

Comparative Study Between Single Port vs Four Port Laparoscopic Cholecystectomy

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Abstract

Background: Gallstone disease is one of the most common problems affecting the digestive tract. The prevalence of gallstone varies widely in different parts of the world, in India it is estimated to be around 4%. Earlier Open cholecystectomy was treatment of choice but with the advent of minimal invasive surgery laparoscopic cholecystectomy evolved and further evolution now single incision laparoscopic surgery for cholecystectomy has become routine approach for better cosmeses.

Materials and Methods: It's a randomized controlled trial. The main source of data for study are patients admitted in Basaveshwara Teaching and General Hospital attached to Mahadevappa Rampurae Medical College, Kalaburagi surgery department undergo Laparoscopic cholecystectomy during period of July 2018 - July 2020. Details of cases are recorded including history, clinical examination, and investigations and following parameters of each patient will be recorded preoperatively and compared with intraoperative findings. And post-surgical outcome will be studied for each SILS and Conventional laparoscopic cholecystectomy.

Results: This study included a total of 65 patients who were planned to undergo laparoscopic. Cholecystectomy out of which 45 patients were in conventional four port and 20 patients in single port. The time taken for surgery was more in single port i.e 129.0 min with conventional four port is 64.4 min and complications was more single port is 20.0% than conventional four port is 15.6%.post-operative

complication seen in conventional four port were fever (n=2, 4.4%), pain (n=4, 8.9%), pain and fever (n=1, 2.2%) and in single port were fever (n=3, 15.0%), pain (n=2, 10.0%), biliary leak (n=1, 5.0%). In our study mean length of hospital stay in conventional four port is 4.2 min and in single port is 7.1 .ports is significantly associated with length of hospital stay.

Conclusion: From this study we conclude Single Incision Laparoscopic Cholecystectomy is an emerging technique and has better cosmesis and needs expertised hands and lot of learning curve to perform it when compared with Conventional Four port Laparoscopic Cholecystectomy.

Keywords: Single Port; Four Port; Cholecystectomy Laparoscopic.

Introduction

Gallstone disease is one of the most common problems affecting the digestive tract. Autopsy reports have shown a prevalence of gallstones from 11 to 36%.¹ The prevalence of gallstones is related to many factors, including age, gender, and ethnic background. The prevalence of gallstone varies widely in different parts of the world. It is estimated that at least 20 million people in the United States have gallstones and that approximately 1 million new cases of cholelithiasis develop each year. In India it is estimated to be around 4%. An epidemiological study restricted to rail road workers showed that north Indians have 7 times higher occurrence of gallstones as compared to south Indians.² Changing incidence in India is mainly attributed to westernization of diet, change in socioeconomic structure and availability of ultrasound as investigation in both rural and

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urban areas. Surgical removal of gall bladder has been the gold standard for treatment of gall stones since it was described in 1882 by Carl Langenbuch. Open surgery, laparoscopic cholecystectomy and now single incision laparoscopic surgery for cholecystectomy has become routine approach.³

Laparoscopy laid the milestones and various open surgeries were done by laparoscopy. Furthermore, in order to keep the incision to minimum number of ports for laparoscopy, which gives way to Single Incision access surgery?⁴

Soon after introduction of laparoscopic surgery the idea of no scar surgery gripped the surgeons all over the world. Various natural orifices like umbilicus, vagina are being used as portals for surgery. Termed as single port access surgery (SPA), also known as single incision laparoscopic surgery (SILS) or one port umbilical surgery (OPUS) or single port incision less conventional equipment-utilizing surgery (SPICES) or natural orifice transumbilical surgery (NOTUS) is a novel technique which promises all advantages of reduced postoperative morbidity and almost invisible scar.⁵

e-NOTES (Embryonic Natural Orifice Transumbilical Endoscopic Surgery) is a technique in which incision is made directly through the umbilicus, which is defined as natural embryonic scar. Therefore, the procedure is called e-NOTES (Embryonic Natural Orifice Transumbilical Endoscopic Surgery). In most cases, the scar is not visible after 2 weeks, especially in patients with deep umbilicus. It has more and more important for patients to undergo surgery with no scar or at least very small ones.⁶

SILS can be performed using (a) one of the many commercially available multichannel single-port devices: R-port (Advanced Surgical Concepts, Dublin, Ireland), XCONe (Karl Storz, Tuttlingen, Germany), SILS port (Covidien), and SPIDER (Trans Enterix, Durham, NC, USA); (b) passing three 5mm trocars side by side through the fascia via a single umbilical incision; (c) using an extra-small wound retractor (ALEXIS wound retractor XS, Applied Medical) and a surgical glove as the "single port" through the umbilical incision.⁴

Aims and Objectives

To compare outcome between single incision laparoscopic cholecystectomy and conventional laparoscopic cholecystectomy.

Materials and Methods

Basaveshwara Teaching and General Hospital, Kalaburagi, attached to Mahadevappa Rampure Medical College, Kalaburagi surgery department undergo Laparoscopic cholecystectomy during period of July 2018 – July 2020.

Details of cases are recorded including history, clinical examination, and investigations done. Following parameters of each patient will be recorded preoperatively and compared with intraoperative findings. And post-surgical outcome will be studied for each SILS and Conventional laparoscopic cholecystectomy.

Results

This study included 65 cases that were studied prospectively over a period of 21 months, from October July 2018 – July 2020. The statistical analysis was as follows.

Table 1: Association of Age by cases and controls.

Age	4 Port		Single Port		Total	p value
	N	Percent	N	Percent		
15-30	14	31.1	3	15.0	17	0.565
31-45	17	37.8	10	50.0	27	
46-55	7	15.6	3	15.0	10	
>55	7	15.6	4	20.0	11	

4 port patients are majorly from 31-45 years age group and single port patients are also mainly from same age group. Age is not significantly associated with ports (p=0.565). (Table 1)

In our study in conventional four port group total male patients were 51.1% (n=23) and females 48.9% (n=22) in single port 60.0% (n=12) and females 40% (n=8) and gender is not significantly associated with ports (0.507). (Table 2)

Table 2: Association of Gender by cases and controls.

Gender	4 Port		Single Port		p value
	N	Percent	N	Percent	
Male	23	51.1	12	60.0	0.507
Female	22	48.9	8	40.0	
Total	45	100.0	20	100.0	

Table 3: Mean Duration by cases and controls.

Parameters	Groups	N	Mean (min)	SD	P value
Duration (Min)	4 Ports	45	64.4	28.8	0.000*
	Single Ports	20	129.0	40.2	

*significant with p<0.05

Above table states that time taken for surgery was more in single port. i.e 129.0 with standard deviation of 40.2 compared with conventional four port is 64.4 min with standard deviation of 28.8. (Table 3)

Table 4: Association of LOHS(days) by cases and controls.

LOHS (Days)	4 Ports		Single Ports		Total		p value
	N	Percent	N	Percent	N	Percent	
	0-5	35	77.8	9	45.0	44	
6-10	10	22.2	9	45.0	19	29.2	
>10	0	0.0	2	10.0	2	3.1	
Total	45	100.0	20	100.0	65	100.0	

*significant with p<0.05.

Above table states that length of hospital stay in conventional four port seen is between 6 to 10 days i.e 22.2% and in single port is between 0 to 5 days and 6 to 10 days i.e 45.0% and number of ports is significantly associated with length of hospital stay. (Table 4)

Table 5: Association of Complications by cases and controls.

Complications	4 Ports		Single Ports		Total		p value
	N	Percent	N	Percent	N	Percent	
	None	38	84.4	13	65.0	51	
Seen	7	15.6	7	35.0	14	21.5	
Total	45	100.0	20	100.0	65	100.0	

*significant with p<0.05

Above table states that complications was more in single port 35.0% (n=7) than in conventional four port is 15.6% (n=7) and number of ports is significantly associated with complication. (Table 5)

Table 6: Association of Follow up by cases and controls.

Followup after 3 weeks	4 Ports		Single Ports		Total		p value
	N	Percent	N	Percent	N	Percent	
	Fever	1	2.2	2	10.0	3	
None	44	97.8	18	90.0	62	95.4	
Total	45	100.0	20	100.0	65	100.0	

*significant with p<0.05

As per results follow up after 3 weeks fever was seen in one patient (n=1, 2.2%) in conventional four port and two patients (n=2, 10.0%) in single port and number of ports is significantly associates

follow up after 3 weeks. (Table 6)

Table 7: Association of IOC by cases and controls.

IOC	4 Ports		Single Ports		Total		p value
	N	Percent	N	Percent	N	Percent	
	ADS	2	4.4	3	15.0	5	
CBDI	0	0.0	1	5.0	1	1.5	
CTD	4	8.9	3	15.0	7	10.8	
GBI	1	2.2	0	0.0	1	1.5	
NONE	38	84.4	13	65.0	51	78.5	
AF	1	2.2	0	0.0	1	1.5	
OA	1	2.2	2	10.0	3	4.6	

As per the results intra operative complication seen in conventional four port were adhesions (n=2, 4.4%), difficulty in callots triangle dissection (n=4, 8.9%), injury to gall bladder (n=1, 2.2%), adhesions at the funds of gall bladder (n=1, 2.2%), omental adhesion (n=1, 2.2%) and in single port adhesions (n=3, 15.0%), common bile duct injury (n=1, 5.0%), difficulty in callots triangle dissection (n=3, 15.0%) and number of ports is not significantly associated with intra operative complication. (Table 7)

Discussion

Laparoscopic cholecystectomy was first described by Muhe in 1985, and later published by Mouret, Perissat and Dubois in 1987 and 1988, laparoscopic surgery has expanded in leaps and bounds to become the standard procedure for many intra-abdominal surgeries.¹

Conventional laparoscopic cholecystectomy is done using four ports. With an effort to minimize the number of ports, single-port laparoscopic surgery (SILS) has come into practice. SILS utilises three ports through a single skin incision at the umbilicus. It is being considered as no-scar surgery because the incision is placed within the umbilical scar that is not visible. SILS has also shown to have reduced postoperative pain as compared to four-port cholecystectomy in a recent randomised study.

Chang SKY⁷ et al study shows that number of patients in conventional laparoscopic cholecystectomy group where more in females i.e 30 (60%) compared with male patients 20 (40%) and number of patients in single port group where more in females i.e 31 (62%) compared with male patients 19 (38%).

Ostlie DJ⁸ et al study shows that time taken for surgery in single port i.e 68.6 ± 22.1 min is more compared to conventional laparoscopic

cholecystectomy i.e 56.1 ± 22.1 min.

Ostlie DJ⁸ et al study shows that time taken for surgery in single port i.e 68.6 ± 22.1 min is more compared to conventional laparoscopic cholecystectomy i.e 56.1 ± 22.1 min.

Culp BL⁹ et al study showed that length of hospital stay in conventional laparoscopic cholecystectomy was more i.e 0.98 days compared with Single port 0.34 days.

In our study out of 65 patients 35 (53.8%) were males and 30 (46.2%) were females.

In our study in conventional four port group total male patients were 51.1% (n=23) and females 48.9% (n=22) in single port 60.0% (n=12) and females 40% (n=8) and gender is not significantly associated with ports (0.507).

In our study time taken for surgery was more in single port i.e 129.0 with standard deviation of 40.2 compared with conventional four port is 64.4 min with standard deviation of 28.8.

In our study mean length of hospital stay in conventional four port is 4.2 min with standard deviation of 1.9 and in single port is 7.1 with standard deviation of 4.9 and number of ports is significantly associated with length of hospital stay.

Conclusion

From this study we conclude Single Incision Laparoscopic Cholecystectomy is an emerging technique and has better cosmesis and needs expertised hands and lot of learning curve to perform it when compared with Conventional Four port Laparoscopic Cholecystectomy.

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