

ASSESSMENT OF EFFECTS OF LAPAROSCOPIC CHOLECYSTECTOMY, HYSTERECTOMY AND APPENDECTOMY ON NOSOCOMIAL INFECTION RISKS

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Abstract

Background: Laparoscopic approach has been shown to involve less pain, shorter hospitalizations, improved cosmesis, and faster recovery times than open procedures. The present study was conducted to assess effects of laparoscopic cholecystectomy, hysterectomy and appendectomy on nosocomial infection risks.

Materials and Methods: 154 admissions that have a nosocomial infection monitoring system was analyzed by source of infection: urinary tract, wounds, respiratory tract, bloodstream, and others. Parameters such as gender, age, type of insurance, complexity of admission on presentation, admission through the emergency department, and hospital case mix index (CMI) was recorded. **Result:** Out of 154 patients, males were 90 and females were 64. Approach was open in 84 and laparoscopic in 70. The admissions with >1 NIM was seen in 3 and 2 respectively. Procedure performed was cholecystectomy in 45, appendectomy in 65 and hysterectomy in 44. The admissions with >1 NIM was seen in 1, 3 and 1 respectively. NIM rate in age group <18 years was seen in 1, 18-28 years in 1, 28-38 years in 2 and 38-48 years in 1. Male had 3 and female had 2. Emergent admission had 3 and non-emergent admission in 2 and CMI complex had 3 and non-complex had 2. A significant difference was observed (P< 0.05).

Conclusion: Laparoscopic cholecystectomy and hysterectomy are associated with statistically significantly lower risks for nosocomial infections.

INTRODUCTION

For a variety of surgeries, the laparoscopic approach has been shown to involve less pain, shorter hospitalizations, improved cosmesis, and faster recovery times than open procedures.^[1] In contrast, nosocomial infections have been associated with longer hospitalizations and slower recovery times.^[2] With the realization of smaller incisions, better cosmesis, less postoperative pain, same-day surgery, speedier postoperative recovery, and the potential for reduced complications, laparoscopic approaches have all but replaced the traditional laparotomic alternatives for certain commonly performed surgical procedures.^[3] However, the widespread adoption of laparoscopic techniques into the overall surgical armamentarium has been slowed by a variety of factors, including the learning curves required to integrate new levels of depth perception and fine

dexterity, longer operating times without commensurate economic reward, and the nullification of savings from earlier hospital discharge by the cost of disposable surgical instrumentation.^[4]

For hysterectomies and appendectomies, however, the adoption rates have been much slower.^[5,6] In the case of hysterectomy, the relatively slow adoption of laparoscopic technique is somewhat surprising given that prospective randomized clinical trials have demonstrated that total laparoscopic hysterectomy and laparoscopically assisted vaginal hysterectomies for benign diseases involve less postoperative pain and blood loss, fewer transfusions, and faster recovery times, with complication rates similar to that of abdominal hysterectomy.^[7] Considering this, the present study was conducted to assess effects of laparoscopic cholecystectomy, hysterectomy and appendectomy on nosocomial infection risks.

MATERIALS AND METHODS

The present study comprised of 154 admissions that have a nosocomial infection monitoring system. The nosocomial infection marker was used to identify nosocomial infections during hospitalization and post discharge. The dataset was limited to admissions with laparoscopic or open cholecystectomy, appendectomy, or hysterectomy and was analyzed by source of infection: urinary tract, wounds, respiratory tract, bloodstream, and others. Parameters such as gender, age, type of insurance, complexity of admission on presentation, admission through the emergency department, and hospital case mix index (CMI) was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Out of 154 patients, males were 90 and females were 64 [Table 1].

Approach was open in 84 and laparoscopic in 70. The admissions with >1 NIM was seen in 3 and 2 respectively. Procedure performed was cholecystectomy in 45, appendectomy in 65 and hysterectomy in 44. The admissions with >1 NIM was seen in 1, 3 and 1 respectively.

NIM rate in age group <18 years was seen in 1, 18-28 years in 1, 28-38 years in 2 and 38-48 years in 1. Male had 3 and female had 2. Emergent admission had 3 and non-emergent admission in 2 and CMI complex had 3 and non-complex had 2. A significant difference was observed (P< 0.05).

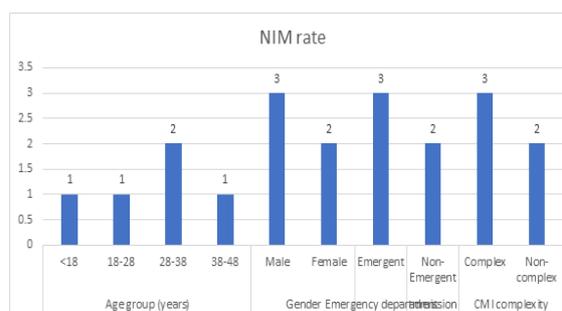


Figure 1: Univariate analyses of factors associated with NIM

Table 1: Distribution of patients

Total- 154		
Gender	Males	Females
Number	90	64

Table 2: Assessment of nosocomial infection rates

Parameters	Variables	Admissions	Admissions with >1 NIM
Approach	Open	84	3
	Laparoscopic	70	2
Procedure	Cholecystectomy	45	1
	Appendectomy	65	3
	Hysterectomy	44	1

Table 3: Univariate analyses of factors associated with NIM

Variable	Category	NIM rate	OR
Age group (years)	<18	1	0.84
	18-28	1	0.44
	28-38	2	0.64
	38-48	1	0.71
Gender	Male	3	1.51
	Female	2	1.24
Emergency department admission	Emergent	3	1.04
	Non-Emergent	2	1.02
CMI complexity	Complex	3	1.05
	Non-complex	2	1.03

DISCUSSION

In addition to the clinical advantages of reduced pain and faster recovery times, there is now evidence that infection rates following laparoscopic surgery are lower than those for open surgery.^[8,9] In a recent study, laparoscopic cholecystectomy and hysterectomy were shown to each reduce the overall odds of acquiring nosocomial infections by more than 50% (P < 0.01). Laparoscopic cholecystectomy and hysterectomy also resulted in statistically significantly fewer readmissions with nosocomial

infections (P < 0.01).^[10] In surgical patients overall, rates of nosocomial infection have been reported to range from 1.9% to 25.4%, depending upon the procedure and often add significantly to the costs of health care. To date, however, there is relatively little information quantifying the effects of nosocomial infections on the cost of care for specific surgical procedures.^[11] The present study was conducted to assess effects of laparoscopic cholecystectomy, hysterectomy and appendectomy on nosocomial infection risks.

We observed that out of 154 patients, males were 90 and females were 64. Brill et al,^[12] estimated of nosocomial infection risks associated with laparoscopic as compared to open surgery in three procedures: cholecystectomy, appendectomy, and hysterectomy. A retrospective analysis was performed on 11,662 admissions from 22 hospitals that have a nosocomial infection monitoring system. The dataset was limited to admissions with laparoscopic or open cholecystectomy (32.7%), appendectomy (24.0%), or hysterectomy (43.3%) and was analyzed by source of infection: urinary tract, wounds, respiratory tract, bloodstream, and others. Analyses were based on 399 NIMs in 337 patients. Laparoscopic cholecystectomy and hysterectomy each reduced the overall odds of acquiring nosocomial infections by more than 50% (p < 0.01). Laparoscopic cholecystectomy and hysterectomy also resulted in statistically significantly fewer readmissions with nosocomial infections. Excluding appendectomy, the odds ratio for laparoscopic versus open NIM-associated readmission was 0.346. Laparoscopic appendectomy did not significantly change the odds of acquiring nosocomial infections.

Our results showed that approach was open in 84 and laparoscopic in 70. The admissions with >1 NIM was seen in 3 and 2 respectively. Procedure performed was cholecystectomy in 45, appendectomy in 65 and hysterectomy in 44. The admissions with >1 NIM was seen in 1, 3 and 1 respectively. Gunnarsson et al,^[13] examined the cost of care for laparoscopic versus open surgery and the added cost of nosocomial infections for three common surgical procedures: cholecystectomy, hysterectomy, and appendectomy. The Cardinal Health database repository produced a Nosocomial Infection Marker to identify and track nosocomial infection rates for these procedures. ICD-9 codes were utilized to identify 10,731 patients who had undergone these procedures. Laparoscopic surgery significantly reduces the overall cost of care for cholecystectomies, hysterectomies, and appendectomies. Controlling for the cost of nosocomial infection, incremental cost savings from laparoscopic versus open surgery for all three procedures average \$1608. Cholecystectomy has the largest savings (\$3299), followed by hysterectomy (\$1385) and appendectomy (\$1032). These cost savings in part reflect that patients undergoing laparoscopic procedures have shorter lengths of stay. In contrast, nosocomial infection increases costs substantially for each surgery type, raising costs for cholecystectomy by \$4794, hysterectomy by \$4528, and appendectomy by \$6108.

We found that NIM rate in age group <18 years was seen in 1, 18-28 years in 1, 28-38 years in 2 and 38-48 years in 1. Male had 3 and female had 2. Emergent admission had 3 and non-emergent admission in 2 and CMI complex had 3 and non-complex had 2.

Gupta et al,^[14] in their study revealed that laparoscopic appendectomy showed no differences in overall nosocomial infection risks compared to open surgery. The findings for wound infections are consistent with results from randomized trials, which have reported statistically significantly lower surgical site infection rates for laparoscopic approaches.

The limitation the study is small sample size.

CONCLUSION

Authors found that laparoscopic cholecystectomy and hysterectomy are associated with statistically significantly lower risks for nosocomial infections.

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