

Factors Increasing Risk of Septicemia in Acute Cholecystectomy Patients

SHAFQATULLAH¹, SAMINA KARIM², DILEEP KUMAR³, MUHAMMAD AQIL RAZZAQ⁴, MUHAMMAD HANIF⁵, ABDUL RASHEED ZAI⁶¹Assistant Professor, Department of General Surgery, Sahara Medical College, Narowal, Pakistan²Assistant Professor, Department of Surgery Unit-1, Sandeman Provincial Hospital, Quetta³Associate Professor, Department of Surgery Ward 2, Jinnah Sindh Medical University/Jinnah Postgraduate Medical Centre Karachi⁴Professor, Department of General Surgery Unit-1, Central Park Medical College Lahore⁵Associate Professor, ⁶Assistant Professor, Department of Surgery, Indus Medical College Tando Muhammad KhanCorrespondence to: Shafqatullah, E-mail: drshafqatullah2012@gmail.com, Cell: 0333-9151275

ABSTRACT

Background: Septicemia is defined as systematic inflammatory response syndrome which is formed as a result of an infection.**Objective:** To identify the factors increasing risk of septicemia in acute cholecystectomy patients.**Study Design:** Retrospective study**Place and Duration of Study:** Department of Surgery, Sahara Medical College, Narowal from 1st August 2020 to 31st May 2021.**Methodology:** One hundred and seventy acute cholecystectomy patients were enrolled. The patient's demographic, clinical history, comorbidities and post-operative complications were listed. All procedures were done through laparoscopic method.**Results:** There were 54.1% females and 45.9% males. The mean age of patients was 52.17±14.33 years. There were 11.7% cases who developed septicemia. The immune deficient patients were 0.9% and 1.8% had perforated gall bladder. There were 2.7% cases having obesity, cirrhosis or complicated diabetes with 3.6% having chronic kidney disease.**Conclusion:** The factors of complicated diabetes, cirrhosis, obesity and chronic kidney disease are associated with risk of septicemia in acute cholecystectomy.**Key words:** Cholecystectomy, Septicemia, Risk factors, Obesity, Chronic kidney disease

INTRODUCTION

Cholecystectomy is a frequent abdominal procedure conducted for the removal of gall bladder. In majority of the cases it is performed without the involvement of any serious complications, although leakage of the bile or surgical site infection (SSI) can result into intra-operative contamination. Despite of all the risk consideration the surgery is a mandatory purpose required for life saving.¹ A meta-analysis described the incidence of SSI post cholecystectomy to be 2.4% in patients with peri-operative antibiotics undergoing laparoscopic procedure.² In cases of elective cholecystectomy the chances are more decreased in post operative patients discouraging the use of prophylaxis antibiotics.³⁻⁵

On the contrary in cases with acute cholecystectomy the risk is much higher⁶. Lack of international guidelines has increased the urge of better understanding of the risk factor affecting post-operative SSI in acute cholecystectomy cases. In recent years these risk factors are well studied.⁷⁻⁸ The risk of infection which is related with co morbidities is not well understood bringing negative impact on post treatment and prolonging hospital stay.⁶ A study showed no decrease in risk co factors even after administrating prophylaxis antibiotics. Intra-abdominal complications are still prevalent even after abdominal drainage.⁹

This brings the attention of scientist on the influence of other post-operative risk factors. The present study was designed to evaluate the risk factors of septicemia in patients undergoing cholecystectomy.¹⁰ The rationale of this study was to identify those risks factors which attribute in wound life threatening complications so that a better understanding can provide into better treatment.

PATIENTS AND METHODS

This retrospective study conducted at Department of Surgery, Sahara Medical College, Narowal from 1st August 2020 to 31st May 2021 and 170 patients age between 30-65 years were enrolled. Patients who were having elective cholecystectomy were not included. The demographic and clinical information in addition to factors like comorbidities (diabetes, hypertension, obesity, immune deficiency, cirrhosis) were also documented in a well-structured questionnaire. The standard laparoscopic surgical plan has been adapted on each patient at the time of their surgery. It included a four incision protocol. Through verse needle usage a pneumoperitoneum was placed in left upper quadrant (max intra-abdominal pressure was kept as 12mmHg). Intravenous antibiotic were given to each patients. Complete data was analyzed by using SPSS version 24.0.

RESULTS

The mean age of patients was 52.17±14.33 years. There were 54.1% females and 45.9% males with majority of the patients were having an age >41 years (Table 1).

Table 1: Frequency and percentages of gender and age categories (n=170)

Variable	No.	%
Gender		
Male	78	45.9
Female	92	54.1
Age (years)		
30-40	18	10.5
41-50	50	29.4
51-60	81	47.6
>61	21	12.3

Table 2: Frequency of risk factors

Risk factors	No.	%
Perforated gall bladder	2	1.8
Immune deficiency	1	0.9
Complicated diabetes	3	2.7
Un-complicated diabetes	2	1.8
Cirrhosis	3	2.7
Chronic kidney disease	4	3.6
Obesity	3	2.7
No risk factor	2	1.8
Total	20	11.7

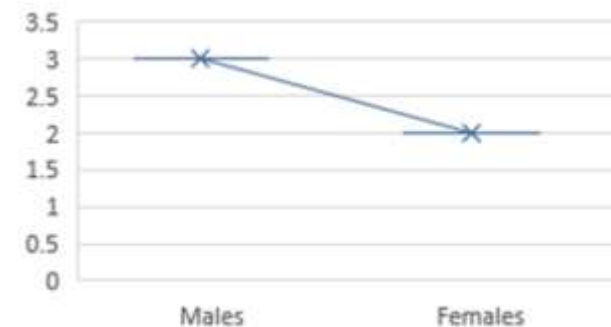


Fig 1: Post-operative mortality between genders

There were 20 cases out of total who developed septicemia and had various risk factors but with obesity and chronic kidney

disease as well as cirrhosis and complicated diabetes were major challenges. The immune deficient patients were 0.9% and 1.8% had perforated gall bladder. Two cases were those who still developed septicemia but had no associated risk factor. Both were males. A total of 12.3% patients developed septicemia. The difference among various risk factors was insignificant (Table 2).

The post-operative mortality results showed three cases who were males died while 2 females lost their lives. All these patients suffered from complicated diabetes. They did not develop septicemia but had complications within surgery (Fig. 1).

DISCUSSION

Sepsis is the most common cause of death in worldwide. Despite the fact that present study elaborates a very low incidence of morbidity related to cholecystectomy but it enlist those risk factors which are worth noting before surgery. International literature supports that almost 98% of cholecystectomy now performed are laparoscopic technique with only 2% through open surgery procedure.¹¹ The present study was also conducted through laparoscopic protocol. In this study there was higher prevalence of females than males. Gall stones have been related with females especially in the age of forties.¹² However, as the number of males was also significantly high in this study it could be due to the reason that this study was conducted on acute case of cholecystectomy and male gender is on its own a major risk factor in having surgical site infections.¹³⁻¹⁵

The risk factors of complicated diabetes, cirrhosis, aging, obesity and chronic kidney disease are associated with septicemia increased risk in acute cholecystectomy patients as observed in current study.¹¹ Gall bladder perforation can also increase the risk of septicemia in post-operative patients. Even in cases where septicemia is fortunately not formed gall bladder perforation has been linked with negative recovery and complications after surgery. Elderly patients are also observed to be more prone towards infections.¹⁶⁻¹⁷ Patients with cirrhosis had greater chances of complications¹⁸ and so is with chronic kidney disease.¹¹

Chuang et al¹⁹ have shown that patients with poor control of diabetes are also at higher risk of septicemia or surgical site infection. The current study also found diabetes and obesity as highest risk factor in terms of acute cholecystic patients who were more vulnerable for septicemia. The immune host response in sepsis is dependent on expression of various cytokines which have been reported to be also directly associated with obesity and its further risk of insulin resistance.²⁰⁻²³

CONCLUSION

The risk factors of complicated diabetes, cirrhosis, obesity and chronic kidney disease are associated with septicemia increased risk in acute cholecystectomy.

REFERENCES

1. Jaafar G, Hammarqvist F, Enochsson L, Sandblom G. Patient-related risk factors for postoperative infection after cholecystectomy. *World J Surg* 2017;41(9):2240-44.
2. Pasquali S, Boal M, Griffiths EA, Alderson D, Vohra RS. Meta-analysis of perioperative antibiotics in patients undergoing laparoscopic cholecystectomy. *Br J Surg* 2016;103(1):27-34.
3. Chang WT, Lee KT, Chuang SC, Wang SN, Kuo KK, Chen JS, et al. The impact of prophylactic antibiotics on postoperative infection

4. complication in elective laparoscopic cholecystectomy: a prospective randomized study. *Am J Surg* 2006;191(6):721-5.
5. Yildiz B, Abbasoglu O, Tirnaksiz B, Hamaloglu E, Ozdemir A, Sayek I. Determinants of postoperative infection after laparoscopic cholecystectomy. *Hepatogastroenterology* 2009;56(91-92):589-92.
6. Darkahi B, Videhult P, Sandblom G, Liljeholm H, Ljungdahl M, Rasmussen IC. Effectiveness of antibiotic prophylaxis in cholecystectomy: a prospective population-based study of 1171 cholecystectomies. *Scand J Gastroenterol* 2012;47(10):1242-46.
7. Coccolini F, Catena F, Pisano M, Gheza F, Fagioli S, Di Saverio S, et al. Open versus laparoscopic cholecystectomy in acute cholecystitis: systematic review and meta-analysis. *Int J Surg* 2015;18:196-204.
8. Murphy MM, Ng SC, Simons JP, Csikesz NG, Shah SA, Tseng JF. Predictors of major complications after laparoscopic cholecystectomy: surgeon, hospital, or patient? *J Am Coll Surg* 2010;211(1):73-80.
9. Donkervoort SC, Kortram K, Dijkman LM, Boermeester MA, van Ramshorst B, Boerma D. Anticipation of complications after laparoscopic cholecystectomy: prediction of individual outcome. *Surg Endosc* 2016;30:5388-394.
10. Park JS, Kim JH, Kim JK, Yoon DS. The role of abdominal drainage to prevent of intra-abdominal complications after laparoscopic cholecystectomy for acute cholecystitis: prospective randomized trial. *Surg Endosc* 2015;29(2):453-7.
11. Enochsson L, Thulin A, Osterberg J, Sandblom G, Persson G. The Swedish registry of gallstone surgery and endoscopic retrograde cholangiopancreatography (GallRiks): a nationwide registry for quality assurance of gallstone surgery. *JAMA Surg* 2013;148(5): 471-8.
12. Warren DK, Nickel KB, Wallace AE, Mines D, Tian F, Symons WJ, et al. Risk factors for surgical site infection after cholecystectomy. *Open Forum Infect Dis* 2017;4(2):36.
13. Thesbjerg SE, Harboe KM, Bardram L, Rosenberg J. Sex differences in laparoscopic cholecystectomy. *Surg Endosc* 2010;24(12): 3068-72.
14. Richards C, Edwards J, Culver D, et al. Does using a laparoscopic approach to cholecystectomy decrease the risk of surgical site infection? *Ann Surg* 2003; 237:358-62.
15. Rotermann M. Infection after cholecystectomy, hysterectomy or appendectomy. *Health Rep* 2004; 15:11-23.
16. Bogdanic B, Bosnjak Z, Budimir A, et al. Surveillance of surgical site infection after cholecystectomy using the hospital in Europe link for infection control through surveillance protocol. *Surg Infect (Larchmt)* 2013; 14:283-7.
17. Jansen S, Stodolski M, Zirngibl H, et al. Advanced gallbladder inflammation is a risk factor for gallbladder perforation in patients with acute cholecystitis. *World J Emerg Surg* 2018; 13: 9.
18. Jansen S, Doerner J, Macher-Heidrich S, Zirngibl H, Ambe PC. Outcome of acute perforated cholecystitis: a register study of over 5000 cases from a quality control database in Germany. *Surg Endosc* 2017;31(4):1896-900.
19. Strömberg J, Hammarqvist F, Sadr-Azodi O, Sandblom G. Cholecystectomy in patients with liver cirrhosis. *Gastroenterol Res Pract* 2015;2015:783823.
20. Chuang SC, Lee KT, Chang WT, Wang SN, Kuo KK, Chen JS, Sheen PC. Risk factors for wound infection after cholecystectomy. *J Formos Med Assoc* 2004; 103(8):607-12.
21. Kolyva A, Zolota V, Mpatsoulis D, et al. The role of obesity in the immune response during sepsis. *Nutr Diabetes* 2014; 4: e137.
22. Hillenbrand A, Knippschild U, Weiss M, Schrezenmeier H, Henne-Bruns D, Huber-Lang M et al. Sepsis induced changes of adipokines and cytokines - septic patients compared to morbidly obese patients. *BMC Surg* 2010; 10: 26.
23. Damas P, Canivet JL, de Groote D, Vrindts Y, Albert A, Franchimont P et al. Sepsis and serum cytokine concentrations. *Crit Care Med* 1997; 25: 405-12.
24. Vachharajani V. Influence of obesity on sepsis. *Pathophysiology* 2008; 15: 123-34.