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Comparative Study of Laparoscopic Appendicectomy Under General and Regional Anesthesia: Randomized Control Trial

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Abstract

Laparoscopic appendicectomy is normally performed under general Anesthesia which is said to be necessary for tolerance of pneumoperitoneum and muscle relaxation. The efficacy of laparoscopic appendicectomy under spinal Anesthesia has been documented in few selected studies so far. In view of the above consideration, this clinical study was performed to evaluate the feasibility of laparoscopic appendicectomy under spinal Anesthesia.

Fifty patients underwent laparoscopic appendicectomy under spinal Anesthesia which were selected randomly. Intra operatively, out of the 50 patients, 4% experienced anxiety and 6% complained of shoulder/neck pain. None of the patients developed intraoperative nausea/vomiting and hypotension. 10% of the patients who underwent under spinal Anesthesia required sedation either due to shoulder/neck pain or anxiety. Out of these, 2 (4%) of the patients required conversion to general Anesthesia. Patients who underwent laparoscopic appendicectomy under spinal anesthesia experienced lesser post-operative pain as compared to those who underwent laparoscopic appendicectomy under general anesthesia.

Our data in this prospective study has confirmed the efficacy of laparoscopic appendicectomy under spinal Anesthesia. Moreover, it appears that spinal Anesthesia is more effective than the standard general Anesthesia on post-operative pain control during the patient's hospital stay. From these data, it appears that spinal Anesthesia is a promising method of Anesthesia for laparoscopic procedures, and with proper refinements, it could potentially evolve as the new gold standard Anesthetic approach for laparoscopic appendicectomy in healthy patients.

Keywords: Laparoscopy; Appendicectomy; Pneumoperitoneum, Anesthesia.

Introduction

Appendicitis is the most common abdominal-related emergency seen in the ER, as well as the most common reason to have urgent surgery.[1] The standard treatment for acute appendicitis is surgical removal of the appendix.[2] This may be done by an open incision in the abdomen (laparotomy) or through a few smaller incisions with the help of cameras (laparoscopy). Surgery decreases the risk of side effects or death associated with rupture of the appendix.[3]

Laparoscopic appendectomy has been established as the treatment of choice since last few decades. Laparoscopic appendectomy (LA) has shown to have considerable advantages over open appendectomy; such advantages include less postoperative pain, better cosmetic results, a shorter hospital stay, and a lower complication rate.[4]

Laparoscopic surgeries are normally performed under endotracheal general anesthesia to prevent aspiration and respiratory embarrassment

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secondary to induction of pneumoperitoneum. The low pneumoperitoneum pressure, good musculature relaxation, pain free and spontaneous breathing are an advantage of spinal Anesthesia for laparoscopic procedures.

Various study already established the feasibility and safety of spinal Anesthesia for laparoscopic surgery.[5,6] This study aims to compare laparoscopic appendectomy under regional and general Anesthesia with respect to pperioperative tolerance using parameters like Neck/shoulder pain, hypotension, requirement of per operative sedation and need for conversion to general anesthesia in cases of regional anesthesia.

Objectives

To compare the peri-operative tolerance and post-operative complications in patients undergoing laparoscopic appendectomy in general and spinal anesthesia.

Materials and Methods

Source of data

Data will be collected from patients admitted to Department of General Surgery, Vydehi Institute of Medical Sciences and Research Centre who presented with acute appendicitis and underwent laparoscopic appendectomy during the study period (Oct 2017-Sept 2019).

Method of collection of data

Diagnosis of acute appendicitis was confirmed using clinical examination and investigations like ultrasound abdomen, total counts and differential counts.

A total of 100 patients who underwent laparoscopic appendectomy were randomly selected based on computer generated numbers and divided into 2 groups.

Study group (50 patients): Patients undergoing laparoscopic appendectomy under spinal Anesthesia.

Control group (50 patients): Patients undergoing laparoscopic appendectomy under general Anesthesia.

Comparison of patients undergoing laparoscopic appendectomy under regional and general Anesthesia was done using a pre-designed proforma.

Data was analyzed using the Students *t*-test, Chi-square Analyzis and *p* - value of < 0.05 was considered significant.

Inclusion criteria

- Patients with acute appendicitis who underwent laparoscopic appendectomy

Exclusion criteria

- Patients with previous history of abdominal surgeries
- In whom General Anesthesia was contraindicated
- Patients with appendicular mass

Results

The results of the Analyzis of data on 50 patients who underwent laparoscopic appendicectomy under spinal Anesthesia and another group of 50 patients, who underwent laparoscopic appendicectomy under general Anesthesia are as follows.

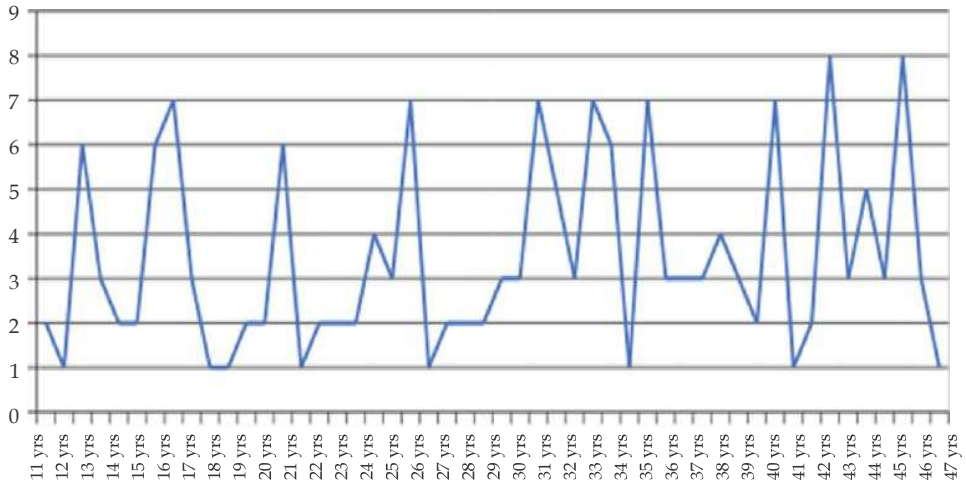
The mean age of the patients in laparoscopic appendicectomy under spinal and general Anesthesia was 26.2 and 25.38 years respectively.

Pain was measured using visual analogue scoring and a score of more than 5 was taken as significant.

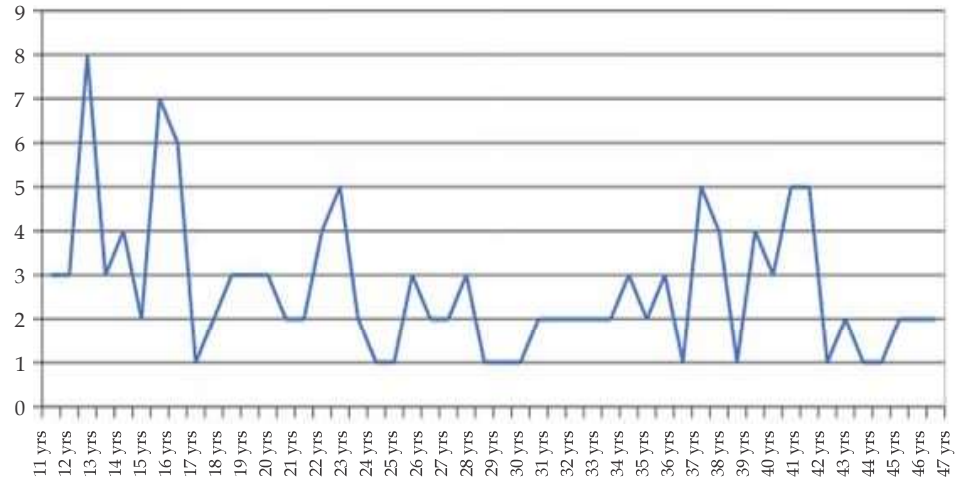
Table 1: Distribution of patients with respect to age and sex

Laparoscopic Appendicectomy	Characteristic				Total
	Spinal		General		
	N	%	*N*	%	
Patients analyzed	50	50	50	50	100
Sex					
Male	27	54	23	46	
Female	23	46	27	54	
Age (years)					
11–15	5	10	7	14	
16–20	11	22	12	24	

Laparoscopic Appendicectomy	Characteristic				Total
	Spinal		General		
	N	%	*N*	%	
21–25	9	18	8	16	
26–30	9	18	10	20	
31–35	2	4	7	14	
36–40	10	20	5	10	
>40	4	8	1	2	
Mean ± SD	26.2 ± 10.51		25.38 ± 8.64		



Graph 1: Distribution of pain score in GA patients.



Graph 2: Distribution of pain score in SA patients.

Post-operatively analgesics (intravenous diclofenac) were given on demand to patients who complained of pain. Pain was measured using visual analogue scoring and a score of more than 5 was taken as significant. Patients who underwent laparoscopic appendicectomy under spinal anesthesia experienced lesser post-operative pain as compared to those who underwent laparoscopic appendicectomy under general anesthesia. This study showed significant difference between the two groups in post-operative pain (p-value <0.050). Pain score on an average was higher in older

patients in the general anesthesia group wherein younger patients complained of pain following surgery under SA.

The patients were evaluated for:

Perioperative Tolerance

1. Neck/shoulder pain - 3 (6%) patients who underwent laparoscopic appendicectomy under spinal anesthesia complained of neck/ shoulder pain intraoperatively
2. Hypotension - No patient in either of the group developed hypotension intraoperatively
3. Per operative sedation - 5 (10%) patients who underwent laparoscopic appendicectomy under spinal anesthesia required sedation intraoperatively.
4. Conversion to GA - Of the 5 patients who were given sedation, 2 (4% of the total) patients required conversion to GA intraoperatively.

Operative Complications

1. Nausea/ Vomiting - No patient in either of the group developed post-operative nausea/ vomiting
2. Urinary retention - No patient in either of the group developed urinary retention postoperatively
3. Post-operative pain - 3 (6%) patients who underwent laparoscopic appendicectomy under spinal anesthesia complained of pain post-operatively. 12 (24%) patients who underwent laparoscopic appendicectomy under general anesthesia complained of pain post-operatively.

Discussion

Appendicitis is the most common intra-abdominal condition requiring emergency surgery. In this study we have compared laparoscopic appendectomy under regional and general Anesthesia and assessed the perioperative tolerance and post-operative complications in patients.

The goal of Anesthetic management is

- Management of pneumoperitoneum
- Achieving adequate level of sensory blockade
- Management of shoulder tip pain
- Provision of postoperative pain relief
- Ambulation as early as possible

Spinal Anesthesia fulfils all the above criteria and aids in the quick and uneventful postoperative recovery and thus has been suggested to be a suitable alternative Anesthetic method for laparoscopic appendicectomy.

Collins LM, Vaghadia H. studied Regional anesthesia for laparoscopy. And concluded that the key benefits of regional anesthesia include less emesis, less postoperative pain, shorter postoperative stay, improved patient satisfaction, and overall safety.[7]

Rajeev Sinha, et al. did a study on laparoscopic surgery using spinal anesthesia. The advantages of a uniform total muscle relaxation, a conscious patient, and relatively uneventful recovery after spinal anesthesia on the one hand and the protection from potential complications of general anesthesia on the other, were the main reasons for selecting spinal anesthesia as the first choice.[8]

There is no risk of intubation-related airway obstruction, little risk of unrecognized hypoglycemia in a diabetic patient, excellent muscle relaxation, decreased surgical bed oozing, and a more rapid return of gut function when laparoscopic surgery is done using spinal anesthesia compared with general anesthesia. This is in addition to the obvious advantages in an old patient or those with chronic obstructive pulmonary disease or other systemic diseases like hepatic and renal disease and diabetes.[9]

The study conducted by Purvi J Mehta, et al. on comparative Analyzis of spinal versus general anesthesia for laparoscopic cholecystectomy has not only confirmed the feasibility of safely performing laparoscopic cholecystectomy under spinal anesthesia as the sole anesthetic procedure but also shown superiority of spinal anesthesia in terms of better postoperative pain control as compared to general anesthesia.[10]

Pain assessed throughout any time in the postoperative period during the patients' hospital stay was significantly lesser in spinal group as compared to general anesthesia group, which is due to residual analgesic effect of local anesthetic in subarachnoid space and decrease in discomfort due to avoidance of general anesthesia. Pain relief, a component for rapid and smooth recovery, was seen in spinal anesthesia group.

Conclusion

On analyzing the data, we found a similar in outcome between laparoscopic appendicectomy

performed under general and spinal Anesthesia in a properly selected patient.

There was no statistical difference in the peri operative tolerance between the two groups.

Post-operatively, patients who underwent laparoscopic appendicectomy under spinal Anesthesia had lesser pain as compared to those undergoing under general Anesthesia. Pneumoperitoneum, shoulder tip pain and anxiety are the factors whose interplay leads to conversion to General Anesthesia.

In conclusion, laparoscopic appendectomy under spinal Anesthesia is safe and effective. It can be done with low intraoperative and post-operative complications with an advantage of early ambulation and cost effectiveness. But careful evaluation of the technique is appropriate particularly in patients with compromised cardiorespiratory conditions.

References

1. Shelton T, McKinlay R, Schwartz RW. Acute appendicitis: Current diagnosis and treatment. Curr Surg 2003;60(5):502–05.
2. Graffeo, Charles S.; Counselman, Francis L. "Appendicitis". Emergency Medicine Clinics of North America November 1996;14(4):653–71.
3. Hobler, K. (Spring 1998). Acute and Suppurative Appendicitis: Disease Duration and its Implications for Quality Improvement. Permanente Medical Journal 1998;2:5–8
4. LiX,ZhangJ,SangL,ZhangW,etal.Laparoscopic versus conventional appendectomy: A meta-Analyzis of randomized controlled trials. BMC Gastroenterol 2010;10:129.
5. Yuksek YN, Akat AZ, Gozalan U, et al. Laparoscopic cholecystectomy under spinal anesthesia. Am J Surg 2008;195(4):533–6.
6. Manoranjan Kar, Jugal K. Kar, Bibhas Debnath. Experience of Laparoscopic Cholecystectomy Under Spinal Anesthesia with Low-pressure Pneumoperitoneum - Prospective Study of 300 Cases. Saudi J Gastroenterol 2011 May-Jun;17(3):203–07.
7. Collins LM, Vaghadia H: Regional anesthesia for laparoscopy, Anesthesiol Clin North America 2001 Mar;19(1):43–55.
8. Sinha Rajeev, Gurwara A.K. And Gupta S.C.: Laparoscopic Surgery Using Spinal Anesthesia, JSLS 2008 Apr-Jun;12(2):133–38.
9. Jaffe Bm Anel Berger DH, "The appendix" "Chapter 30 in Schwartz's principle of surgery" 9th Edn 2005;1075–92.
10. Mehta J Purvi, Chavda R Hiral, Wadhwana P Ankit, et al. Comparative Analyzis of spinal versus general anesthesia for laparoscopic cholecystectomy: A controlled, prospective, randomized trial, Anesthesia Essays and researches 2010;4(2):91–95.