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Comparison of gall bladder retrieval through umbilical port and epigastric port: A randomized comparative study

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Abstract

Laparoscopic cholecystectomy is one of the commonest surgeries done these days. It has become gold standard for the treatment of symptomatic cholelithiasis. Retrieval of gallbladder is an important terminal event in laparoscopic cholecystectomy and is reported as one of the factors that affects the outcome of surgery. This study aimed to compare the clinical outcome between patients who had gallbladder retrieved by epigastric port versus umbilical port following laparoscopic cholecystectomy. This was a randomized comparative study for a period of 18 months where multiple parameters were compared between umbilical port and epigastric port for retrieval of the gallbladder. Out of total of 100 patients, 74 were females and 26 were males. It was found that umbilical port is better than epigastric in view of less post-operative pain but with an increased risk of port site infection and hernia.

Keywords: Laparoscopic cholecystectomy, gallbladder retrieval, umbilical port, epigastric port

Introduction

Laparoscopic cholecystectomy since its inception in 1985 by Professor Dr. Eric Muhe has become gold standard treatment for gall stone disease [1, 2]. It has revolutionized the surgical management of gall stone disease by reducing post-operative pain, risk of surgical infection, incisional hernia and hospital stay [3]. Pain is the most frequent complaint after laparoscopic cholecystectomy and the most common reason for extending hospital stay following surgery [4]. It depends on multiple factors, including rupture of blood vessels caused by rapid distension of the peritoneum, traumatic traction on nerves, trauma to abdominal wall during port insertion and gall bladder retrieval and with pneumoperitoneum. It is reported that incisional pain is more intense than visceral pain and is dominant during the first 48 hours after laparoscopic cholecystectomy [5].

Acutely inflamed or distended gallbladder packed with stones almost always creates a problem during its retrieval. Gallbladder removal in these cases requires a needle decompression, stone fragmentation and stone removal from the gallbladder near the port site or extension of one of the fascial incision to facilitate gallbladder retrieval which causes more post-operative port site pain [6]. Retrieval of gall bladder is an important terminal event of laparoscopic cholecystectomy and is reported as one of the factors affecting post-operative port site pain. There is a high chance of intra-abdominal spillage and port site contamination. During retrieval of gall bladder some studies show epigastric port is better for retrieval due to ease for surgeon as there is no need to change the position of telescope and readjustment of position of surgeon. Other studies show superiority of umbilical port in terms of pain [7]. Both, umbilical port and epigastric port have been recommended for retrieval of gallbladder in laparoscopic cholecystectomy. However, there is a huge debate on which is superior [8]. This study explored a better port site for gallbladder retrieval in laparoscopic cholecystectomy in terms of pain outcome, surgical site infection, incisional hernia and time taken to extract out the specimen.

Materials and Methods

Patients were recruited for this study from 1st January 2016 to 31st December 2016. All patients were followed up for 6 months. Patients with gallbladder disease were selected by block randomization. All patients above 18 years of age undergoing laparoscopic cholecystectomy

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were included. Patients converted to open cholecystectomy, suspected or proven malignancy of gall bladder, chronic users of analgesic medicines and steroids and those lost to follow-up were excluded. All patients received Betadine scrub bath twice before surgery, once in the previous day's night and the other in the morning of surgery. Half an hour before surgery a bolus dose of prophylactic antibiotic was administered. The abdomen was prepared from below nipple to mid-thigh by using hair clippers on the operative table. Patient was cleaned with 10% Bovidone iodine from below nipple to mid-thigh and draped with sterile drapes. Access to peritoneal cavity and creation of pneumoperitoneum was performed by open or closed technique based on surgeon's preference and was insufflated with Carbon Dioxide. Then trocars were placed in infraumbilical region, anterior right anterior axillary line, right midclavicular line and epigastric region. Gall bladder was retracted superolaterally towardS right shoulder through right anterior axillary line trocar. Right mid-clavicular line trocar was used to grasp the gall bladder infundibulum, retracting it inferolaterally to open calot's triangle. Cystic duct and cystic artery were identified and dissected out from surrounding tissue. Calot's triangle was visualized for any abnormal variant artery or duct. After demonstrating critical view of safety, cystic duct and cystic artery were clipped and divided. Gall bladder was dissected from liver bed with cautery. The gall bladder was taken out

through 10 mm port either through umbilical port or epigastric port directly or through endobag. During retrieval, documentation was made of port used for retrieval, intra peritoneal spillage, port site contamination, time taken to retrieve, changing laparoscope port and extension of fascial plane. Romovac drain no. 14 was kept in gall bladder fossa as per surgeon's discretion. After ensuring hemostasis, camera and ports were removed. Rectus sheath was closed with No. 1 nylon/ No.1 Vicryl and skin with 3.0 nylon. Following surgery all patients received standard postoperative care. Postoperative pain was assessed subjectively by Visual Analogue scale after 6, 12, 24 and 48 hours of surgery. The analgesic required to control the pain was noted. Port site hernia following surgery was seen clinically at 1 month, 3 months and by ultrasound at 6 months. Port site infection was noted up to 1 month in both groups.

Results and Analysis

Among 100 patients enrolled for this study, 74 patients were females and 26 patients were males. 26 were diagnosed case of DM II, 25 with Hypertension, 2 with coronary artery disease and 1 with chronic kidney disease. Comparison of Total Leucocytes count, alkaline phosphatase, gall bladder wall thickness, size of calculus, number of calculi, common bile duct diameter, pericholecystic fluid between the two groups was statistically non-significant as shown in table 1.

Table 1: Comparison of various preoperative variables

	Epigastric	Umbilical	Overall	p-value
Total Leucocyte Count	7582±297.66	7964±370.69	7773±237.28	0.4236
Alkaline phosphatase	105.06±7.85	119.1±9.53	112.08±6.18	0.2582
Gall bladder wall edema(present in)	2	6	8	0.2687
Calculus size	35 (<10), 15(>10)	32 (<10), 18 (>10)	67 (<10), 33 (>10)	0.6709
No. of calculi	13 (S), 37 (M)	9 (S), 41 (M)	22 (S), 78 (M)	0.4695
Dilated CBD	4	6	10	0.7407
Pericholecystic fluid	0	0	0	1.0000

Comparison of intra operative parameters such as port site contamination, use of endobag, fascial plane extension, needle decompression and stone removal between epigastric and umbilical group showed both groups were well matched as shown in table 2.

Table 2: Comparison of various intraoperative variables

Parameters	Epigastric (n=50)	Umbilical (n=50)	Overall (n=100)	P Value
Contamination	1	3	4	0.6173
Endo Bag Used	3	4	7	1.000
F P Extension	1	0	1	1.000
Needle Decomp	2	1	3	1.000
Stone Removal	13	11	24	0.8153

1-0 nylon suture material was used to close rectus sheath in 42(84%) patients in whom gall bladder was removed through epigastric port and 1-0 vicryl suture material was used in 43 (86%) patients in whom umbilical port was used for retrieval of gall bladder. The difference was statistically significant. Mean time taken to retrieve gall bladder through epigastric port was 6.18 ± 1.95 and through umbilical port was 6.16 ± 1.93 . Port site pain at intervals of 6, 12, 24 and 48 hours was interpreted using visual analogue scale and the results showed a statistically significant more pain in epigastric port retrieval of gallbladder as compared with umbilical port [Table 3].

Table 3: Comparison of Port site pain

	Epigastric port	Umbilical port	p value
Pain at 6 hrs	5.8±0.09	4.39±0.15	0.0001
Pain at 12 hrs	4.26±0.13	2.52±0.20	0.0001
Pain at 24 hrs	2.94±0.18	1.02±0.18	0.0001
Pain at 48 hrs	0.78±0.14	0.24±0.08	0.0011

Patients in whom gall bladder was retrieved through epigastric port required more morphine than patients in whom umbilical port was used with a statistically significant difference of 28.6 ± 0.67 and 18.4 ± 1.02 in epigastric and umbilical ports respectively. The post-operative pain calculated by visual analogue score in the group in which nylon was used to close the rectus sheath was $5.71 \pm 0.11, 4.27 \pm 0.13, 2.71 \pm 0.20, 0.65 \pm 0.13$ at 6,12,24 and 48 hours respectively as compared to $4.47 \pm 0.16, 2.55 \pm 0.20, 1.27 \pm 0.20, 0.65 \pm 0.13$ in the group in which vicryl was used to close the rectus sheath. The post-operative analgesia (injection morphine in milligrams) required in the group in which nylon was used to close the rectus sheath was $10 \pm 0.27, 9.59 \pm 0.20, 6.53 \pm 0.47$ and 1.53 ± 0.33 at 6,12,24 and 48 hours respectively as, compared to $9.41 \pm 0.23, 6.08 \pm 0.43, 2.94 \pm 0.51$ and 1.08 ± 0.29 , in the group in which vicryl was used to close the rectus sheath. The post-operative pain and requirement of analgesia was higher in the group in which nylon was used to close the rectus sheath as compared to the group in which vicryl was used. The difference was statistically significant [Table 4].

Table 4: Relation of suture used with pain and dose of analgesic used

		Nylon (n=49)	Vicryl (n=51)	P Value
PAIN (VAS)	6H	5.71±0.11	4.47±0.16	<0.0001
	12H	4.27±0.13	2.55±0.20	<0.0001
	24H	2.71±0.20	1.27±0.20	<0.0001
	48H	0.65±0.13	0.37±0.10	NS
ANALGESIC (mg)	6H	10±0	9.41±0.23	0.0129
	12H	9.59±0.20	6.08±0.43	<0.0001
	24H	6.53±0.47	2.94±0.51	<0.0001
	48H	1.53±0.33	1.08±0.29	NS
	TOTAL	27.65±0.70	19.51±1.17	<0.0001

Table 5 shows the comparison of port site infection [PSI] between two groups noted at post-operative day 1, 2, after one week, at the time of suture removal and finally up to one month.

Table 5: Relation of port site with port site infection

	Epigastric (n=50)	Umbilical (n=50)	p-value
PSI 1	0	0	1.000
PSI 2	1	2	1.000
PSI 1W	1	4	0.362
Psi Suture Rem	1	5	0.204
PSI 1M	0	0	1.000
Total no. of patients	1	5	0.362

8 patients had gall bladder oedema out of which only one patient developed port site infection. 8 patients had bile spillage out of which only 2 patient developed port site infection. Endobag was used to retrieve the gall bladder in 15 patients out of which 1 patient developed port site infection. Fascial plane was extended in only one patient and same patient developed port site infection. Needle decompression was done in 3 patients and none of them developed port site infection. 3 patients, among the group where gall bladder was retrieved through umbilical port, developed port site hernia and none of the patients, in group in which gall bladder was retrieved through epigastric port, developed hernia. Epigastric group patients took a mean of 4.64 ± 0.25 days for resumption of routine as compared to umbilical group who took 5.94 ± 0.40 days. However, the difference was not statistically significant. Our patients took minimum of 3 to maximum of 16 days in epigastric group and 4 to 27 days in umbilical group to return back to their workplace.

Summary

The pain and requirement of analgesia was significantly higher in epigastric group than in the umbilical group. This pain was noted to gradually decrease over time following a sharp rise 6 hours post operatively. Though the different suture material was used to close the rectus sheath in umbilical port in both the groups, it did not statistically affect the difference in pain in both the groups. Gall bladder wall edema, spillage of bile, port site contamination, use of endobag, needle decompression and fascial plain extension did not play a significant role in the occurrence of port site infection. There was significant difference in the port site infection between the retrieval of gall bladder through epigastric or umbilical port. Three patients developed port site hernia, all at the umbilical port site. Thereby in our study we conclude that umbilical port can be preferred over epigastric port in view of post-operative pain but with an increased risk of port site infection and port site hernia. For a more conclusive answer to which port is superior studies will have to be done on a larger population.

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