Original Research Article

Study of outcome with twin dose antibiotic therapy in elective laparoscopic cholecystectomy

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Abstract

Introduction: Laparoscopic cholecystectomy offers increased safety in obese, decreased post operative pain, early initiation of enteral feeding, early ambulation, shorter hospital stay, decreased wound complications and improved quality of life. 95% of currently performed cholecystectomies are by Laparoscopic approach.

Aim: The present study was designed to assess the role of double dose antibiotic therapy in elective laparoscopic cholecystectomy in Osmania General Hospital.

Materials and methods: The present clinical study was a prospective study conducted at Osmania General Hospital Hyderabad, Andhra Pradesh. 30 patients were selected from a period of December 2011 to July 2013 undergoing elective endocystectomy according to inclusion and exclusion criteria.

Results: A total of 30 LC were studied, out of which 5 developed adverse results with infection rate of 16.66%. In earlier year i.e. 2011, infection result rate is higher (25%) when compared to this year i.e. 2013 (11.76%). Infection result rate for 25-64 year group was 17.64%, for 65-70 year group was 15.38%. Out of 30 patients, 9 patients (30%) who had symptoms for less than 30 days in those 3 patients (33.33%) developed infection whereas 21 patients (70%) who had symptoms for more than 30 days 2 cases (9.5%) with infection are noted. Of the 5 cases that had developed adverse results, 2 patients suffered from pneumonia, 1 patient developed cholangitis, 1 patient developed peritonitis and 1 patient developed bile leak.

Conclusion: Study found that the dual dose antibiotic therapy is effective in preventing the postoperative infection result.

Key words

Laparoscopy, Cholecystectomy, Infection, Antibiotic.

Introduction

95% of currently performed cholecystectomies are by Laparoscopic approach [1]. It is now one of the most commonly performed operations of the digestive tract [2]. It has attained the position as the gold standard treatment for Gall-stone disease and now considered the first line or standard treatment modality. Laparoscopic cholecystectomy offers increased safety in obese, decreased post operative pain, early initiation of enteral feeding, early ambulation, shorter hospital stay, decreased wound complications and improved quality of life.

Complications can occur in 10-15% of cases [3]. Serious complications of laparoscopic cholecystectomy fall into two major areas: access complications or bile duct injuries. In the main, access complications occur during the insertion of the Verres needle to establish pneumoperitoneum or the insertion of trocars. If insertion is performed blindly or is found to be difficult, visceral injury should be excluded. If either a visceral or a bile duct injury is suspected, conversion to an open technique is recommended by most surgeons.

Bile duct injuries occur in approximately 0.5% of cases [4], in the main biliary injury results from poor dissection and failure to adequately define the surgical anatomy.

A number of factors may be involved in the occurrence of bile duct injuries during laparoscopic cholecystectomy. These include acute or chronic inflammation, obesity, anatomic variations, and bleeding. Surgical technique with inadequate exposure and failure to identify structures before ligating or dividing them are the most common cause of significant biliary injury. The bile duct injury rate is increased in patients with complications of gallstones, including acute cholecystitis, pancreatitis, cholangitis, and obstructive jaundice. Surgeon training and experience were recognized as factors in early reports of laparoscopic bile duct injuries. As surgeon experience increases beyond 20 cases, the bile duct injury rate decreases. Recent reports have indicated that errors leading to laparoscopic bile duct injuries stem from misperception, not errors of skill, knowledge, or judgment. The primary cause of error in 97% of cases was a visual perceptual illusion, whereas only 3% of injuries were due to faults of technical skill [5].

Postcholecystectomy 20% of patients present with right upper quadrant pain, jaundice, and chills should be evaluated for retained stones or biliary leak.

Persistent pain following cholecystectomy is abnormalities in the sphincter of Oddi such as stenosing papillitis or sphincter dysfunction.

Retained Biliary Stones; Patients will present most commonly shortly after cholecystectomy with sharp, intense right upper quadrant pain and jaundice.

Biliary leak; Leaks from the cystic duct stump or an unrecognized duct of Luschka may be problematic. The most common etiology for a cystic duct stump leak is an inflammation around the duct in the setting of acute cholecystitis, which dislodges placed clips. Bile leaks commonly present shortly after cholecystectomy (within 1 week) with right upper quadrant pain, fever, chills, and hyperbilirubinemia. Bile leak or bile peritonitis should be considered in any patient with persistent bloating or anorexia more than a few days after laparoscopic

cholecystectomy. The port sites on the right side should be examined for bile staining [3].

It is with this intention to determine the post operative infection result and to determine the criteria dictating the failure of the study, this study is planned.

Materials and methods

The present clinical study is a prospective study conducted at Osmania General Hospital Hyderabad, Andhra Pradesh. 30 patients were selected from a period of15th December 2011 to 23th July 2013 undergoing elective endocystectomy.

Inclusion criteria

Patients who can understand the study and agree with written informed consent, patients with Cholelithiasis and chronic cholecystitis**,** Candidates for laparoscopic cholecystectomy were included.

Exclusion criteria

Patients with acute cholecystitis, acute cholangitis**,** acute pancreatitis, pregnant and lactating women, antibiotic allergy, antibiotic therapy within 48 hours to 7 days prior to surgery, clinically active infection at the moment of surgery, evidence of common bile duct stones, contraindications to laparoscopic cholecystectomy, need for additional procedure, patient unable to give informed consent, age of patient more than 80 years, BMI more than 30.

Intra operative exclusion criteria

Patients with intestinal injury, injury to the common bile duct, abdominal peritoneal adhesions, gangrenous gallbladder, injury to analogous bile ducts (ducts of Luschka), gallbladder perforation (during traction, during resection from liver bed, during extraction from abdomen), Choledhocholithiasis, carcinoma gallbladder, large vessel vascular injury, excessive bleeding in the region of calot's triangle, bleeding from gallbladder bed, accidental injury to intrahepatic sinus were excluded.

Interventions used in clinical trial

Inj. MONOCEF (ceftriaxone sodium)1gr and Inj. AMIKACIN 500mg at the time of induction of anesthesia and 6 hours post operatively at the time of induction and 6 hours post operatively.

Outcomes

Outcomes of surgery should be evaluated within 30 days after discharge in terms of surgical site infection (superficial, deep and distant), allergic reactions to antibiotics and quality of life.

Preoperative preparations

Patients were put on NPO from 10 pm on the preceding night. After induction of anaesthesia skin was disinfected with 10% solution of povidone iodine. The operating surgeons were a professor, an associate professor or an assistant professor. In all the cases operating surgeon selected the port placement (American or European). Pneumoperitoneum was induced using co_2 at pressure 14 mm Hg. Depending on the surgical preference a 0 or 30 degree camera was used. Hook cauterys, graspers, Maryland forceps or scissors were used for dissection. Gallbladder was removed through umbilical port. Umbilical and epigastric ports closed with 1 prolene and 5 mm ports with 2 -0 prolene. Ryle's tube and Foleys removed within 8 hours after surgery.

Results

The patients were divided into 2 groups by age (25 – 64 years, 65 -70 years). Infection result rate for 25-64 year group was 17.64%, for 65-70 year group was 15.38%.

The average duration of symptoms was 274.75 days with a range of 2 days to 548 days. Out of 30 patients, 9 patients (30%) who had symptoms for less than 30 days in those 3 patients (33.33%) developed infection whereas 21 patients (70%) who had symptoms for more than 30 days 2 cases (9.5%) with infection are noted (**Table - 1**).

Table - 1: Demographic Data.

Characteristics	Total No. of Cases	No. of Cases With Good Out Come	No. of Cases With Infection Result	Infection Result
Total outcome	30	25	5	16.66%
Age in years				
25-64	17	14	3	17.64%
65-70	13	11	2	15.38%
Gender distribution				
Male	30	12	4	33.33%
Female		18	1	5.5%
Year wise distribution				
2011	1		0	0%
2012	12		3	25%
2013	17		2	11.72%
Duration of symptoms				
<30 days	30	9	3	33.33%
>30 days		21	2	9.5%
Weight				
<60 kg	18		2	11.1%
>60 kg	12		3	25%

According to weight patients have been divided into 2 groups below 60 kg and above 60 kg. Infection had been observed in patients who weigh >60 kg (**Table - 1**).

Out of 30 patients, 4 patients had hypertension (13.33%) and 1 patient had both hypertension and diabetes (3.33%). Out of 5 patients with co-morbid conditions 1 patient developed infection result (**Table - 2**).

Table - 2: Co-morbid conditions and infection result (n=30).

Co-morbid condition	No. of cases	No. of cases with infection result
HTN	4	0
HTN+DM	1	1

Out of 30 patients, 7 patients (23.33%) underwent surgical procedure in the past. Out of these 7 patients 1 patient developed infection result (**Figure - 1**).

All 5 cases with infection result had per operative LFT and WBC count tests done; all patients have WBC count less than 12000cells/ml. The range is 4800 to 11500cells/ml (**Table - 3**).

Out of 5 cases with infection 2 cases were done by Professors and 3 cases done by Assistant professors and 3 cases had cholelithiasis and 2 cases had chronic cholecystitis.

Of the 5 cases that had developed adverse results, 2 patients suffered from pneumonia, 1 patient developed cholangitis, 1 patient developed peritonitis and 1 patient developed bile leak.

Postoperative stay range is 7 -23 days; average stay is 15 days (**Table - 4**).

A total of 30 LC were studied, out of which 5 developed adverse results with infection rate of 16.66%. In earlier year i.e 2011, infection result rate is higher (25%) when compared to this year i.e. 2013 (11.76%).

Out of 30 patients, 12 were male (40%) good outcome observed in 8 cases (66.66%) and infection result in 4 cases (33.33%). Out of 18

female patients (60%) good outcome observed in 17 cases (94.44%) and infection result observed in 1 case (5.5%).

Figure – 1: Previous surgeries and infection result.

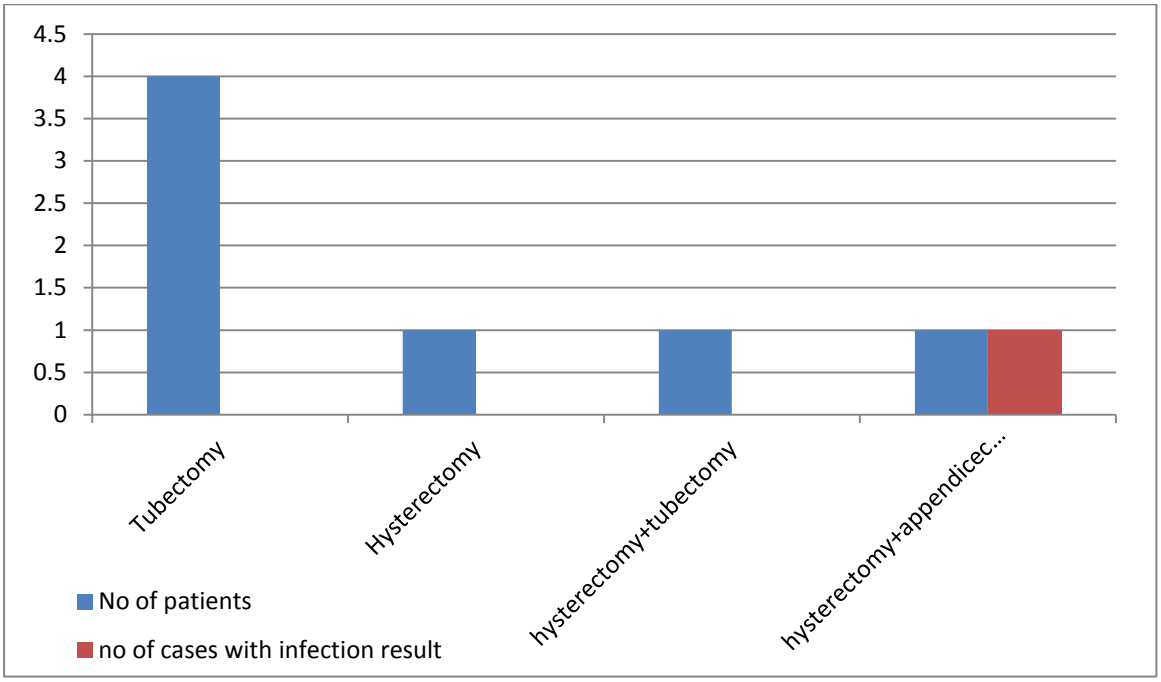

Table - 3: Laboratory investigations of patients with infection result.

Test		No. of cases	Percentage
Bilirubin	<1.2 mg/dl	5	100
	>1.2mg/dl	0	0
SGOT	<60mg/dl	5	100
	>60mg/dl	0	0
Alkaline Phosphatase	<13KAU/dl	5	100
	>13KAU/dl	0	0
WBC count	<9000 cells/ml	3	60
	>9000cells/ml	2	40

Discussion

Total 30 cases of elective laparoscopic cholecystectomies were studied, out of which 5 cases had infection result.

Infection result rate

In our study the infection result rate is 16.66%. In 2009 Uludag [5] stated that the infection result rate is 10.29% with cefazolin 1 gram i.v. given at the time of induction. Reported infection result rate in different series varied from 0.4% to 6.3%. The outcome rate of 16.66% in our study is higher when compared with other international studies [1, 2, 5, 6-11] (**Table - 5**).

Demographic data of cases with infection result

The infection result rate in our study depicted annual variation. In the year 2012 the infection result rate is 25%.This rate showed a declining trend over the next year to reach 11.76%.This could reflect better case selection over the year, improved laparoscopic dexterity and skills.

Table – 4: Distribution of infection results (n=5).

Result	No. of Cases	Percentage
Pneumonia(Extra Abdominal)	2	40
Cholangitis	1	20
Peritonitis	1	20
Bile Leak	1	20

Table - 5: Comparison with other studies.

Author	Year	Infection Result (%)
Csendes, et al. [1]	1995	4
Harling, et al. [2]	2000	7.6
Koc, et al. [6]	2003	2.01
Kuthe, et al. [7]	2006	2.5
Mahatharadol, et al. [8]	2001	0
Sharma, et al. [9]	2010	4
Tocchi, et al. [10]	2000	9.01
Uludag, et al. [5]	2009	10.29
Yildiz, et al. [11]	2009	3.80

In our study infection result is observed more in cases below 65 years of age (17.64%) compared to cases with age more than 65 years (15.38%). Vallina, et al. [12] and Vittemberga, et al. [13] states that the incidence of infections in patients older than 65 years was higher compared with that of remaining population [14].

In the present study male patients demonstrated an infection result rate of 33.33%among males when compared to 5.5%among females. All the cases with infection result sought medical help within 2 months of onset. Kartal, et al. [15] state that estrogen inhibits connective tissue deposition following peritoneal inflammation (adhesion formation) by suppressing macrophase activation. This fibro suppressive effect of estrogen may explain the decreased incidence of adhesion formation in women.

Yol, et al. [16] conducted a trial in which tissue hydroxyproline and collagen were measured in sample taken from the gallbladder wall and pericholecystic tissue of both genders. They observed that inflammatory cells were more numerous in the tissue samples taken from males. Also the difference in tissue hydroxyproline values between male and female patients was found to be statistically significant, being higher in males. Dense collagen accumulation was seen in the sub mucosal region of the gallbladder wall in males [16].

Duration of symptoms

Of the 5 patients with infection result 3 patients sought medical help within 30 days of onset of symptoms and 2 patients after 30 days of onset of symptoms.

In our study the infection result is observed more in cases who had episodes of colic within 30 days of surgery. Tocchi, et al. [10] stated that recent history of episode of colic within 30 days of surgery is significantly correlated with the onset of postoperative sepsis complications.

Co-morbid conditions

Of the 5 patients with Infection Result 1 patient had both HTN and DM. Tocchi, et al. [10] stated that postoperative sepsis complications are significantly correlated with concomitant diabetes.

Previous surgeries

Of the 5 cases with infection result 1 patient had history of hysterectomy and appendicectomy.

Operating Surgeons Experience

Of the 5 cases with infection result the operating surgeon was a professor in 2 cases and an assistant professor of more than 5 years experience in 3 cases. All the surgeons were experienced laparoscopic surgeons. It is observed that no difference noted between the well experienced and less experienced surgeons in terms of infection result.

Distribution of Infection Results

Of the 5 cases with infection results 2 cases had extra abdominal infections (pneumonia) and 3 patients had surgical site infection (1 patient

developed peritonitis, 1 patient developed cholangitis and 1 patient had bile leak). Our study is comparable to Uludag, et al. [5] study in view of extra abdominal infections. No cases of peritonitis or cholangitis were documented in the other studies [1, 2, 5-7, 9-11, 14, 17] (**Table – 6**).

Table - 6: Comparison of our results with other studies.

Study	No. of Cases	SSI (%)	Extra Abdominal (%)	Total (%)
Our study	30	3(10)	2(6.66)	5(16.66)
Csendes, et al. [1]	50	2(4)	0	2(4)
Harling, et al. [2]	39	3(7.6)	0	3(7.6)
Uludag, et al. [5]	68	3(4.41)	4(5.88)	7(10.29)
Koc, et al. [6]	49	1(2.01)	0	1(2.01)
Kuthe, et al. [7]	40	1(2.5)	0	1(2.5)
Sharma, et al. [9]	50	2(4)	0	2(4)
Tocchi, et al. [10]	44	3(6.81)	1(2.2)	4(9.01)
Yildiz, et al. [11]	105	4(3.80)	0	4(3.80)
Higgins, et a1. [14]	277	5(1.8)	1(0.36)	6(2.16)
Illig, et al. [17]	128	0	1(0.78)	1(0.78)

Postoperative Complications

A. Peritonitis

One patient had iatrogenic gastric perforation identified on first postoperative day. Emergency exploratory laparotomy done and 0.5×0.5 cm perforation identified at the pylorus of stomach and approximated with 2-0 silk. Postoperative period was uneventful and the patient was discharged on 15th postoperative day.

B. Cholangitis

One patient had colicky abdominal pain, high grade fever with chills and rigors and jaundice on 10th postoperative day. MRCP was done which revealed small postoperative collection or bilioma in gallbladder fossa and prominent proximal CBD. ERCP stenting was done and patient was relieved of the symptoms. He was discharged on the 9th day of readmission.

C. Bile leak

One patient developed bile leak on the day of surgery with about 200 ml of drain. Patient developed fever on the 2nd postoperative day. Ultrasound abdomen was done and the collection in the gallbladder fossa was noted. Patient was managed conservatively. Repeat ultrasonography was on 7th postoperative day and patient was discharged.

D. Pneumonia

Two patients developed fever with chills and rigors on 2nd postoperative day with cough and expectoration and pain in right lower chest and right infrascapular region. Patients were managed conservatively and were discharged within 9 days of surgery.

Conclusion

Factors that are important in influencing the results of the study are male gender, duration of symptoms for < 30 days, co-morbid conditions. The following factors were not associated with results of the study are age of the patient, previous surgeries, weight of the patient, pathology in the gallbladder, operating surgeon's experience. It is observed that dual dose antibiotic therapy is effective in preventing the postoperative infection result.

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