For 15 patients it lasted for 24 hrs.

In 3 patients when it lasted for 48 hrs, additional analgesics[Paracetamol] had to be used to relieve pain.

8 . DURATION OF PROCEDURE.

There were two procedures included in this study.

Laparoscopic appendectomy and Laparoscopic cholecystectomy

PROCEDURE / DURATION	GROUP A	GROUP B
LAP APPENDECTOMY	77 MINS	80 MINS
LAP CHOLECYSTECTOMY	106 MINS	122 MINS
TOTAL MEAN	94 MINS	104 MINS

Cholecystectomy tends to be longer in both groups as compared to the appendectomy.

9.CO2 flow rate.

The surgeon was advised to keep the pressure between 12- 14 mm hg during the procedure.

CO2 FLOW RATE	GROUP A	GROUP B
MEAN	12.4	12.3

Hence both groups had similar CO2 flow rate values.

DISCUSSION

This study compared the effects of the Positive end-expiratory pressure given before laparoscopic port removal with the valves open and the incentive spirometry in the postoperative period in the reduction of the post-laparoscopy shoulder pain[PLSP]

Age distribution

Both the groups had patients from 18- 70 and the mean age in both groups was similar around 42 in group A and 40 in group B. Younger, middle-aged age, and older patients were equally distributed in both groups. There is no association of pain with age

Gender distribution.

There was a similar gender distribution in each group.

Diagnosis

Patients with cholelithiasis and appendicitis were equally divided in each group with 17 patients of cholelithiasis and 13 patients of appendicitis and they were randomized into two different groups preoperatively,

In Group A

1. Patients received 5 cycles of PEEP[Positive end-expiratory pressure] before laparoscopic port removal with valves open

2. post-operative incentive spirometry for 3 days.

In Group B

1. patient has no PEEP[positive end-expiratory pressure] given
2. No spirometry.

INCIDENCE OF SHOULDER PAIN

In GROUP A, 3 patients experienced Right shoulder pain,

In Group B, 18 patients experienced Right shoulder pain.

The incidence of Right shoulder pain in patients undergoing laparoscopic appendectomy and cholecystectomy was more in Group B [I.e - Patients without PEEP with no spirometry] whereas the incidence of pain was less in Group A [I.e Patients in whom PEEP and spirometry were given]

INCIDENCE IN GROUP A - 10 percent[3 out of 30 patients] .

INCIDENCE IN GROUP B - 60 percent[18 out of 30 patients].

Grades of shoulder pain

Shoulder pain was graded as mild, moderate, and severe pain according to the visual analog score [VAS]

In group A

2 Patients had mild Right shoulder pain,

1 patient had moderate Right shoulder pain,

No patient had Severe right shoulder pain.

In group B

9 Patients had mild Right shoulder pain.

8 patients had moderate Right Shoulder pain.

1 Patient had severe Right Shoulder pain.

The severity of the pain is associated with the duration of the surgery and intraabdominal pressure during the procedure.

Both groups have a similar CO2 insufflation rate.

In group A, the mean CO2 insufflation pressure was 12.4.In group b, the mean CO2 insufflation pressure was 12.3.

Duration of the procedure

This study included two procedures.

In Group A,

Laparoscopic appendectomy has average duration of 77 minutes

Laparoscopic cholecystectomy has average duration of 106 minutes

In Group B,

Laparoscopic appendectomy has average duration of 80mins

Laparoscopic cholecystectomy has average duration of 122mins

Patients having a longer duration of surgery have a higher association of experiencing shoulder pain.

Pain scoring

Pain scoring has been done in both the groups using Visual Analog score[VAS]

at 8, 16, 24, 48 hrs

In GROUP A, Patients with the use of Positive end-expiratory pressure[PEEP] and incentive spirometry had lower pain scores when compared to the GROUP B patients where PEEP and spirometry have not been given.

P values at 8, 16, 24, and 46 hrs between both the groups were 0.001, 0.001,

0.005 and 0.005 respectively.

P values were significant in all the time intervals in both groups.

Duration of the pain

In GROUP A[Patients with PEEP and spirometry],shoulder pain experienced by the patient lasted for 24 hrs.

In GROUP B, shoulder pain experienced by the patient lasted for more than 48 hrs.

Rescue analgesia - Paracetamol was used in both the group [thrice daily] postoperatively for 24 hrs.

The duration of the pain represents the post-operative quality of life.

Hence, The patients in Group A have better pain relief and faster recovery and early ambulation when compared to the patients in GROUP B

CONCLUSION

Postoperative shoulder pain is the most common thing that the patient complaints about after the laparoscopic procedure.

In our study of 60 patients with laparoscopic cholecystectomy and laparoscopic appendectomy. we divided patients into two groups.

In Group A of 30 patients, Right Shoulder tip pain of mild - moderate grade was experienced in **3 patients.**

In Group B of 30 patients,Right shouder tip pain of mild - severe grade was experienced in 18 patients out of which 9 had mild , 8 had moderate and 1 had severe pain.

Hence, in conclusion, According to our study,Right Shoulder tip pain has significantly reduced in Group A patients where the use of Positive End Expiratory Pressure [PEEP] and Post operative incentive spirometry was used when compared to the Group B patients where No Postive end expiratory pressure [PEEP] and post operative Incentive Spirometry was not used.

HENCE, we conclude in our study the use of PEEP before laparoscopic port removal with the valves open and Post operative spirometry has reduced the Right Shoulder tip pain significantly can be used as routine practice in laparoscopy cases to relieve post-operative Right shoulder tip pain.

SUMMARY

Post laparoscopy Right shoulder tip pain is an important postoperative complication that goes unnoticed and the patients have mild - severe pain in the postoperative period. This occurs due to the residual carbon dioxide which gets trapped in the subdiaphragmatic space and causes stretching of the diaphragm which causes referred pain through the phrenic nerve to the Right shoulder in the postoperative period.

This study was conducted in the tertiary care center in north Karnataka Where an attempt was made to find the association between the usage of Positive end-expiratory pressure [PEEP] with post operative incentive spirometry in the reduction of post-laparoscopic Right shoulder tip pain in patients undergoing elective laparoscopic cholecystectomy and laparoscopic appendectomy.

In our study ,21 patients experienced Right shoulder pain in both the groups.

GROUP A - 3 patients

GROUP B - 18 patients

Statistical analysis revealed that there is a significant reduction in the number of patients experiencing post Laparoscopy shoulder pain with the usage of PEEP before port removal with valves open and post operative incentive spirometry for 48hours.

Hence This can be used routinely in laparoscopic procedures to reduce the Right shoulder pain and to improve the quality of post-operative care in patients.

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ANNEXURE 1

CONSENT FORM

Consent form format

KAHERs JNMC

BELAGAVI

INFORMED CONSENT FORM

"A RANDOMIZED CONTROL STUDY TO EVALUATE THE EFFECT OF POSITIVE END-EXPIRATORY PRESSURE [PEEP] AND POST-OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTION OF RIGHT SHOULDER TIP PAIN AFTER LAPAROSCOPIC CHOLECYSTECTOMY AND APPENDECTOMY."

Name of Student/Principal Investigator:

Name of Guide/Co-Investigators:

Objective:

The main objective of the study is to reduce shoulder tip pain post laparoscopic procedure like cholecystectomy and appendectomy with Positive end expiratory pressure [PEEP] with Post operative Incentive spirometry for 48hrs .

Introduction: Laparoscopic surgery has evolved from a limited surgical procedure used only for diagnostic purposes to a major surgical approach for treating a multitude of malignant and non-malignant pathologies. It is currently one of the most common surgical procedures performed for cholecystectomy and appendectomy. Although laparoscopic surgery has proven its superiority over laparotomy in terms of improved postoperative pain scores, postoperative shoulder pain remains a major concern following laparoscopic surgeries. Shoulder pain is reported to occur in 35 to 70% of laparoscopic surgeries. The pain can be severe and is usually relieved in 24–48 hours, but rarely persists for over 72 hours after surgery.

In this study, post-operative shoulder tip pain is evaluated using visual analog score [VAS] at 8,16,24,48 hrs post-surgery. The effect of using incentive spirometry in the reduction of shoulder tip pain will be evaluated.

Explanation of procedure:

If patient agree to enroll in this study, detailed history will be taken and will be clinically examined in detail. Investigations like Hemoglobin, Total Count, Differential Count, Platelet Count, RBS, Blood Urea, Serum Creatinine, Blood Grouping, Chest X-ray, ECG, USG Abdomen and Pelvis, are required for confirmation of your diagnosis, and pre-operative work will be done accordingly. Patient will be assigned to either of the two groups o, i.e., Group A – with PEEP and Incentive spirometry, Group B – No PEEP and no incentive spirometry, by SNOSE [Sequentially Numbered Opaque Sealed Envelope]. You will undergo Laparoscopic Surgery under General Anesthesia 5 PEEP will be given BEFORE the laparoscopic port closure with ports in situ with valves open with post operative Incentive spirometry in group A patients and In group B patients No PEEP and No spirometry will be given.

Patients in group A will be using incentive spirometry for 48 hrs. and the patients in group B will not be using incentive spirometry Post-operative pain will be assessed using Visual Analogue Scale (VAS) and graded at 8,16,24, and 48 hours. The intensity of pain will be assessed by using a 10-point VAS representing various intensities of pain from 0 (No pain) to 10 (Worst possible pain)

Withdrawal from participation in the study: Participation in this study is voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to withdraw your participation, you are free to do so. However, please convey the decision to the principal investigator.

Possible benefits from participating in the study: You will/will not have nor get any benefits by participating in this study. The data gathered will help the population at large.

Possible risks from participating in the study: There are no risks involved in participating in this study.

Privacy and confidentiality: The information collected from you will be coded, to prevent any person from identifying you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.

Financial incentives: You will not receive any payment for participating in this study.

Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purposes and or presented to scientific groups. However, your identity will never be revealed.

Legal rights: By signing this consent form, we are not waiving any of your legal rights.

CONSENT STATEMENT

I am making a voluntary decision to participate in the study""A RANDOMIZED CONTROL STUDY TO EVALUATE THE EFFECT OF POSITIVE END EXPIRATORY PRESSURE AND POST-OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTION OF RIGHT SHOULDER TIP PAIN AFTER LAPAROSCOPIC CHOLECYSTECTOMY AND APPENDECTOMY."

My signature below indicates that I have decided to participate and I have read the information provided above or the information provided above has been read to me in the language that I understand best. I was allowed to ask questions and they were answered to my satisfaction.

Name of the participant:

Signature or left thumb impression of the participant:

Name of the witness:

Signature or left thumb impression of the witness:

Name of the investigator:

Signature of the investigator:

ANNEXURE 2

PROFORMA

The proposed proforma / questionnaire to be used for data collection for the study.

"A RANDOMIZED CONTROL STUDY TO EVALUATE THE EFFECT OF POSITIVE END-EXPIRATORY PRESSURE AND POST-OPERATIVE INCENTIVE SPIROMETRY FOR REDUCTION OF RIGHT SHOULDER TIP PAIN AFTER LAPAROSCOPIC CHOLECYSTECTOMY AND APPENDECTOMY."

Group:

Name:

IP no.: Sex: Age:

Address:

Religion: Education:

Date of admission: Occupation:

Date of discharge

SCREENING

H/O APPENDICITIS /CHOLELITHIASIS:

_YES

_NO

Patient age between 18-70:

_Yes

_No

The applicant is willing to give consent

_YES

_N0

DATA COLLECTION TOOL

SHOULDER TIP PAIN

Present/absent

Grade of pain

Onset

Duration

Character

Relieves post spirometry

Relieves post Trendelenburg procedure

Other symptoms post-surgery

CHIEF COMPLAINTS:

HISTORY OF PRESENTING COMPLAINTS:

PAST HISTORY:

PERSONAL HISTORY:

FAMILY HISTORY:

GENERAL PHYSICAL EXAMINATION:

Built and Nourishment:

Weight:

Pallor / Icterus / Cyanosis / Clubbing / Edema / Lymphadenopathy

Vital Signs:

PR: /min;

BP: mm Hg;

RR: /min;

Febrile/Afebrile

SYSTEMIC EXAMINATION:

Abdomen:

Inspection:

Palpation:

Percussion:

Auscultation:

Cardio Vascular System.

Respiratory System:

CLINICAL IMPRESSION:

INVESTIGATIONS:

Hb: Total Leucocyte Count:

Platelet count: Random blood sugar :

Blood Group:

Blood urea:

Sr. Creatinine:

PT/INR:

Urine routine and microscopy:

HIV: HBsAg:

ECG:

Chest Xray:

USG-Abdomen and Pelvis:

OPERATION DETAILS:

Date of Surgery:

Anesthesia: General Anesthesia

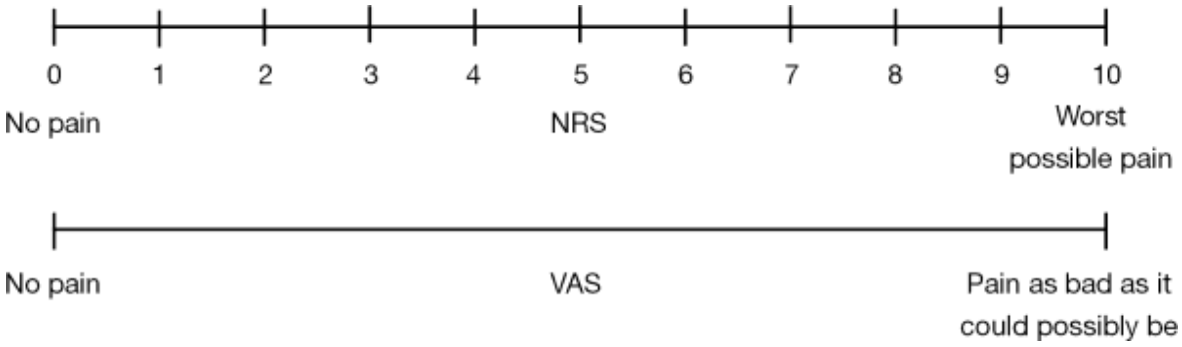
Duration of Surgery:

Amount of CO2 used for creating pneumoperitoneum during the surgery.

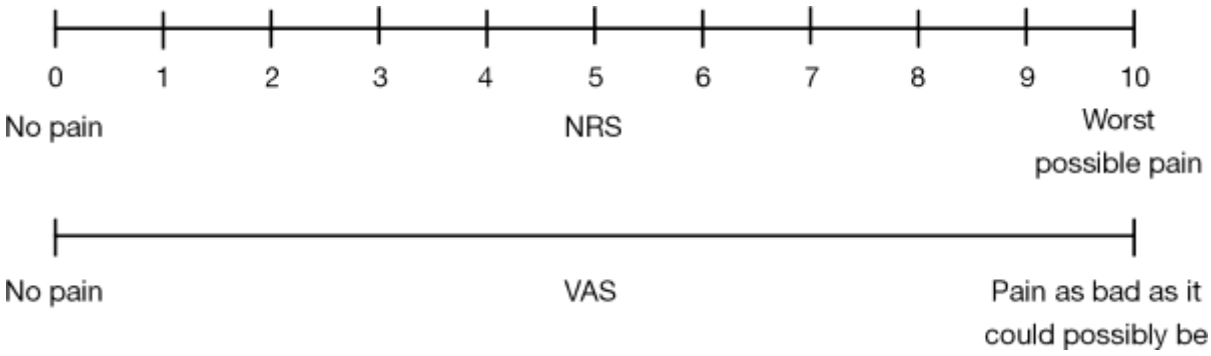
Maximum pressure of pneumoperitoneum used during the surgery.

ASSESSMENT OF POSTOPERATIVE PAIN BY VISUAL ANALOGUE SCALE (VAS):

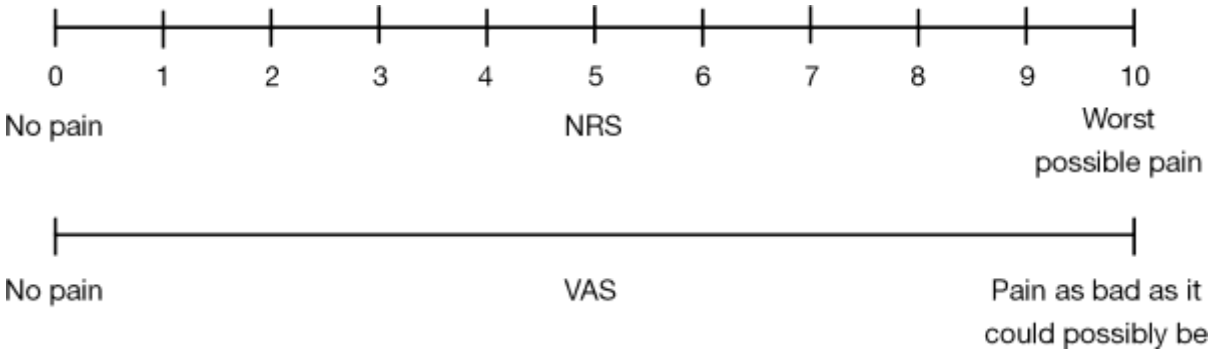
ASSESSMENT AT 6 HOURS



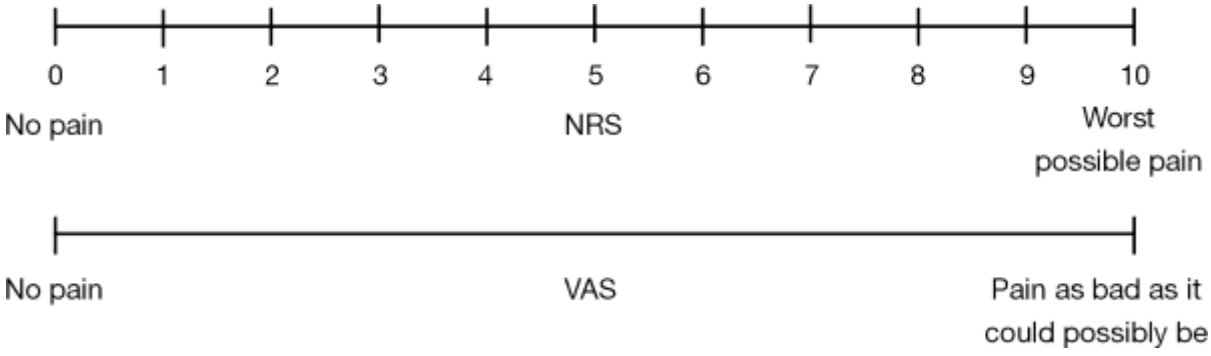
VAS AFTER 12 HOURS:



VAS AFTER 24 HOURS:



VAS AFTER 48 HOURS



ANNEXURE 3

PHOTOGRAPHS

FIGURE 1

Patient using incentive spirometry post laparoscopic cholecystectomy In the postoperative period.

Figure 2

Patient during laparoscopic cholecystectomy, intraoperative positive end-expiratory pressure [peep] was given before port removal with the valves open.

ANNEXURE 4

MASTER CHART

SL.NO	NAME	IP NO	GENDER	AGE	ADMISSION	DISCHARGE	STAY	PEEP	SPIROMETRY	DIAGNOSIS	SHOULDER PAIN	GRADE	Duration of pain	RELEIVES WITH SPIROMETRY
1	Rayappa	1162650	M	26	16/01/2023	23/01/2023	8	yes	yes	Acute appendicitis	yes	moderate	12hrs	yes
2	pallavi	1163643	F	27	10/01/2023	16/01/2023	6	yes	yes	Acute appendicitis	No	nil	nil	none
3	suresh piraji lad	1152325	M	52	16/11/2022	21/11/2023	6	yes	yes	Acute appendicitis	No	nil	nil	none
4	renuka patil	1170890	F	30	14/02/2023	03/03/2023	9	yes	yes	Acute appendicitis	No	nil	nil	none
5	amol	1124943	M	22	05/07/2022	12/07/2022	7	yes	yes	Acute appendicitis	no	nil	nil	none
6	laxmi	1149360	F	65	03/11/2022	07/11/2022	4	yes	yes	appendicitis	no	nil	nil	none
7	sadiya	1193976	F	21	06/06/2023	11/06/2023	5	yes	yes	appendicitis	No	nil	nil	none
8	muttava	10008097	F	45	16/09/2023	24/09/2023	8	yes	yes	appendicitis	no	nil	nil	none
9	swapnil	1149554	M	29	02/11/2022	09/11/2022	7	yes	yes	appendicitis	no	nil	nil	none
10	imthiyas	10030228	M	58	29/12/2023	04/01/2024	6	yes	yes	appendicitis	no	nil	nil	none
11	arun kumar	1145862	m	21	21/09/2023	26/09/2023	5	yes	yes	appendicitis	no	nil	nil	none
12	lata jayaraj	10007855	F	51	16/Sep	25/09/2023	9	yes	yes	appendicitis	no	nil	nil	none
13	babajan katalsab	10032323	M	41	08/01/2023	14/01/2023	6	yes	yes	appendicitis	no	nil	nil	none
14	laxman jakkappa jakkannawa	10038452	M	50	05/02/2024	13/02/2024	8	yes	yes	cholelithiasis	No	nil	nil	none
15	sumitra	10023374	F	55	28/11/2023	07/12/2023	10	yes	yes	cholelithiasis	No	Nil	nil	none
16	sameena pathan	1156893	F	36	06/04/2023	10/04/2023	4	yes	yes	chlolelithiasis	yes	moderate	3hrs	yes
17	bharathi shekar bagewadi	1149365	F	28	02/11/2022	05/11/2022	4	yes	yes	cholelithiasis	No	nil	nil	none
18	sneha vittal kamkar	10023174	F	35	26/11/2023	04/12/2023	8	yes	yes	cholelithiasis	No	nil	nil	None
19	sunandha madivallappa gowda	10027447	F	63	16/12/2023	24/12/2023	8	yes	yes	Cholelithiasis	no	nil	nil	none
20	laxmi yashwanth	10026260	f	70	16/12/2023	28/01/1900	13	yes	yes	cholelithiasis	no	nil	nil	none
21	devendra kalappa	10029579	M	70	29/12/2023	03/01/2024	5	yes	yes	cholelithiasis	no	nil	nil	none
22	nityanand siddaya horamath	10030668	m	44	03/01/2024	09/01/2024	6	yes	yes	cholelithiasis	no	nil	nil	none
23	ajit jyotiba	1125698	M	42	05/02/2024	11/02/2024	6	yes	yes	cholelithiasis	no	nil	nil	none
24	kalyani gouraj	10038497	F	31	05/02/2024	12/02/2024	8	YES	YES	cholelithiasis	no	nil	nil	none
25	mallava rudrappa ramaji	10004137	F	65	31/08/2023	08/09/2023	9	yes	yes	cholelithiasis	no	nil	nil	none
26	prema	11935031	F	26	05/06/2023	11/06/2023	6	yes	yes	cholelithiasis	no	nil	nil	none
27	varsha	1148659	F	19	20/03/2023	26/03/2023	6	yes	yes	cholelithiasis	yes	mild	6hrs	yes
28	malage	10014603	f	44	17/10/2023	30/10/2023	14	yes	yes	cholelithiasis	no	nil	nil	none
29	anusuya lagmappa	10025970	F	40	19/12/2023	27/12/2023	8	yes	yes	cholelithiasis	no	nil	nil	none
30	surekha	10044829	F	57	04/03/2024	16/03/2024	12	yes	yes	cholelithiasis	no	nil	nil	none
31	sonali pavan	10048091	F	28	19/03/2024	24/03/2024	5	no	no	cholelithiasis	no	nil	nil	none
32	laxmi maruti patil	10030362	F	61	30/12/2023	10/01/2024	10	no	no	cholelithiasis	yes	moderate	24hrs	none
33	karoshi nagavva bhimappa	10050201	F	38	04/09/2023	10/09/2023	6	no	no	cholelithiasis	yes	severe	24hrs	none
34	vijaya patil	10004040	F	50	31/08/2023	07/09/2023	7	no	no	cholelithiasis	yes	moderate	24hrs	none
35	bhumika surkar	10005350	F	21	05/09/2023	11/09/2023	6	no	no	cholelithiasis	yes	moderate	24hrs	none
36	sahebi shaikh	1173476	F	61	22/03/2023	28/03/2023	6	no	no	cholelithiasis	no	nil	nil	none
37	ashfaq	10030935	M	38	06/01/2024	16/01/2024	10	no	no	cholelithiasis	no	nil	nil	none
38	saleembanu	10032585	F	32	09/01/2024	15/01/2024	7	no	no	cholelithiasis	yes	mild	24hrs	none
39	renuka sidarai	10030980	F	37	02/01/2024	17/01/2024	15	no	no	cholelithiasis	yes	moderate	48hrs	none
40	shanta	10035648	F	67	23/01/2024	31/01/2024	8	no	no	cholelithiasis	yes	mild	24hrs	none
41	yallappa	10029465	M	45	26/12/2023	02/01/2024	8	no	no	cholelithiasis	yes	mild	48hrs	none
42	parvathi	10029851	F	34	28/12/2023	02/01/2024	4	no	no	cholelithiasis	yes	mild	6hrs	none
43	mallikarjun	10044670	M	61	04/03/2024	07/03/2024	3	no	no	cholelithiasis	yes	moderate	24hrs	none
44	shrishail	1163082	M	70	09/01/2023	25/01/2023	22	no	no	cholelithiasis	yes	mild	24hrs	none
45	renuka .	1145682	F	53	26/12/2023	31/12/2023	6	no	no	cholelithiasis	no	nil	nil	none
46	parwathi	1167939	F	66	31/01/2023	06/02/2023	6	no	no	cholelithiasis	yes	moderate	24hrs	none
47	sahebbi	1173476	F	64	21/03/2023	28/03/2023	7	no	no	cholelithiasis	yes	moderate	24hrs	none
48	mahesh basavaraj badiger	1175896	M	31	04/10/2023	09/10/2023	5	no	no	subacute appendicitis	yes	mild	6hrs	none
49	sagar	10007336	M	21	14/09/2023	19/09/2023	6	no	no	subacute appendicitis	no	nil	nil	none
50	mallikrehan	10007436	M	21	14/09/2023	19/09/2023	6	no	no	appendicitis	no	nil	nil	none
51	Ruksansa	10008860	F	30	22/09/2023	26/09/2023	4	no	no	appendicitis	yes	mild	24hrs	none
52	shrishail kasepa alas	1125634	M	18	30/05/2023	04/06/2023	4	no	no	appendicitis	yes	moderate	12hrs	none
53	subroa helvi	1185273	M	31	25/04/2023	30/04/2023	5	no	no	appendicitis	no	nil	nil	none
54	pakeja multani	1196996	F	22	20/06/2022	25/06/2022	3	no	no	appendicitis with mess	no	nil	nil	none
55	Hafea javed	10029721	F	28	27/12/2023	02/01/2024	6	no	no	appendicitis	no	nil	nil	none
56	Tukaram	10022817	M	56	25/11/2023	30/11/2023	6	no	no	appendicitis	no	nil	nil	none
57	shasidhar	10031204	M	34	03/01/2024	06/01/2024	3	no	no	appendicitis	yes	mild	48hrs	none
58	bharamanna	1156489	M	37	21/02/2023	01/03/2023	11	no	no	appendicitis	no	nil	nil	none
59	solanisunil	1145430	F	38	11/10/2022	16/10/2022	5	no	no	appendicitis	yes	mild	24hrs	none
60	renuka	1170890	F	21	14/02/2023	18/02/2023	4	no	no	appendicitis	no	nil	nil	none

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CHIEF COMPLAINTS	PREVIOUS SURGERY	HB	USG FINDING	DURATION OF SURGERY	CO2 FLOW RATE	MAX FLOW RATE	ETCO2	PAIN AT 8	PAIN AT 16H	PAIN AT 24	PAIN AT 48 HR
right lower abdominal pain x 3days	nil	15.8	appendix inflammed dilated 8mm	90	12	14	32	6	5	2	0
right lower abdominal pain x 5days	nil	11.8	appendix dilated 12mm in length	80	16	16	38	7	4	4	2
right lower abdomen pain x 4days	nil	10.1	appendix is dilated and 7 mm in length	70	16	16	34	7	6	4	1
right sided abdominal pain x 3days	nil	10.7	appendix is dilated and measures 7 mm and minimal colle	110	12	16	36	7	4	3	3
right lower abdominal pain x 4days	nil	14	appendix is indlammed and measures 4 mm in length	80	12	16	37	6	3	3	2
right upper abdominal and epigastric pain x 2months	nil	13.6	inflammed appendix 9 mm	110	14	14	36	8	7	5	3
right lower abdomen pain x 4days	nil	12.1	appendix is inflamed, 8 mm dilated	100	12	12	38	6	4	2	2
abdominal pain x 2months	nil	11.2	appendicitis	40	12	14	34	5	4	3	0
pain in right abdomen x 1 moonth	nil	14.2	appendix inflammed 7.7 mm	90	12	14	40	7	5	5	3
pain abdomen x 8months	nil	13.2	appendix dilated 12 mm	45	12	14	36	5	3	3	2
pain abdomen x 1week	nil	14.4	appendix inflammed 9 mm	60	12	14	32	6	4	4	2
pain abdomen x 4days	nil	13	10 mm inflammed appendix	75	12	16	32	7	4	3	2
right lower abdominal pain x 5 days	nil	12.5	appendix 10mm dilated inflammed	60	12	14	28	6	4	3	1
right upper abdomen pain x 1 year	nil	10.2	cholelithiasis - multiple stones largest 6.9mm	100	12	14	34	6	3	3	2
right upper abdomen pain x 3 month	lap tubectomy	11.2	cholelithiasis with sludge stone size 8mm	105	12	12	35	5	3	2	1
abdominal pain upper abdomen	nil	10.6	gallbladder is distended with multiple calculus largest 13	120	12	14	35	10	8	8	2
Right upper abdomen pain x 2years	nil	12.2	calculus in the gallbladder 6mm	145	12	14	36	7	5	4	2
abdominal pain x 6 months	1 lscs, lap tubectomy	11.8	cholelithiasis with pericholecystic collection	165	14	16	37	6	4	3	2
abdominal pain x 4months	LSCS,Hysterectomy	13.5	cholelithiasis	90	14	14	35	5	4	3	2
pain abdomen since 1 month	hysterectomy	13.6	cholelithiasis 0.5x0.2cms	100	12	14	30	5	3	1	0
pain abdomen x 4 months	cataract sx	9.4	gallbladder .6x .3 cm	105	12	14	32	6	4	3	1
pain abdomen x 45 days	tubectomy	14.8	gallbladder .8 x 1 cms	100	10	14	30	6	3	2	1
pain abdomen 15 days	nil	11.4	multiple gb calculi	110	12	16	30	7	5	5	2
pain abdomen x 2months	ercp stenting	12.7	gb calculi	75	12	16	32	6	3	3	1
right abdominal pain x 3 months	tubectomy	11.7	calculus cholelithiasis	90	12	14	32	5	4	2	1
pain in right upper abdomenx 1 month	nil	10.5	1.8x0.7 xm gb calculi	60	14	14	36	9	6	4	3
pain abdomen on and off 5months	nil	11.6	gb calculi	105	12	14	36	6	4	3	2
pain abdomen x 6 months	nil	10	gb calculi 1.2 x.8 cm	90	12	16	33	5	4	3	2
abdominal pain on and off x 8 months	nil	6.8	cholelithiasis , fatty liver	105	12	14	36	6	4	3	2
pain abdomen x 3 months	nil	9.4	cholelithiasis	150	12	16	35	6	4	3	1
pain abdomen x 4 days	nil	13.9	2.7 mm calculi, dilated cystic duct	105	12	16	35	7	4	4	1
right sided abdominal pain x 7days	nil	12.9	cholelithiasis with 7mm stone	100	14	14	37	7	6	5	5
right upper abdominal pain x3 months	nil	10.2	cholelithiasis 0.8 x 0.6 cm	160	12	14	37	7	6	6	6
right upper abdominal pain x 1 month	nil	12.4	cholelithiasis with fatty liver	100	12	14	44	7	6	6	4
right abdominal pain x 4 days	nil	10.2	cholelithiasis	130	14	14	44	7	5	5	3
abdominal pain x 15days	nil	11.1	cholelthiasis with cbd stent	130	12	14	38	10	9	9	7
right upper abdomen pain x7 months	nil	14.2	cholelithiasis	160	12	14	38	8	5	2	0
pain abdomen x 1 month	open appendectomy	11.4	multiple gb calculi	110	12	14	38	8	4	4	2
pain abdomen x 1 year	nil	12.7	cholelithiasis	100	12	16	36	7	5	4	3
pain abdomen x 1 month	hysterectomy	12.8	gb neck calculi 10 mm	165	12	14	40	9	6	5	4
pain abdomen x 2 months	nil	13.6	cholelithiasis 0.6 x 1 cms	100	12	16	35	8	6	5	4
pain abdomen x 2 months	lscs	14.1	sludge in the Gb	80	12	16	37	8	5	5	4
pain abdomen x 1 month	nil	14.3	gb stone 1.2 cms	160	12	12	35	8	5	5	2
pain abdomen x14 days	nil	10.7	multiple gb calculi	105	12	14	28	8	7	7	5
pain abdomen x 45days	nil	13.4	cholelithiasis	90	12	12	36	7	4	2	0
pain abdomen x 1 month	nil	11.8	0.8 mm single calculi	140	12	14	36	9	8	5	4
no complaints post ercp stenting	ercp stenting	11.1	7 mm calculi in gb	150	12	14	42	10	9	2	1
pain in the abdomen x 5 months on and off	nil	15.1	appendix inflamed and 5 mm	35	14	14	40	3	0	0	0
abdominal pain x 8 months	nil	15.9	appendix inflammed and 13mm in length	60	12	12	36	6	3	3	1
pain abdomen x 1month	nil	14.5	appendix inflammed and 6.3 mm in length	60	12	12	35	7	6	2	1
pain abdomen x 1month	nil	10.6	6.9 mm inflammed appendix	180	14	14	44	7	5	4	2
Pain abdomen x 3 days	nil	13.2	appendix inflammed 8mm length	70	12	12	42	6	5	4	4
pain abdomen x 5days	nil	13.7	appendix is inflammed and 7 mm distended	70	14	14	40	7	6	4	3
pain abdomen x 5days	nil	10.2	6 mm dilated appendix	105	12	14	36	7	5	4	4
pain abdomen on and off 2 years	nil	11	appendix dilated 5 mm	50	12	16	38	6	4	3	2
right lower abdomen pain x 15 days	nil	14.5	subacute appendicitis	40	12	14	37	8	5	5	4
right lower abdomen pain x 90 days	nil	14.2	appendicitis	45	12	14	36	7	6	3	2
pain abdomen x 2 days	nil	14.4	9mm dilated appendix	100	12	14	30	7	5	5	3
pain abdomen x 2days	nil	12.6	7mm inflamed appendix	120	12	16	30	8	7	4	1
pain abdomen x 3days	nil	10.7	inflammed appendix 9 mm	105	12	14	28	6	5	5	4