

Anaesthesia for Laparoscopic Surgery: Knowledge Attitude and Practice among Anaesthetists in Port Harcourt

Joy O Dayi¹, Rex Friday Ogoronte A Ijah² and Longinus N Ebirim¹

¹Department of Anesthesiology, University of Port Harcourt Teaching Hospital / Faculty of Clinical Sciences, College of Health Sciences, University of Port Harcourt, Rivers State, Nigeria

²Department of Surgery, Rivers State University Teaching Hospital, & Lecturer, PAMO University of Medical Sciences, Port Harcourt, Nigeria

*Corresponding author: Ijah RFOA, Department of Surgery, Rivers State University Teaching Hospital, & Lecturer, PAMO University of Medical Sciences, Port Harcourt, Nigeria, Tel: +2348033953290; E-mail: rexijah@gmail.com

Received: January 16, 2022; **Accepted:** January 22, 2022; **Published:** January 31, 2022

Abstract

Aim: To evaluate the knowledge, attitude, and practice of anaesthesiologists involved in laparoscopic surgical procedures in Port Harcourt in the last three years.

Background: Laparoscopic cholecystectomy has since become gold standard for gallbladder removal. However, the uptake of this mode of care has not been at the same pace in some developing countries as it is in the developed clime. The gradual adoption of laparoscopic surgery practice has witnessed some mortality associated with anaesthesia in low and middle-income countries, and some pioneering practices have reported some apathy from support staff and institutional challenges among others.

Materials and Methods: A cross-sectional descriptive study was carried out among anaesthesiologists of all categories self-administered semi-structured questionnaires.

Results: Twenty-four (48.0%) were of the opinion that both general and regional anaesthesia could be used for laparoscopic surgery. Forty-eight (96.0%) were inclined to conducting anaesthesia for laparoscopic surgery, and 46 (92.0%) were willing to undergo some more training in anaesthesia for laparoscopic surgery given the opportunity. Forty-six (92.0%) respondents had carried out anaesthesia for laparoscopic surgery in the past. Thirty-two (64.0%) respondents had carried out between 1 to 10 anaesthesia cases for laparoscopic surgery.

Conclusion: Majority of respondents demonstrated awareness of anesthesia for laparoscopic surgery. Although there was positive interest among majority of respondents for training and practice of anesthesia for laparoscopic surgery, the actual exposure per case was low.

Keywords: *Laparoscopic surgery; Anesthesia; knowledge attitude and practice; Port Harcourt; Nigeria*

1. Introduction

Minimal invasive surgical technique has come to stay in modern care of the surgical patient, with applications across specialties [1-6]. Laparoscopic surgery, a form of minimal invasive surgery, was popularized by Phillippe Mouret, who performed the first successful laparoscopic cholecystectomy in 1987 [7]. Laparoscopic cholecystectomy has since become gold standard for gallbladder removal [7-10]. However, the uptake of this mode of care has not been at the same pace in some developing countries as it is in the developed clime. Emphasis has been placed on anesthesia and surgical considerations as being twin secretes for safe laparoscopic surgery [7].

The most favorable of the insufflation agents is carbon dioxide which is more physiological, however, systemic absorption of carbon dioxide and elevated intra-abdominal pressure are known reasons for cardiovascular effects, especially with pressures above 15 mmHg [11-14]. The systemic consequences of pneumoperitoneum of concern also include neurologic effect which may be made worse with abnormal positioning for surgery [15,16].

General anesthesia is considered the technique of choice. However, challenges encountered and necessary innovations especially in the developing world has warranted consideration for regional anesthesia (spinal, epidural, and combined spinal-epidural) as an alternative for laparoscopic surgery with comparable safety profile [11,17-25]. Minimum mandatory standards for anesthesia are known as set out by regulatory bodies [26-30], and the some considerations for laparoscopic surgery anesthesia have been documented [7,31-33].

The gradual adoption of laparoscopic surgery practice has witnessed some mortality associated with anesthesia in low and middle-income countries [34], and some pioneering practice have reported some apathy from support staff and institutional challenges among others [35,36]. There are few reports on anesthesia for laparoscopic surgery in Africa, however, laparoscopic surgery under regional anesthesia has been reported in Ibadan, Nigeria [37]. Any effort directed at improving minimal invasive surgery in our environment without consideration for anesthesia will not be wholesome. This study sets out to evaluate the knowledge, attitude, practice and challenges of anesthesiologist towards laparoscopic surgery.

2. Materials and Methods

2.1 Study area

The study was carried out in Port Harcourt, the capital of the petroleum oil-producing Rivers State, South-South of the Federal Republic of Nigeria.

2.2 Study sites/setting

The Department of Anaesthesia of the University of Port Harcourt Teaching Hospital, and the Rivers State University Teaching Hospital all in Port Harcourt were the study settings.

2.3 Research design

A cross-sectional descriptive study.

2.4 Study population

The study was carried out among anesthesiologists of all categories.

2.5 Study instrument

Self-administered semi-structured questionnaires was used for data collection.

2.6 Sampling method

A total population of 60 anaesthetists was aimed in this study.

2.7 Sample size determination

A minimum of 2/3rd of the population of 60 anaesthesiologists in Port Harcourt was targeted.

2.8 Data analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0.

2.9 Validity/Reliability of instrument

The study instrument was designed and critiqued by all authors before use. The study instrument (the questionnaires) was also pre-test in a similar work environment and corrections made before commencement of study.

3. Results

Fifty (50) respondents out of a total of 60 distributed questionnaires were retrieved giving a response rate of 83%.

The demographic characteristics of the respondents summarized in TABLE 1 indicated that thirty-one (62%) respondents were male and nineteen (38.0%) were female. Forty-four (88%) respondents were between 25 and 60 years of age. Thirty-three (66%) respondents have been in the practice of anesthesia for 6-20 years comprising consultants (15=30%), senior registrars (18=36%), and registrars (17=34%).

The respondents' knowledge of Anaesthesia for Minimally Invasive Surgery is presented in TABLE 2. Twenty-four (48.0%) respondents were of the opinion that both general and regional anaesthesia can be used for laparoscopic surgery. Forty-one (82%) asserted that there is advantage of regional anaesthesia over general anaesthesia for laparoscopic surgery. Thirty-one (62.0%) respondents were of the opinion that avoidance of airway manipulation, minimal nausea and vomiting, and early ambulation & discharge from hospital, were significant advantages of regional anaesthesia over general. However, 13 (26%) respondents were concerned over severe hypotension for regional anaesthesia, respiratory embarrassment due to pneumoperitoneum, inability to achieve higher sensory block and pneumoperitoneum and abnormal position may be uncomfortable in the awake patient, as disadvantages of regional over general anaesthesia.

TABLE 1. Socio-demographic characteristics of respondents (n=50).

Variables	Frequency	Percentage
Sex		
Male	31	62.0
Female	19	38.0
Age		
Less than 25 years	2	4.0
25- 40 Years	13	26.0
41-60 years	31	62.0
More than 60 years	4	8.0
Number of years in Service/Training		
Less than 1year	5	10.0
1-5 years	5	10.0
6-10 years	12	24.0
11-15 years	10	20.0
16-20 years	11	22.0
More than 20 years	7	14.0
Category of Respondents		
Registrar	17	34.0
Senior Registrar	18	36.0
Consultant	15	30.0
Institution of practice or training		
Rivers State University Teaching Hospital	5	10.0
University of Port Harcourt Teaching Hospital	45	90.0

TABLE 2. Knowledge of Anaesthesia for Laparoscopic Surgery (n=50).

Variables	Frequency	Percentage
<i>Type of anaesthesia used for laparoscopic surgery</i>		
General anaesthesia	19	38.0
Regional anaesthesia	5	10.0
Both general and regional anaesthesia	24	48.0
Regional and local anaesthesia	2	4.0
<i>Any advantage of regional over general anaesthesia for laparoscopic</i>		
Yes	41	82.0
No	9	18.0
<i>Advantage of regional over general anaesthesia</i>		

Avoidance of airway manipulation	2	4.0
Minimal nausea and vomiting	4	8.0
Early ambulation and discharge from hospital	4	8.0
All of the above	31	62.0
None of the above	9	18.0
<i>Disadvantage of regional over general anaesthesia</i>		
Severe hypotension for regional anaesthesia	4	8.0
Respiratory embarrassment due to pneumo-peritoneum	2	4.0
Inability to achieve higher sensory block	2	4.0
Pneumoperitoneum and abnormal position may be uncomfortable in the awake patient	2	4.0
All of the above	3	6.0
None of the above	37	74.0

Respondents’ opinion on issues of concern when carrying out anaesthesia for laparoscopic surgery, is reported in TABLE 3. Pneumoperitoneum and elevated intra-abdominal pressure (37=74.0%), positioning and its effect (32=64.0%), respiratory effects (30=60.0%), neurologic (23=46%), and cardiovascular effects (29=58.0%), were opined (TABLE 4).

TABLE 3. Issues of concern when carrying out anaesthesia for laparoscopic surgery (n=50).

	YES		NO		No Opinion	
	Freq	(%)	Freq	(%)	Freq	(%)
Pneumoperitoneum and elevated intra-abdominal pressure	37	74	5	10.0	8	16.0
Cardiovascular effects	29	58	3	6.0	18	36.0
Respiratory effects	30	60	6	12.0	14	28.0
Neurologic effects	23	46	11	22.0	17	32.0
Positioning and its Effect	32	64	4	8.0	14	28.0

TABLE 4. Attitude to Anaesthesia for Laparoscopic Surgery (n=50).

Variables	Frequency	Percentage
Incline/Comfortable with anaesthesia for laparoscopic surgery		
Yes	48	96.0
No	2	4.0
Willing to undergo some more training in anesthesia for laparoscopic surgery		
Yes	46	92.0
No	4	8.0

Forty-eight (96.0%) were inclined to conducting anaesthesia for laparoscopic surgery, and 46 (92.0%) were willing to undergo some more training in anaesthesia for laparoscopic surgery given the opportunity.

TABLE 5 reports respondents experiences in practice and challenges encountered in anaesthesia for minimally invasive surgery. Forty-six (92.0%) respondents had carried out anaesthesia for laparoscopic surgery in the past. Thirty-two (64.0%) respondents had carried out between 1 to 10 anaesthesia cases for laparoscopic surgery, while 10 (20%) had done between 10-50 cases. Twenty-four (48%) had conducted anaesthesia for 10-50 other minimally invasive surgical procedures. Thirty-nine (78%) respondents declined to indicate the type of minimally invasive surgical procedures for which they had conducted the anaesthesia. Twelve (24%) asserted to encountering challenges during anaesthesia for laparoscopic surgery. Thirty-eight (76%) declined mention of the specific challenges encountered.

TABLE 5. Practices/Challenges Encountered in Anaesthesia for Minimally Invasive Surgery (n=50).

Variables	Frequency	Percentage
Ever carried out anaesthesia for laparoscopic surgery		
Yes	46	92.0
No	4	8.0
Number of Anaesthesia Cases Carried Out for Laparoscopic Surgery		
None	4	8.0
1 -10	32	64.0
11 -50	10	20.0
51-100	4	8.0
Number of Anaesthesia Cases Carried Out for Other Minimally Invasive Surgeries		
None	16	32.0
1 -10	24	48.0
11 -50	8	16.0
201-300	2	4.0
Minimal invasive surgery carried out anaesthesia for		
Laparoscopic Cholecystectomy /Appendectomy	1	2.0
Percutaneous Nephrolithotomy	2	4.0
Transurethral Resection of the Prostate Gland (TURP)	2	4.0
Hysteroscopy	4	8.0
Endoscopy for upper GI bleeding colonoscopy	2	4.0
No response	39	78.0
Encounter challenges while carrying out anesthesia for laparoscopic surgery		
Yes	12	24.0
No	38	76.0
Other challenges encounter in carrying out anesthesia for laparoscopic surgery		

usually, prolonged perioperative time	5	10.0
Learning curve	4	8.0
Prolonged perioperative time and learning curve	3	6.0
No response	38	76.0

4. Discussion

Two-third of respondents were between twenty-five and sixty years of age - the active working group, and more than half of them had worked for between six and twenty years. Additionally, two-third of the respondents were senior registrars and consultants, who constitute a pool of active workforce from which anaesthetists could be drawn for further training to improve on anaesthesia for laparoscopic surgery. Nearly half of the respondents were aware that both general and regional anaesthesia can be used for laparoscopic surgery, with about two-third emphasizing that there is advantage of regional anaesthesia over general anaesthesia for laparoscopic surgery. Most of the respondents were also aware that regional anaesthesia has advantage over general anaesthesia in avoidance of airway manipulation, minimal nausea and vomiting, and early ambulation & discharge from hospital. This implies that awareness of anaesthesia for laparoscopic surgery was not suboptimal among this population of anaesthetists.

However, certain disadvantages of regional over general anaesthesia for laparoscopic surgery were asserted by a few respondents. These disadvantages include tendency to severe hypotension for regional anaesthesia, respiratory embarrassment due to pneumo-peritoneum, inability to achieve higher sensory block and pneumoperitoneum and abnormal position may be uncomfortable in the awake patient. More than half of the respondents were also conversant with the issues of concerns in anaesthesia for laparoscopic surgery such as pneumoperitoneum and elevated intra-abdominal pressure, positioning and its effect, respiratory effects, neurologic and cardiovascular effects. Similar concerns have been expressed by other authors in other climes [11,38].

Nearly all the respondents were inclined to conducting anaesthesia for laparoscopic surgery, and willing to undergo some more training in anaesthesia for laparoscopic surgery given the opportunity. This posture appears to be different from the apathy experienced and reported by some pioneers of laparoscopic surgery in other centres [35,36]. Additionally, the challenges encountered during pioneering anaesthesia for laparoscopic surgery, as asserted to by almost a third of respondents, in this study, could explain the unsupportive attitude earlier reported. The relative change in attitude, therefore, may have been informed by increased awareness and practice, with evidence of positive outcomes.

Nearly all respondents had been practically involved in conducting anaesthesia for laparoscopic surgery in the past. Also, about half of respondents were involved in carrying out anaesthesia for other minimally invasive surgical procedures. This means that some form of laparoscopic (and other minimally invasive) surgery was being practiced.

However, majority of the respondents were involved in few cases (about one to ten cases) of laparoscopic anaesthesia. This implies that experience in the practice is limited, and growth-curve will be affected. This is a sharp contrast with the report from a single centre where 4,645 patients had spinal anaesthesia for laparoscopic surgery over 11 years [38].

5. Study Limitation

A limitation of this study is that it is questionnaire-based, and hence represents the opinion of respondents.

6. Conclusion

Majority of respondents demonstrated awareness of anesthesia for laparoscopic surgery. Although there was positive interest among majority of respondents for training and practice of anesthesia for laparoscopic surgery, the actual exposure per case was low. There is need therefore for affected institutions to take advantage of the expressed interest in laparoscopic anesthesia to provide training opportunities for case volume to be stepped up to keep pace with the needed experience.

7. Acknowledgement

We express our appreciation to our senior colleagues and colleagues in the study centers for their kindness in participating in the study that gave birth to this article.

8. Ethical Considerations

The approval of the Research Ethics Committee of the University of Port Harcourt Teaching Hospital and the Rivers State University Teaching Hospital were obtained before data collection.

9. Conflict of Interest

None declared

REFERENCES

1. Schreuder HW, Oei G, Maas M, et al. Implementation of simulation in surgical practice: minimally invasive surgery has taken the lead: the Dutch experience. *Med Teach.* 2011;33(2):105-15.
2. Mack MJ. Minimally invasive cardiac surgery. *Surg Endosc.* 2006;20(2):S488-S92.
3. Horvath O. Minimal invasive surgery. *Acta Chirurgica Hungarica.* 1997;36(1-4):130-01.
4. Awad M, Awad F, Carter F, et al. Consensus views on the optimum training curriculum for advanced minimally invasive surgery: A delphi study. *Int J Surg.* 2018;53:137-42.
5. Banta HD. Minimally invasive surgery. Implications for hospitals, health workers, and patients. *Br Med J.* 1993;307(6918):1546-9.
6. Rothenberg SS. Developing neonatal minimally invasive surgery: Innovation, techniques, and helping an industry to change. *J Pediatr Surg.* 2015;50(2):232-5.
7. Srivastava A, Niranjana A. Secrets of safe laparoscopic surgery: Anaesthetic and surgical considerations. *J Minim Access Surg.* 2010;6(4):91.
8. Begos DG, Modlin IM. Laparoscopic cholecystectomy: from gimmick to gold standard. *J Clin Gastroenterol.* 1994;19(4):325-30.

9. Soper NJ, Stockmann PT, Dunnegan DL, et al. Laparoscopic cholecystectomy the new 'gold standard'? *Arc Surg.* 1992;127(8):917-23.
10. Bingener J, Richards ML, Schwesinger WH, et al. Laparoscopic cholecystectomy for elderly patients: gold standard for golden years? *Arc Surg.* 2003;138(5):531-6.
11. Bajwa SJS, Kulshrestha A. Anaesthesia for laparoscopic surgery: General vs regional anaesthesia. *J Minim Access Surg.* 2016;12(1):4.
12. Gutt C, Oniu T, Mehrabi A, et al. Circulatory and respiratory complications of carbon dioxide insufflation. *Dig Surg.* 2004;21(2):95-105.
13. Zuckerman R, Heneghan S. The duration of hemodynamic depression during laparoscopic cholecystectomy. *Surg Endosc.* 2002;16(8):1233-6.
14. Gerges FJ, Kanazi GE, Jabbour-Khoury SI. Anesthesia for laparoscopy: a review. *J Clin Anesth.* 2006;18(1):67-78.
15. Hirvonen E, Poikolainen E, Pääkkönen M, et al. The adverse hemodynamic effects of anesthesia, head-up tilt, and carbon dioxide pneumoperitoneum during laparoscopic cholecystectomy. *Surg Endosc.* 2000;14(3):272-7.
16. Salihoglu Z, Demiroglu S, Cakmakaya S, et al. Influence of the patient positioning on respiratory mechanics during pneumoperitoneum. *Middle East J Anaesthesiol.* 2002;16(5):521-8.
17. Bajwa SJS, Takrouri MSM. Innovations, improvisations, challenges and constraints: The untold story of anesthesia in developing nations. *Anesth Essays Res.* 2014;8(1):1.
18. Mehanna A, Ibrahim A. Comparative Study between General and Spinal Anaesthesia in Laparoscopic Appendectomy. *J Anesth Clin Res.* 2017;8(713):2.
19. Zhang H-W, Chen Y-J, Cao M-H, et al. Laparoscopic cholecystectomy under epidural anesthesia: a retrospective comparison of 100 patients. *Am Surg.* 2012;78(1):107-10.
20. Sharma A, Shankaranarayana P. Hemodynamic stability with intrathecal fentanyl alone in laparoscopic hysterectomies under general anesthesia-A pilot study. *Karnataka Anesth J.* 2015;1(2).
21. Yüzkat N, Çegin MB, Soyoral L. Laparoscopic Cholecystectomy Under Thoracic Epidural Anaesthesia in Patients with Situs Inversus Totalis. *Haseki Tip Bulteni.* 2015;53(2).
22. da Silveira GGG, de Oliveira AR, Silva MR, et al. Total Laparoscopic Hysterectomy Without General Anesthesia. *Surg Innov.* 2010;17(4):366.
23. Mane RS, Patil MC, Kedareshvara K, et al. Combined spinal epidural anesthesia for laparoscopic appendectomy in adults: A case series. *Saudi J Anesth.* 2012;6(1):27.
24. Vretzakis G, Bareka M, Aretha D, et al. Regional anesthesia for laparoscopic surgery: a narrative review. *J Anesth.* 2014;28(3):429-46.
25. Singh R, Saini A, Goel N, et al. Major laparoscopic surgery under regional anesthesia: A prospective feasibility study. *Med J Armed Forces India.* 2015;71(2):126-31.
26. Merry AF, Cooper JB, Soyannwo O, et al. International standards for a safe practice of anesthesia 2010. *Can J Anaesth.* 2010;57(11):1027-34.
27. Gelb AW, Morriss WW, Johnson W, et al. World Health Organization-World Federation of Societies of Anaesthesiologists (WHO-WFSA) international standards for a safe practice of anesthesia. *Can J Anaesth.* 2018;65(6):698-708.

28. Merry AF, Cooper JB, Soyannwo O, et al. An iterative process of global quality improvement: the International Standards for a Safe Practice of Anesthesia 2010. *Can J Anaesth.* 2010;57(11):1021-6.
29. Shetty A, Raveendra U. Anesthesia for day care surgery. *J Health Sci NU.* 2015;5(02):97-103.
30. Weiss M, Vutskits L, Hansen TG, et al. Safe Anesthesia For Every Tot - The SAFETOTS initiative. *Curr Opin Anaesthesiol.* 2015;28(3):302-7.
31. Hayden P, Cowman S. Anaesthesia for laparoscopic surgery. *Continuing Education in Anaesthesia, Crit Care Pain.* 2011;11(5):177-80.
32. Henny C, Hofland J. Laparoscopic surgery: pitfalls due to anesthesia, positioning, and pneumoperitoneum. *Surg Endosc.* 2005;19(9):1163-71.
33. Whalen FX, Gajic O, Thompson GB, et al. The effects of the alveolar recruitment maneuver and positive end-expiratory pressure on arterial oxygenation during laparoscopic bariatric surgery. *Anesth Analg.* 2006;102(1):298-305.
34. Alfa-Wali M, Osaghae S. Practice, training and safety of laparoscopic surgery in low and middle-income countries. *World J Gastrointest Surg.* 2017;9(1):13.
35. Abdur-Rahman LO, Bamigbola KT, Nasir AA, et al. Pediatric laparoscopic surgery in North-Central Nigeria: Achievements and challenges. *J Clin Sci.* 2016;13(4):158.
36. Ekwunife CN, Chianakwana GU, Anyanwu SN, et al. Pioneering laparoscopic surgery in South-Eastern Nigeria: A two-center general surgery experience. *Niger J Basic Clin Sci.* 2012;9(2):75.
37. Olonisakin R. Regional anaesthetic technique for laparoscopic appendicectomy in Ibadan. *Afr J Med Med Sci.* 2014;43(3):219-23.
38. Sinha R, Gurwara A, Gupta S. Laparoscopic surgery using spinal anesthesia. *JLS.* 2008;12(2):133.