



ORIGINAL RESEARCH PAPER

Anesthesiology

A COMPARATIVE EVALUATION OF DIFFERENT TECHNIQUES OF ANAESTHESIA FOR GYNECOLOGICAL LAPAROSCOPY

KEY WORDS:

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ABSTRACT

Laparoscopy (Peritoneoscopy) is endoscopic visualization of the peritoneal cavity through puncture of the anterior abdominal wall after induction of pneumoperitoneum. The present study was undertaken, with following aims and objectives: To evaluate and compare methods of anaesthesia in three groups of patients undergoing laparoscopy, to assess the respiratory and cardiovascular changes that are likely to manifest during phase of increased intraperitoneal tension and trendelenburg position, to study the possible clinical complications of the procedure, if any, with a view to assess the future therapeutic implications.

INTRODUCTION AND AIM

Laparoscopy (Peritoneoscopy) is endoscopic visualization of the peritoneal cavity through puncture of the anterior abdominal wall after induction of pneumoperitoneum.

The present study was undertaken, with following aims and bleats.

1. To evaluate and compare methods of anaesthesia in three groups of patients undergoing laparoscopy.
2. To assess the respiratory and cardiovascular changes that are likely to manifest during phase of increased intraperitoneal tension and trendelenburg position.
3. To study the possible clinical complications of the procedure, if any, with a view to assess the future therapeutic implications.

MATERIAL & METHODS

The present study was conducted on patients who are ASA grade 1, 60 adult female patients belonging to age group 20-40 years undergoing elective gynecological laparoscopy at UISEMH, GSVM Medical College, Kanpur after ethical committee clearance.

GROUPING OF THE CASES

All the patients were equally divided into three groups :

Group A : Patients maintained on Isoflurane with spontaneous ventilation.

Group B : Patients on controlled ventilation with vecuronium as muscle relaxant.

Group C : Patients given IV Diazepam + Fentanyl supplemented by local anaesthesia.

PRE ANAESTHETIC ASSESSMENT

All the patients were examined and investigated for complete blood examination – Hb, DLC, TLC and Urine examination. Patients with gross obesity, cardiorespiratory problems, pelvic inflammatory diseases, hiatus hernia and were not included in this study.

A written informed consent for the proposed procedure was taken after explaining the nature of procedure to the patient. In all cases pneumoperitoneum was achieved with carbon dioxide.

PREMEDICATION

All the patients in Group A and B were premedicated with, 0.2 mg glycopyrrolate I/V, 8 mg ondansetron, Pantoprazole 40 mg IV, Fentanyl 2µg/kg I/V.

Group A : The anaesthesia was induced with Propofol 2 mg/kg body weight and patients were intubated following a paralyzing dose of IV Succinylcholine 2 mg/kg body weight. Anaesthesia was maintained with 1-2% Isoflurane vaporized in a mixture of nitrous oxide and oxygen in a proportion of 5:3 with a fresh gas flow of 8 l/min. The patients were allowed to breathe spontaneously using a

Bain's circuit and an efficient non rebreathing valve. After return of protective reflexes at the end of the procedure, patients were extubated after a thorough examination and suction of pharyngeal cavity.

Group B : Patients were induced and intubated with assistance of succinylcholine as in Group A cases. The muscular relaxation was maintained with vecuronium bromide 0.04 mg/kg body weight and ventilation was controlled with 66% nitrous oxide and 33% oxygen using Magill's circuit. At the end of procedure on return of adequate respiration the neuromuscular blockade was antagonized with neostigmine 2.5 mg + Glycopyrrolate 0.2 mg pharynx and upper airways were examined and sucked thoroughly before extubation.

Group C : Patients were premedicated with inj. Ondansetron 8 mg I/V, inj. Pantoprazole 40 mg IV, inj. Fentanyl 2µg/kg I/V and inj. Midazolam 1 mg I/V given slowly in 3-5 min. until patients closed their eyes spontaneously and appeared to be in deep sleep though they were able to follow commands. After painting and draping the skin and underlying tissues at the trochar insertion site was infiltrated with 6-8 ml of 0.25% bupivacaine solution.

Patients were closely watched for adequacy of respiration, for regurgitation and aspiration and any other complications.

Post Operative Interviews

In the postoperative period all the patients were asked whether they had experiences nausea, hoarseness, sore throat, blurred vision, awareness, abdominal pain, lethargy and weakness and if so whether this was mild, moderate or severe.

Monitoring

1. Time of
 - a. Induction
 - b. Insufflation of gas
 - c. End of procedure
2. Heart rate for any change in rhythm and rate
3. Blood pressure – systolic and diastolic
4. Engorgement of neck veins – for CVP
5. Blood gas analysis – pH, PaO₂, PaCO₂
6. ECG

Timings of Blood Sampling

All the observations including blood gases analysis were measured at three points during the operative procedure: -

1. Just before induction of anaesthesia.
 2. Immediately before insertion of laparoscope.
 3. At the end of skin suturing.
- Blood samples were analyzed for PCO₂, PO₂ and pH.

STATISTICAL ANALYSIS:

The results of continuous variables are given as mean ± SD and proportion as percentage. The difference between the two groups was assessed by student's unpaired t-test for continuous variables and chi-square test wherever applicable. For all the tests a 'p' value of 0.05 and less was considered for statistical significance

OBSERVATIONS

This study 'A comparative evaluation of different technique of Anesthesia for Gynecological laparoscopy', comprised of observations made on ASA grade 1, 60 cases, in three groups of 20 patients each.

TABLE 1 Table showing patients characteristics, duration of tilt and duration of anesthesia

Parameter		Group A	Group B	Group C
Age (yrs)	Mean (Range)	27.85 (22-33)	29.25 (22-36)	28.55 (22-34)
Parity	Mean (Range)	2.93 (0-5)	3.20 (0-6)	2.30 (0-5)
Duration of tilt (min.)	Mean (Range)	16.30 (8-32)	18.85 (12-35)	17.80 (10-20)
Duration of anesthesia(min.)	Mean (Range)	25.80 (10-40)	29.50 (25-45)	21.80 (15-28)

TABLE 2 Table showing variation in mean pulse rate in different groups

Group	Time 1	Time 2	Time 3
A	81.30 ± 2.38	93.35 ± 3.45	86.95 ± 1.45
B	85.95 ± 2.12	96.35 ± 3.04	91.00 ± 1.67
C	83.35 ± 2.63	103.65 ± 3.22	99.25 ± 2.48

The increase in pulse rate from preoperative value (time 1) to value just before insertion of laparoscope (time 2) is highly significant in group c, there is increase in pulse rate from preoperative to postoperative period (time 3) this changes are highly significant in group c.

TABLE 3 Table showing the significant relationship between mean pulse rate at different time in different groups.

	Time 1 vs Time 2			Time 1 vs Time 3		
	t (mean)	P (SE)	Inference	T (mean)	P (SE)	Inference
Group A	4.28	<0.01	Moderately significant	2.27	<0.05	Significant
Group B	2.85	>0.05	Insignificant	1.94	>0.05	Insignificant
Group C	4.07	<0.001	Highly significant	3.87	<0.001	Highly significant

TABLE 4 Table showing changes in systolic blood pressure (SBP) & diastolic blood pressure (DBP) in different groups

Group		TIME 1	TIME 2	TIME 3
A	SBP	108.50±0.88	112.60± 1.23	115.40± 1.90
	DBP	75.60±1.07	79.70± 0.99	80.00± 1.05
B	SBP	103.60±0.71	106.00± 0.64	106.80±1.06
	DBP	74.30±0.72	76.80± 0.68	71.00±0.89
C	SBP	106.70±0.67	121.50±1.98	132.60±1.89
	DBP	74.20±0.68	79.40±0.91	81.10±0.65

Systolic and diastolic blood pressure was increased from preoperative value to time 2 and further increase was noted at the end of procedure. These changes were highly significant in group C, moderately significant in group A and significant in group B.

TABLE 5 Table showing changes in PO2, PCO2, Ph of arterialized blood of different groups'

SAMPLE	Po2			PCO2			PH		
	A	B	C	A	B	C	A	B	C

1	94 ±0.45	92 ±0.49	85±0.67	35±0.69	34±0.61	35±0.52	7.36±0.01	7.37±0.01	7.39±0.01
2	146 ±1.0	133 ±0.74	75 ±0.62	38±0.39	33±0.28	54±5.52	7.32±0.0	7.35±0.01	7.30±0.01
3	148±0.42	133±0.66	81 ±0.46	34±0.42	31±0.24	41±2.24	7.35±0.0	7.38±0.01	7.26±0.01

Observation of the veins of the neck

In all the three groups the neck veins were not engorged preoperatively. They become fully engorged as patients were tilted in trendelenberg position and became normal when patients were replaced in normal horizontal position.

Disturbance in cardiac rhythm

None of the patients in group B developed cardiac arrhythmias during the procedure. One instance of bradycardia occurred in group A during peak insufflation which responded to iv atropine. In group C two patients developed arrhythmias which were self corrected and did not significantly affect the systolic blood pressure.

DISCUSSION

Laparoscopy has become so common procedure that it requires the evaluation of anaesthetic techniques. The anaesthetic techniques should be modified in a way that it can provide maximum support to the laparoscopist and minimum anaesthetic and surgical complications. Keith at al (1974) stated that each of the anaesthetic methods used in laparoscopy has its advantage and disadvantages.

Changes in Clinical Parameters

PULSE RATE: Patients in all the three groups had an increase in pulse rate at the time of peak insufflation (Time II) from preoperative value. At the end of procedure after deflation of abdomen those values were decreased but still it was higher than preoperative value. The change from preoperative to postoperative value is also highly significant in groupC, significant in group A while insignificant in group.

BLOOD PRESSURE: The changes in blood pressure from preoperative value (Time I) to value just before insertion of laparoscope (Time II) was highly significant in group C, moderately significant in group A while significant in group B. Similarly the change from preoperative to postoperative value was also highly significant in group C, moderately significant in group A and significant in group B.

Smith and Associates (1971) have reported essentially similar results in patients artificially ventilated while Aarshall et al (1972) noted similar, results in supine and spontaneously breathing patients.

CHANGES IN BLOOD GASES PARAMETERS

In present study using spontaneous ventilation moderately significant (P < 0.01) rise occurred in PCo2 from preoperative value to PCo2 at peak insufflation. A further significant (P < 0.05) change occurred to end of procedure. This finding is in accordance to results obtained by Barataz and Karts (1960), Hodgson et al (1970);Desmond and Grodon (1970),

However, in patients on controlled ventilation insignificant (P 0.05) change in Pco2 occurred at end of insufflation and there was insignificant decrease from samples II to III. Barataz et al (1968) showed that Pco2 does not rise significantly instead it falls (due to hyper-ventilation) inspite of presence of carbon dioxide in peritoneal cavity in patient on controlled ventilation.

Changes in pH of arterial blood There was no significant difference in the base line preoperative pH value in the different groups in this study.

Changes in oxygen Tension In patients receiving general anaesthesia there was a progressive increase in PO2 and these

changes were highly significant.

CONCLUSION

A scientific study was undertaken under the title "A Comparative evaluation of Different techniques of Anaesthesia for gynecological Laparoscopy" on ASA grade 1, sixty female patients undergoing gynecological laparoscopy at U.I.S.E.Maternity Hospital, GSVM Medical College, Kanpur after clearance from ethical committee.

On the basis of our clinical and laboratory experience, we have come to the following conclusions with regard to the anaesthetic management for pelvic laparoscopy: Any patient who has respiratory disease & severe cardiac disease are not a good candidate for the procedure.

Patients with mild cardiac disease may undergo laparoscopy provided care is taken to limit the duration of procedure and degree of pneumoperitoneum.

Patients with General anaesthesia should be preferred in view of better control of ventilation and thus hypercarbia, decreased anxiety and better and good surgical conditions.

Artificial ventilation may be considered better than spontaneous ventilation in view of better control of hypercarbia by hyperventilation, greater margin of safety and prevents cardiac arrhythmias.

For muscular relaxation in patients on controlled ventilation, vecuronium bromide may be better choice.

Lastly, we can say that safety of the procedure probably depends more on the short operative time, close intraoperative monitoring and the experience of both anaesthetic and surgeon.

Conflict of Interest

This research was self supported

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