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ASSOCIATION BETWEEN INTRA-ABDOMINAL PRESSURE DURING GYNAECOLOGICAL LAPAROSCOPY AND POSTOPERATIVE PAIN

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Abstract:
In gynaecology, various technical innovations and surgical methods have introduced that play a very important role in an increasing range of medical indications; one of these methods include laparoscopy. Doctors need to opt for high-quality surgical techniques to assure the provision of maximum patient care. The purpose of this paper to highlight the association between intra-operative CO2 pressure and postoperative pain of gynaecology laparoscopy.
A randomized, mono-centric, single-blind study was carried out in the hospital of Multan at the department of Gynaecology and Obstetrics. Patients who were scheduled for different laparoscopic procedures were included in the study. They were divided into six groups and pain was measured by the nurse using a visual analogue scale after surgery. Total of 540 patients was included in the study from a period from June 2016 to January 2019. The analysis showed a relationship between postoperative pain and CO2 levels. The patients with 12 mm Hg showed less pain score in comparison to those having 15 mm Hg pressure. The result of this study showed the advantage of less CO2 pressure levels. However, clinical relevance remained ambiguous because of slight differences in pain scale between different groups of patients.

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INTRODUCTION:

In the treatment of many malignant and benign diseases of gynecological nature, laparoscopy is regarded as the gold standard for treatment over the last three decades. Laparoscopy for gynecological indications includes the diagnosis of tubal surgeries, pelviscopies, surgical interventions both myomectomy and hysterectomy of the uterus, ovarian surgery, urogynecology surgery including oncological, sacrocolpopexy and endometriosis surgeries. [1, 2]

In comparison to open abdominal surgeries, laparoscopy requires minimal invasive cuts with a lot of advantages like faster wound recovery, perioperative morbidity, shorter hospital stay and less pain. [3] Adipositas and abdominal surgeries carry a greater risk of perioperative complications and issues. Injuries related to surgery of small intestine, colon, arterial and venous vessels, walls of the uterus and bladder, are frequently observed in major surgical procedures. [4]

In order to avoid these complications, a lot of trials were made on different surgical advancements to minimize surgical trauma and postoperative pain, because post-operative pain and recovery were the most common issue faced by the patients and doctors in the rehabilitation phase. Multiple research studies have shown that reduction in intra-abdominal pressure plays a significant positive role in achieving better clinical outcome after gynaecological laparoscopy. [5]

The direct view of internal organs can be attained by an artificially created pneumoperitoneum in various laparoscopic procedures. This "penumoperitoneum" can be defined as the gas or air accumulation in the peritoneal cavity. These days this gas accumulation is created by carbon dioxide, and this whole thing is called as capno-pneumoperituneum. [6]

Carbon dioxide is used for various reasons:

1. It is non-flammable
2. It has less risk of gas embolism owing to its high solubility property in blood
3. Its level can be maintained in comparison with atmospheric air pressure, which helps in having less abdominal and shoulder pain
4. It helps in attaining a better view of internal organs because of its anti-fog characteristics
5. It is less toxic than room air
6. It reduces high blood concentrations via hyperventilation (mechanical) [6]

However, this procedure has some consequences upon ventilation and respiration. The effects of carbon dioxide pneumoperitoneum upon pain are due to the following reasons:

1. Peritoneal cavity stretching
2. Diaphragmatic injury
3. Diaphragmatic irritation
4. Shoulder abduction surgery [7, 8]

The patient can feel different types of postoperative pain after laparoscopies like visceral pain or intra-abdominal pain, shoulder pain, incisional pain or parietal pain. To reduce this pain, many possibilities exist, some of them include the use of smaller trocars, well administration of local anesthesia in the abdominal cavity and insertion point of trocars and use of body tempered, moist carbon dioxide. [9] The effect of carbon dioxide used with less pressure is observed positive in reducing post-operative pain, but the reason behind this is still unclear to surgeons especially in gynaecological pelvic operation.

This study aims to bring under observation the impact of different pressures of carbon dioxide in laparoscopy on parietal, visceral and referred visceral pain after gynaecological surgeries.

Modus Operandi

The study was carried out in the Gynaecological Department of Multan hospital. The study was carried out after seeking permission from the Ethical Committee of the Hospital along with the written consent from all the patients included in the study.

In the study, female patients with age above 16 years were added who required laparoscopic surgery. The period of this study was from June 2016 to January 2019. The gynaecological surgery indications which were included in the study are as follows:

1. Ovarian cystectomy
2. Salpingectomy
3. Afnexectomy
4. Diagnostic laparoscopy
5. Extirpation of endometriosis
6. Hysterectomy
7. Adhesiolysis

Patients with laparoscopic sterilization were not included in the study as this procedure is rarely carried out on the limited number of cases. The criteria which were excluded were, serious post-operative complications, and intra-operative conversion to laparoscopy because both these had serious impacts upon pain levels.

Total of 540 patients was included in the randomized, single-blinded study, and patients were divided into 6 groups.

1. Group 1: initial CO2 pressure 15 mm Hg, decreasing to 10 mm Hg during operation
2. Group 2: initial and intra-operative pressure 10 mm Hg

3. Group 3: initial pressure 15 mm Hg and intra-operative pressure 12 mm Hg
4. Group 4: initial and Intra-operative pressure 12 mm Hg
5. Group 5: initial pressure 15 mm Hg reducing to 8 mm Hg during operation
6. Group 6: initial and intra-operative pressure 15 mm Hg

- **Surgery Details**

The pressure level was changed in these groups after 3 minutes of beginning the surgery and insertion of trocars. The same anaesthetic protocol was used for all the groups. After anaesthetic induction, pneumoperitoneum was induced with Veress needle at umbilicus point. CO2 was used at 0% relative humidity with a rate of 6 1/min at room temperature by following intra-abdominal pressure as per protocol. The pressure level was constantly maintained by regular CO2 inflow.

3 trocars of 5mm, one 10mm umbilical for the camera and four working ports were used in the lower abdomen on a routine basis. The Trendelenburg position of the patient was maintained at 30 degrees. For bladder drainage, the Foley catheter was used and a gastric tube was routinely inserted and checked by the anaesthetist. In some cases, it was required to insert Robinson wound drainage. At the end of the operation, CO2, which was left in the abdominal cavity, was evacuated by compressing the area.

- **Study Parameters**

In the study of those patients the following parameters were included:

- Patient's age
- Body Mass Index (BMI)
- Previous surgery details
- Gravidity and parity
- Hospital stay duration
- Quantity of blood lost during surgery
- Amount of CO2 used during surgery

The pain level was evaluated three times a day. Patients were asked to mark their pain levels on a visual analogue scale (VAS), ranging from 0 to 10. They were also asked to let us know if they feel different pain like dull aching, visceral pain or anything else.

RESULTS:

The primary results were measured after the gynaecological pelvic laparoscopic surgery; effect of intra-abdominal CO2 pressure on visceral pain, parietal pain and referred visceral pain. For statistical analysis, IBM SPSS Statistics were used. A descriptive statistic procedure was performed to evaluate the characteristics of the patients. For the measurement of differences for continuous parameters between the 6 intervention groups, a single factor variance analysis (ANOVA) was carried out.

A total of 540 patients were included in the study. 450 patients out of 540 formed the ITTP known as an intention to treat population. As many patients were dropped out of our study the reason behind this included, no surgery (n= 23), no laparoscopy (n= 25), conversion to laparoscopy (n= 26), and postoperative complications (n= 11).

360 patients were evaluated for analysis as the per-protocol population. The reasons that led to the exclusion of 90 patients here included: missing data on the use of different pressure levels of CO2 (n= 28), intra-operative deviation from randomized CO2 pressure (n= 44), and negligence of surgeons (n= 19). The mean age of our patients was 43 years and the mean BMI was 25.4. On average, almost every patient has 1.11 surgical interventions before an operation.

Statistical Data

The average duration of the surgery was 71- 73.4 minutes. The different kind of surgeries included 153 ovarian operations, 103 hysterectomies, 36 myomectomies, 48 laparoscopies with 60 min duration and 28 other surgeries. The average hospital stay was 0 to 8 days and 346/360 were inpatients and 14/ 360 were outpatients.

Patients in group 5 had the shortest hospital stay with an average of 2.4 days, and they also needed the lowest number of analgesics (1.1 doses) on their first day after surgery. In its comparison, patients in group 6 had the longest hospital stay and they were among those who needed the highest level of doses (1.8).

The table given below includes the data of different gynaecological procedures carried out on patients belonging to six intervention groups with different pressure levels of CO2 used during laparoscopic surgery.

Patients' Groups	**1: 15 to >10 mmHg**	**2: 10 to >10 mmHg**	**3: 15 to >12 mmHg**	**4: 12 to >12 mmHg**	**5: 15 to >8 mmHg**	**6: 15 to >15 mmHg**
Total amount of surgery	N= 69	N= 33	N= 68	N= 54	N= 61	N= 74
Duration of surgery	72 ± 37.4 (22 – 203)	66.2 ± 27.9 (23 – 149)	85.9 ± 50 (18 – 243)	77 ± 40 (18 – 207)	59 ± 32 (18 – 176)	78 ± 39 (16 – 155)
Kinds of Surgery						
1. Hysterectomy	27 (39.2%)	4 (13.7%)	23 (33.8%)	20 (36.5%)	5 (8.6%)	24 (33.1%)
2. Ovarian surgery	21 (31.3%)	22 (60.9%)	28 (41.0%)	20 (36.4%)	33 (52.6%)	29 (40.0%)
3. Laparoscopy duration <60 min	14 (20.1%)	5 (12.0%)	6 (6.5%)	7 (11.0%)	10 (15.1%)	6 (7.2%)
4. Enucleation of myoma	4 (6.4%)	3 (5.9%)	9 (12.0%)	5 (10.0%)	10 (14.5%)	5 (7.2%)
5. Other surgery	3 (3.0%)	3 (6.0%)	6 (8.5%)	3 (4.6%)	5 (6.5%)	8 (10.0%)

CONCLUSION:

In the nutshell, the results of our entire study showed there was a significant positive effect of lowering the intra-operative CO2 pressure levels on the post-operative gynaecological surgery-related pains. Although the reason was not clear.

In particular, the clinical results depicted that the use of 12 mm Hg pressure level of CO2 in comparison to 15 mm Hg level showed less post-operative pain in patients. No reliable results were obtained in further lowering the pressure level of CO2 to 10 to 8 mm Hg in other groups. Moreover, it was found that increasing the CO2 pressure in low pressure groups left negative impacts upon visibility conditions of the camera. Apart from the role played by different CO2 levels, other important factors were found that played a crucial role in defining the sensitivity of pain. Those factors included the age of the patient, the number of previous operations and the duration of the operation.

However, for 100% accuracy, there is a dire need to deeply study the association between intra-abdominal pressure (the pressure of CO2) during gynaecological laparoscopy and postoperative pain.

REFERENCES:

1. Mettler L, Semm K, Gebhardt JH et al (2002) Endoscopic abdominal surgery in gynaecology. (German), 1st edn. Schattauer, Stuttgart
2. Solomayer E (2015) Minimal-invasive therapy in gynaecology—quo vadis? (German). Geburtshilfe Frauenheilkd 75(11):1109–1111
3. Long JB, Giles DL, Cornella JL, Magtibay PM, Kho RM, Magrina JF (2008) Open laparoscopic access technique: review of 2010 patients. JSLS 12:372–375
4. Juhasz-Böss I, Solomayer E (2016) Complications after laparoscopy. Gynakologe 49(1):16–23
5. Bogani G, Cromi A, Casarin J, Ghezzi F (2014) Low pneumoperitoneum pressure reduces pain after mini-laparoscopic hysterectomy: Results from two independent randomized controlled trails. J Minim Invasive Gynaecol 21(5):967–968
6. Fishburne JI (1978) Anesthesia for laparoscopy: Considerations, complications and techniques. J Reprod Med Obstet Gynaecol 21(1):37–40
7. Yasir M, Mehta KS, Banday VH, Aiman A, Masood I, Iqbal B (2012) Evaluation of post operative shoulder tip pain in low pressure versus standard pressure pneumoperitoneum during laparoscopic cholecystectomy. Surgeon 10:71–74
8. Kojima Y, Yokota S, Ina H (2004) Shoulder pain after gynaecological laparoscopy caused by arm abduction. Eur J Anaesthesiol 21:578–579
9. . Bisgaard T, Klarskov B, Kristiansen VB et al (1999) Multiregional local anesthetic infiltration during laparoscopic 1 3 cholecystectomy in patients receiving prophylactic multi-modal analgesia: a randomized, double-blinded, placebo-controlled study 89(4):1017–1024