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THE ROLE OF ANTIBIOTIC PROPHYLAXIS IN LAPAROSCOPIC CHOLECYSTECTOMY

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Prophylactic antibiotics have been used for long time to decrease the infection rate in biliary surgery. The need for prophylactic antibiotic administration as preoperative preparation of patients who will do elective laparoscopic cholecystectomy may not be as important as it is thought.

The aim of this study was to assess the role of prophylactic antibiotics in elective laparoscopic cholecystectomy. A prospective study was done including 79 patients, all had elective laparoscopic cholecystectomy. They were divided into two groups, Group A; 40 patients who had IV antibiotic, and Group B;39 patients who received IV placebo. All the samples [gall bladder, gall stones and bile] were cultured for aerobic and anaerobic microorganisms.

Infection was detected in ten (12.6%) patients in both groups. In Group A, 5 patients had infection in the form of superficial wound infection (3 patients), chest infection (1 patient) and subhepatic collection in (1 patient). Infection in group B occurred in five patients, 3 of them developed wound infection and one patient had urinary tract infection and the last one had chest infection.

According to the data from the study, the use of prophylactic antibiotics did not decrease the rate of post operative infection in elective laparoscopic cholecystectomy.

Key words: laparoscopic cholecystectomy,post operative infection,antibiotic prophylaxis

INTRODUCTION

Invasive microbial infection is the most common cause of significant post operative morbidities and even mortalities [1]. Antibiotic therapy has played a major role in the treatment of general and biliary septic complications in biliary surgery [2]. Antibiotic prophylaxis, which was introduced in the early 1960 has been shown to markedly decrease the incidence of septic complications in biliary surgery from 0% to 4% [3, 4]. Some relatively recent studies have suggested that the use of prophylactic antibiotics in elective laparoscopic cholecystectomy may not be as important as it was shown before [4, 5].

The aim of this study is to evaluate the real need for antibiotic prophylaxis in elective laparoscopic cholecystectomy.

PATIENTS AND METHODS

This study included 79 patients with chronic calcular cholecystitis divided into 2 groups; group A (n= 40 patients) and group B (n=39 patients). In all patients the diagnosis was suggested by clinical symptoms of epigastric or right hypochondrial pain and fatty dyspepsia. The gall bladder stones were diagnosed by ultrasonography. The preoperative evaluation of the patients included ECG, chest x Ray, CBC, blood sugar, liver and kidney function tests.

Cases with recent history of acute cholecystitis (3 months preoperatively), CBD stones and calcular obstructive jaundice were excluded from the study. The patients who did ERCP within the last few days for obstructive jaundice were also excluded from the study. Exclusion also included patients with prosthetic valves or

joints, immunocompromised patients and those on corticosteroids or immunosuppressive drugs in whom antibiotic therapy is a life saving management.

Surgical procedure:-

Laparoscopic cholecystectomy was performed (79 patients) with four ports according to the standard procedure [6] and those who were converted to open cholecystectomy (6 patients) were excluded from the study. Patients in group A received 2 grams of Cefoperazone (Cefobid-Pfizer) intravenously dissolved in 10 ml of isotonic sodium chloride solution at the induction of anaesthesia and a second and a third dose of 1 gm 12 and 24 hours post operatively. In group B, 3 doses of 10 ml of isotonic sodium chloride solution were administrated intravenously at the same intervals like those in group A. We selected Cefoperazone (Cefobid-Pfizer) as it is the antibiotic of choice in our institute according to the infection control policy.

Microbiological tests and samples:-

Each extracted gall bladder was put in a sterile glass and sent immediately for bacteriological examination of the gall bladder wall, stones and bile. Swab was taken from the infected wounds for Microscopy, Culture and Sensitivity (M, C & S). All the samples were cultured for aerobic and anaerobic organisms. Ultrasound guided aspiration was done for post operative abdominal collection and subjected to Microscopy, Culture and Sensitivity

The media used for isolation of aerobic isolates was (MacConkey's Agar and Blood Agar). Identification of the isolates were done using (a) biochemical reaction (TSI triple Suger Iron, Simmon's Citrate Agar, Sulpher Indole Motility Agar SIM and Christenser's urea agar). (b) API-21-E-Kit (bioMerieux)

The media for anaerobic isolates included (Schaedler Blood Agar with Vit K and Hemin, Enriched thioglycolate and phenyl ethyl alcohol Blood Agar). Identification of the isolates was done by API-20-A-Kits.

Stone culture was done after washing the stones three times then crushing the stones. The deposits were cultured for both aerobic and anaerobic isolates.

Sensetivity was done on Muller Hinton Agar using 4th generation Antibiotics.

The follow-up

The patients were followed up post operatively to detect any infection during their hospital admission for 2 days. Those who had smooth post operative course were discharged to be followed up in the out-patient clinic. Those patients who had abnormal vital signs especially high temperature, rapid pulse, low blood pressure or who suffered severe abdominal pain were advised to stay in hospital for close observation and better management. In this study infectious complications were classified into; a) superficial infection; all infections superficial to the deep fascia of the abdominal wounds (skin, subcutaneous tissue). b) deep infection; all infections deep to the deep fascia of the abdominal wounds (intraperitoneal, subhepatic and subphrenic). c) distant infection, away from the operative site as urinary and respiratory tract infections.

RESULTS

The 79 cases of laparoscopic cholecystectomy included 29 males (36.7%) and 50 females (63.3%). These patients were divided into 2 groups; group A, 40 patients who received prophylactic antibiotic and group B, 39 patients who had placebo.

The age and weight of the patients included in this study were almost equally distributed in both groups (Table 1). The age range was (25-62 yrs) in Group A with average of 40.8±5.2 yrs. The age range was (27-65 yrs) in group B with average of 42.2±6.2 yrs. In Group A the weight of patients was ranging between (62-86 Kgm) with average 72.4±8.2 Kgm while in Group B the weight ranged between (63.5-90 Kgm) with average 74.9±11.1 Kgm.

In our study; 13 Patients were diabetic 15% (6 patients) in group A and 17.9% (7 patients) in group B. The blood sugar level was controlled according to local regimen in our hospital. The mean operating time was 90±17.2 min and 89.2±14.3 in group A and B respectively. The intra-operative gall bladder rupture occurred in 8 out of 40 patients (20%) in group A and 8 out of 39 (20.5%) in group B.(Table 2).

Infectious complications and organisms detected by M, C & S are listed in (Table 3,4). In this study, infected bile was detected in 16 (40%) gall bladder in group A and in 17 (43.6%) in group B and the types of organisms detected are demonstrated in (Table 4) which showed E Coli as the most common organism identified. Anaerobic culture showed only one case infected (Group B-deep wound) with Pepto-streptococci. Stones culture showed three cases of infection, One case (E coli) in group A and two cases (Klebsiala and Colstridia) in group B.

No mortalities were reported in this study. There were 5 (12.5%) cases of post operative infection in group A; of which three cases of wound infection ranging from mild to moderate at the site of epigastric port at which GB extraction was carried out, one case of subhepatic infection due to bile collection, and one case of chest infection.

In group B, 5 (12.8%) cases of post operative infection were detected; three of them had wound infection, one had chest infection and one had urinary tract infection. The culture from the site of infection revealed organisms different from those detected in the bile in all patients except the case complicated with subhepatic abscess (Table 4).

Table (1): *Patients data in both groups*

	Group A 40 patients	*Group B 39 patients*
Sex M/F	14/26	15/24
Age [years]	40.8±15.2	42.2±16.2
Weight [Kgm]	72.4±8.2	74.9±11.1
Diabetes	6	7

Table (2): *Operative data in both groups*

	Group A 40 patients	*Group B 39 patients*
Duration of surgery [min]	90.8±17.2	89.2±14.3
Intra-operative GB rupture	8	8

Table (3): *Infectious complication*

	Group A 40 patients	*Group B 39 patients*
Infected bile	16	17
Clinical infection	5(12.5%)	5(12.8%)

Table (4): *Organisms detected in the collected samples*
A: *bile and the Gall bladder wall*

	Group A 40 patients	*Group B 39 patients*
E coli	5(12.5%)	6(15.4%)
Klebsilla	3(7.5%)	3(7.7%)
Enterococci	2(5%)	1(2.6%)
Streptococci	1(2.5%)	1(2.6%)
Staphyllococci (Aureus)	2(5%)	1(2.6%)
Psudomonus	1(2.5%)	2(5.1%)
Clostridia	0	1(2.6%)
Protus	0	1(2.6%)
Others	2(5%)	1(2.6%)
Total	16(40%)	17(43.6%)

B: *Gall stones*

	Group A 40 patients	*Group B 39 patients*
Culture	1 E Coli	2 Klebsilla & Clostridia

C: *wound and other sites of infection*

	Group A 40 patients	*Group B 39 patients*
Wound-Superficial	3 (Staph Epid)	1 (Staph Epid)
Wound-Deep	0	2 (Pepto-Strept cocci)
Others-UTI	0	1 (E coli)
Others-Chest	1 (Pneumococci)	1 (K.Pnumonia)
Others-Intraperitoneal	1 (E coli)	0

DISCUSSION

Modern antibacterial therapy has markedly reduced the morbidity and mortality from infections, and has contributed significantly to the development of modern

surgery [7]. Bactibilia is associated with a higher incidence of wound infection. The benefit of prophylactic antibiotics in conventional biliary tract surgery is well established [8]

However, the broad application of antimicrobial agents has not been problem free. These agents occasionally cause major adverse reactions, interact with other pharmacological agents, and may result in a widespread antimicrobial resistance among bacteria [8, 9].

At present laparoscopy is almost always the used procedure in the elective cholecystectomy. This procedure has many advantages as less post-operative pain, shorter hospital stay, more rapid ambulation of the patients and early food intake [10, 11, 12].

It was noticed over the last 10 years that post operative infectious complications have markedly decreased in patients subjected to laparoscopic surgery, so, it is worthy to study if there is a real need for routine prophylactic antibiotic in elective laparoscopic cholecystectomy [13,14].

In this study, it was planned to equally distribute the type of patients in both antibiotic and placebo groups, regarding their age, weight and DM. Also, the operative time, the incidence of intra-operative gall bladder rupture and the post-operative stay were found to be almost similar in both groups.

The results of this study revealed no significant statistical difference between the incidence of the entire infectious complication between cases in both groups ($p<0.05$). These results were similar to those obtained before by Higgins et al in their randomized controlled study, where they found no significant decrease in the infectious complications with the use of prophylactic antibiotics[15].

However, the over all infectious complications in their study (2.4%) was much lower than in the present study. This difference might be due to the restriction of selecting their patients, by excluding any patients who had biliary colics and/or acute cholecystitis during the last six months before surgery [15].

The results of our study were also similar to the results in another prospective study where they used prophylactic systemic antibiotioc with bactericidal solution for skin preparation (chlorohexidine gluconate) compared to the use of the bactrecidal solution alone. They concluded that in properly selected low risk patients, well performed skin preparation is all what they need [16].

In this study in both groups, the wound infection occurred at the epigastric port from which the resected gall bladder was removed. In these cases, the gall bladder extraction was difficult because they contained large gall stones which needed aspiration of bile and fragmentation with risk of contamination of subcutaneous tissues with bile and small gall bladder gravels

It has been noted that the cases complicated with wound infection were obese and has excess subcutaneous fat. The bacteriological examination of the wound discharge revealed different organisms from those detected in the bile and stones of the resected gall bladder. Therefore, the mechanism of wound infection in such cases might not to be due to direct contamination with the infected bile or stone, but due to irritation of the subcutaneous tissues, which might render the tissue prone to the opportunistic infection [17].

In this study only one case of group A had a subhepatic abscess. This case manifested clinically with fever and right hypochondrial pain started from the fifth day post operatively. Ultrasonographic examination revealed a subhepatic collection measured 7 x 8 cm in diameter. Ultrasound guided aspiration revealed a bilious aspirate which was suggested to be due to bile leakage from trickling of bile from improperly clipped cystic duct as, the volume of the collection was quite small and there was no recurrence after aspiration. The bacteriological examination of the discharge revealed mixed infection of three types of organisms that was detected in the bile of the removed gall bladder. These data might suggest that the leaked infected bile has a direct effect in the intra-abdominal abscess formation.

The patient who developed urinary tract infection in group B, gave a history of urinary tract infection 4 months before the operation. The other patient who developed chest infection, had a history of repeated attacks of asthmatic bronchitis. These two patients received the specific treatment in which full therapeutic doses of the suitable antibiotic was given. This result may suggest that in cases with history of urinary tract or chest infection, it is worthy to give antibiotics even in full therapeutic doses rather than prophylactic doses.

It was obvious in this study that 7 patients out of 13 were diabetics. All these patients developed some form of infection. Diabetes was a constant factor in all infected cases of group B (IV placebo) and in only 2 patients out of 5 cases in group A who had IV antibiotics. This finding might suggest that prophylactic antibiotic administration in diabetic patients is mandatory to reduce the high incidence of infection after elective laparoscopic cholecystectomy. This results were similar to those obtained before [18].

Conclusion

Our study revealed that prophylactic antibiotics did not improve the overall infectious complications after

elective laparoscopic cholecystectomy. Antibiotic prophylaxis did not affect the over all incidence and severity of infection or the degree of bile contamination.

On the other hand, the use of antibiotics is justified only in selected patients. Prophylactic antibiotics may decrease the incidence of post operative infection in diabetic patients subjected to elective laparoscopic cholecystectomy. Therapeutic antibiotics might be recommended in patients with history of repeated attacks of urinary tract or chest infection.

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