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Original Research Article

A Comparative Study between Adult and Elderly Patients for the Incidence of Bradycardia Post Creation of Pneumoperitoneum in Patients Undergoing Laproscopic Cholecystectomy

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Abstract: Bradycardia occurring post creation of pneumoperitoneum in patients undergoing laproscopic procedures is quite common. The aim of this study is to find out which age groups between the adult and elderly population are more susceptible to bradycardia. 60 patients of age between belonging to ASA grade I and II, scheduled for elective laproscopic cholecystectomy were included in the study. The patients were allocated into two groups of 30 each, Group-A and Group-E. Patients in group-A (Adult) were between age group 18 to 60 years of age Patients in group-E (Elderly) were above 60 years of age Occurrence of bradycardia (heart rate of less the 50/minute) after creation of pneumoperitoneum / gas insufflation was observed in the two groups. Comparison of bradycardia between the two groups revealed higher incidence/occurrence in Elderly group with a p-value of between 0.278 which is statistically insignificant. Bradycardia did not result in intraoperative cardiac arrest, neither did it increase the frequency of intensive care unit admission or mortality rate. Surgery resumed in all cases without adversity. Bradycardia is common occurrence post creation of pneumoperitoneum/ gas insufflation in laproscopic surgeries. It usually arises in response to gas insufflation as a vagal mediated physiologic response, and is benign in the majority of cases. Occurrence of bradycardia was more in elderly patients but did not significantly effect outcome. Deflation of pneumoperitoneum and Atropine administration are effective in reversing Bradycardia and possible avoid progression to cardiac arrest.

Keywords: Bradycardia, Laproscopic Surgery, Elderly, Pneumoperitoneum, Vagal Response, Insufflator.

INTRODUCTION

In the Socratic dialogue 'Republic' Plato famously wrote 'our need will be the real creator' which was moulded over time into the English proverb 'Necessity is the mother of invention.

Laparoscopic surgeries have revolutionised the field of surgery and have grown without bounds in popularity. We are also seeing the arrival of robots in the field of surgery performing laparoscopic procedures on a broad population of patients. Pneumoperitoneum is used to assist laparoscopic surgery by making distension of abdominal cavity and splitting up its content, which improves visualization. Although the overall mortality of laparoscopic surgery is low, ranging from 0.3% to 1.8%, preoperative consultation to estimate the risk of perioperative cardiovascular events is common [1, 2].

As Anaesthesiologist we should be aware and prepared to handle the risk of any cardiac or any other system problems inherent to the pneumoperitoneum during laparoscopy. Even though laproscopic procedures have their benefits but they are more challenging to anaesthetists as compared to open surgery. No doubt that these laproscopic procedures are beneficial to the patients and have made the life of surgeons easier but have also made the anaesthetists to be extra cautious due to the added risks involved with these laproscopic surgeries. Amongst the cardiac system bradycardia and hypotension due to excessive vagal activity can be life threatening [3]. The challenges of preventing and managing bradycardia during laparoscopic surgeries and

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avoiding its adverse consequences while the patients are under the influence of anaesthesia remain. A recent study has analysed bradycardia occurring during pneumoperitoneum created for laparoscopic surgeries, as an early warning sign of cardiac arrest [4].

Bradycardia may occur in any age group and may happen in fit and healthy patients with no significant medical history [5]. Bradycardia should be managed promptly and effectively with IV Atropine administration and deflation of pneumoperitoneum as it may be an early warning for cardiac arrest [6].

MATERIALS AND METHODS

In this prospective, observational comparative study, we enrolled patients who were candidates for elective laparoscopic cholecystectomy surgical operation. After obtaining informed consent and approval of the study by ethics committee patients were selected and put into two groups. Patients aged between 18 and 60 years of age were put in one group namely Adult group (Group A) and patients above 60 years of age were put in Elderly group (Group E). All of the patients were in the American Society of Anesthesiologists categories I and II and did not have any history of cardiac disease. The exclusion criteria were history of cardiac arrhythmias (such as sick sinus syndrome), drug-induced bradycardia, and cardiac disease, as well as contraindication of general anesthesia or laparoscopic surgery. Anaesthesia work station was checked. Appropriate size endotracheal tubes, working laryngoscope with medium and large size blades, stylet and working suction apparatus were kept ready before procedure. After shifting the patient to operating room, IV access was obtained with 18G IV cannula and ringer lactate started. All of the patients underwent a balanced anesthesia, including induction of anesthesia with intravenous propofol 2 mg/kg to 3 mg/kg, followed by atracurium, 0.5 mg/ kg. After endotracheal intubation, maintenance of anesthesia was continued by inhalational anesthetic drugs (isoflurane or sevoflurane) and positive pressure ventilation. The patients were secured in the supine position, and their intraabdominal pressure was maintained below 15 mm Hg during the operation with constant normal insufflation flows. They were monitored with a noninvasive arterial pressure measurement device, electrocardiography, pulse oximetry, and capnography. Controlled ventilation was used throughout to maintain eucapnia. Heart rate was recorded following creation of pneumoperitoneum. If bradycardia developed, it would be controlled by atropine sulphate. The collected data were t test was used to compare the age and the chi-square test, to compare the frequency of bradycardia between the two groups.

RESULT

60 patients randomly divided into two groups with 30 patients in Group A (Adult group) and 3 0 patients in Group E (Elderly) scheduled for laproscopic cholecystectomy surgery under general anaesthesia was undertaken to assess occurrence/incidence of bradycardia post creation of pneumoperitoneum.

Table-1: Demographic Variables

		GROUP				Chi square	P value
		Elderly group		Adult group			
		Count	Column N %	Count	Column N%		
ASA	1	18	60.00%	17	55.00%	0.102	0.749
	2	12	40.00%	13	45.00%		
Gender	M	13	45.00%	13	45.00%	0.4	0.527
	F	17	55.00%	17	55.00%		

Table-2: Table we can see that Comparison of the bradycardia between the two groups shows that bradycardia is higher in Elderly group and is statistically non significant with a p value of 0.278

Age (in years)	GROUP	N	Bradycardia (N)	PERCENT	P VALUE
Above 60	Elderly (E)	30	2	6.6%	0.278
18 and 60	Adult(A)	30	1	3.3%	

Among 60 laparoscopic cholecystectomies we found that bradycardia was seen more in elderly population but the results were statistically insignificant. All bradycardias occurred during elective laparoscopic cholecystectomy performed under general anaesthesia but there were no reported deaths. We also observed that female elderly population was more prone to bradycardia but in a statistically insignificant manner. Corrective medications were used for all bradycardias, except for the two that occurred during laryngoscopy and intubation. All patients recovered from bradycardia and succeeding events. Intended surgery was accomplished and the course thereafter was uneventful in all of them.

DISCUSSION

Laparoscopic surgeries involve creation of pneumoperitoneum by insufflation of gases into the peritoneal cavity. This causes an increase in intra-abdominal pressure [7]. The changes in cardiovascular and respiratory systems arise mainly due to raised intra-abdominal pressure of the pneumoperitoneum, alteration in the patient's position and effects of gas absorption.

Bradycardia post creation of pneumoperitoneum is mainly attributed to peritoneal triggered vagal responses and rapid peritoneal stretching with pneumoperitoneum which leads to significant vagal stimulation. Insufflation related Bradycardia is reported 28% of laparoscopic surgeries and the treatment using deflation of the gas, Atropine administration is the best [8].

During laparoscopic surgery, the head-up position and high insufflator pressure reduce venous return and cardiac output with a decrease in the mean arterial pressure and cardiac index. Conversely, the head-down position increases venous return and normalizes blood pressure [9].

Possible extrinsic causes are often reversible and are related to drugs or autonomic nervous system influences. Vagal stimulation, sympatholytics, beta-blockers, calcium channel blockers, opioids, hypothyroidism, hypothermia, increased intracranial pressure and endotracheal suctioning have all been depicted for bradyarrhythmias [10]. One or more of these factors might be implicated during laparoscopic surgeries.

Despite the improvements in patient preparation, surgical techniques and anaesthetic management, bradycardias are still encountered during laparoscopic surgeries. To avoid the possible disappointments that it brings, even in seemingly healthy individuals, bradycardia should be taken seriously.

Knowing the procedure and a preparedness to act promptly is key, but not always enough. Skills including team working, situation awareness, and decision making at the individual level are crucial. And, if any risk factor is evident, it is prudent to administer an anticholinergic prophylactically. Some authors even recommend prophylactic anticholinergic for all laparoscopic patients [8]. But, the paucity of evidence for benefits in terms of numbers needed to prevent bradycardia along with the potential complications, do not suggest routine prophylaxis [11].

Management of cardiac arrest during insufflation is a combination of Atropine administration, resuscitation (CPR), deflation of pneumoperitoneum, Adrenaline administration, and repositioning into the supine position.

CONCLUSION

Bradycardia is common during laparoscopic procedures and usually arises in response to gas insufflation as a vagal mediated physiologic response and is benign in the majority of cases. Despite being reported more common in older patients but in our study statistically insignificant. Intraoperative bradycardia should be wisely followed with prompt response with deflation of pneumoperitoneum and Atropine administration as it can avoid progression to cardiac arrest. Bradycardia should be considered as a significant warning for both surgeons and anaesthetists.

Limitation of study-Small Sample size

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Conflicts of interest: No conflicts of interest

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REFERENCES

1. Fleisher, L. A., Fleischmann, K. E., Auerbach, A. D., Barnason, S. A., Beckman, J. A., Bozkurt, B., ... & Wijeysundera, D. N. (2014). 2014 ACC/AHA guideline on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*, 130, e278–e333. Doi: 10.1161/CIR.0000000000000106.
2. Aminian, A., Brethauer, S. A., Kirwan, J. P., Kashyap, S. R., Burguera, B., & Schauer, P. R. (2015). How safe is metabolic/diabetes surgery?. *Diabetes, Obesity and Metabolism*, *17*(2), 198-201. doi:10.1111/dom.12405.
3. Hirvonen, E. A., Poikolainen, E. O., Pääkkönen, M. E., & Nuutinen, L. S. (2000). The adverse hemodynamic effects of anesthesia, head-up tilt, and carbon dioxide pneumoperitoneum during laparoscopic cholecystectomy. *Surgical endoscopy*, *14*, 272-277.
4. Yong, J., Hibbert, P., Runciman, W. B., & Coventry, B. J. (2015). Bradycardia as an early warning sign for cardiac arrest during routine laparoscopic surgery. *International Journal for Quality in Health Care*, *27*(6), 473-478.
5. Reed Jr, D. N., & Duff, J. L. (2000). Persistent occurrence of bradycardia during laparoscopic cholecystectomies in low-risk patients. *Digestive surgery*, *17*(5), 513-517.
6. Yong, J., Hibbert, P., Runciman, W. B., & Coventry, B. J. (2015). Bradycardia as an early warning sign for cardiac arrest during routine laparoscopic surgery. *International Journal for Quality in Health Care*, *27*(6), 473-478.
7. Perrin, M., & Fletcher, A. (2004). Laparoscopic abdominal surgery. *Continuing Education in Anaesthesia, Critical Care & Pain*, *4*(4), 107-110.
8. Aghamohammadi, H., Mehrabi, S., & Beigi, F. M. A. (2009). Prevention of bradycardia by atropine sulfate during urological laparoscopic surgery: a randomized controlled trial. *Urology Journal*, *6*(2), 92-95.
9. Gerges, F. J., Kanazi, G. E., & Jabbour-Khoury, S. I. (2006). Anesthesia for laparoscopy: a review. *Journal of clinical anesthesia*, *18*(1), 67-78.
10. Tomaselli, G. F. (2008). The bradyarrhythmias. In: Fauci, A. S., Braunwald, E., Kasper, D. L., Hauser, S. L., Longo, D. L., Jameson, J. L, editors.

Harrison's principles of internal medicine. 17th ed. Vol. 2. New York: McGraw Hill; p. 1416-24. [ISBN: 9780071544863]

11. Steer, A. E., Ozcan, J., & Emeto, T. I. (2019). The role of anticholinergic medication in the prevention of bradycardia during laparoscopic gynaecological surgery. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, *59*(6), 777-780.

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