

Reduced incidence of early complications of surgical wounds in laparoscopic surgery

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Abstract

Background: Wound-related complications are major sources of trouble in post-operative period and slow down the wound healing process. This study was performed to determine the incidence of early wound related complications in laparoscopic versus open abdominal surgeries.

Methods: Medical records of 104 elective laparoscopic (A) and 106 diagnosis matched open surgeries (B) including appendectomy, cholecystectomy, ventral hernia repair, and bariatric surgery were retrospectively reviewed between Jun 2002 and Jan 2005. Study data included patients' sex, age, wound class, type of operation, and occurrence of early wound related complications. Surgical wounds were evaluated for presence of early complications during the post-op period and 10 to 15 days after the operation.

Results: The two groups were not different regarding age, sex and wound classes. Wound infection developed in 7 patients [RR: 0.06 (0.01-0.77) (95%CI)] and none in patients of group B. Incidence of Hematoma was similar in the two groups; one case in each. No patients in the two groups experienced seruma nor wound dehiscence. Gender, age, and wound classes were not associated with higher rates of wound complications.

Conclusion: Laparoscopic surgery significantly reduced the incidence of early wound complications, namely wound infection, and is a safe and efficient alternative to conventional open procedures.

Keywords: Wound complications; Laparoscopic surgery; Open surgery

Introduction

Minimally invasive procedures has accepted widely because of smaller incision, least post-

operative pain, lower rates of pulmonary complications, and most of all shorter hospital stay and quicker return to activities of daily work.¹⁻⁴ This study aimed to assess incidence of early wound-related complications including hematoma, seruma, wound infection and dehiscence in laparoscopic versus open abdominal surgeries performed in our center.

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Materials and Methods

Medical records in retrospective cohort study of 104 elective laparoscopic surgeries performed by the surgeons at Milad Hospital, were retrospectively reviewed between Jun 2002 and Jan 2005. The operations included laparoscopic appendectomy, cholecystectomy, ventral hernia repair, and bariatric surgery. To provide a relevant reference, 106 diagnoses matched open procedures over the same period.

Patients above 60 or those with underlying diseases including heart failure, diagnosed COPD, chronic liver diseases, diabetes, and those with history of chemotherapy or radio-

therapy and patients previously treated with steroid drugs were excluded from the study. Surgical operations lasting for more than 2 hours and wounds found to be dirty during the operation were also excluded. All the operations were performed under general anesthesia by the same surgeon. Study data included patients' sex, age, wound class, type of operation, and occurrence of early wound related complications. Surgical wounds were classified based on the presumed magnitude of the bacterial load at the time of surgery⁵ Class I included clean wounds with no infection, class II included clean contaminated wounds, in which a hollow viscous with indigenous bacterial flora was opened under

Table 1: Baseline characteristics and incidence of early complications

	Total	Laparoscopy	Open surgery	Difference
Number	210	104	106	
Sex				NS
Female	130	71	59	
Male	80	33	47	
Age				NS
Mean±SD	43.2±5.4	44.0±10.8	42.4±9.5	
Wound class				NS
Class I	41	17	24	
Class II	144	75	69	
Class III	25	12	13	
Complications				
Hematoma	2	1	1	NS
Wound infection	7	0	7	S
Seruma	0	0	0	NS
Wound dehiscence	0	0	0	NS
Total	9	1	8	S

S: Significant; NS: Non-significant; SD: Standard deviation

controlled circumstances, and class III wounds were contaminated with extensive introduction of bacterial flora. Surgical wounds were evaluated for presence of early complications during the post-operative hospital stay, and re-examined 10 to 15 days after the operation in the ward or on the first follow up visit in the clinic.

Wound infection was defined as erythema or culture proven wound drainage, requiring either antibiotic administration or local wound care intervention.

Comparisons were made using Chi-Square or *Student's t* test, whenever indicated. Odds ratios were calculated using 95% confidence intervals and $P < 0.05$ was considered significant.

Results

The study comprised 210 patients, 130 females and 80 males, aged from 17-60 (mean 43.2 ± 8). There were no significant age and mean gender differences between the two operation groups (Table 1). Classification of surgical wounds included 41 class I, 144 class II, and 25 class III wounds. The two groups did not differ in regard to wound classes. Wound related complications included hematoma in 2

and wound infections in 7 patients. There were no cases of seroma or wound dehiscence.

The incidence of hematoma was similar in both groups including one episode in laparoscopic surgery (Hernia repair) and one case in the open operation group. All 7 cases of wound infections occurred in the open method, 1 with wound class I, 4 with class II, and 2 with class III. Risks of developing wound complications in operative methods and wound classes are presented in terms of odds ratio in Table 2. In general laparoscopy significantly reduced the risk of wound infection, but not hematoma, and early wound complications. Gender, age, and wound classes were not associated with higher rates of any wound related complications. In order to determine the independent effect of operation method on the complications, comparisons of the operative methods within each wound classes, showed reduced risk of wound infections with laparoscopic surgery.

Discussion

Wound-related complications are major sources of trouble in post-operative period; they slow down the wound healing process,

Table 2: Incidence of complications in operation types and wound classes

	Complications			Wound infection			Hematoma		
	n	RR	95% CI	n	RR	95% CI	n	RR	95% CI
Operation									
Open	8	1.00		7	1.00		1	1.00	
Laparoscopic	1	0.17	0.03-0.97	0	0.06	0.01-0.77	1	1.02	0.03-37.84
Wound type									
Class I	2	1.00		1	1.00		1	1.00	
Class II	4	1.98	0.22-12.0	4	1.16	0.04-8.70	0	10.7	0.20-29.5
Class III	3	0.41	0.04-3.09	2	0.35	0.01-4.4	1	0.6	0.02-23.2

Table 3: Published literature of wound complications in laparoscopy

Author	Year	Operation	Cases	Wound complications (%)		P value
				Laparoscopy	Open surgery	
Karim ⁴	2000	Digestive system	3000	1.89	19.8	0.0048
Chuang ¹⁰	2004	Cholecystectomy	545	1.4	14.4	<0.05
Zitser ⁶	1997	Cholecystectomy	1785	2.3	6.3	<0.001
Robbins ²	2002	Ventral hernia repair	54	3	22	0.038
Meynaud-Kraemer ⁸	1999	Appendectomy meta-analysis		Significantly Lower		<0.05
Winslow ³	2002	Colectomy	83	13.5	10.9	NS
Koh ⁹	2005	Colorectal	84	0	9.5	<0.001

NS: Not-significant

prolong the hospital stay, and their treatments impose large costs on the health services. In this study laparoscopic surgery significantly reduced the incidence of early wound complications [0.01 % vs. 0.08%; RR (95% CI): 0.17 (0.03-0.97)]. This was in concordance with the previous studies.^{2,4,6}

Despite expected lower incidence of hematoma with laparoscopy due to minimal tissue damage, one case of hematoma occurred following an inguinal hernia repair. This may be explained by the presence of copious supply of blood vessels and lymphatics in the region. The reduced risk of wound infection in laparoscopy was so remarkable [RR (95%CI): 0.06 (0.01-0.77)] that some studies have debated the necessity of antibiotic prophylaxis before basic laparoscopic surgeries.⁷ The most favorable results of laparoscopic methods in reducing the infection (3% vs 22%, respec-

tively) have been reported with ventral hernia repairs.² Wound infection incidence is also decreased following laparoscopic cholecystectomy (2.3% vs 6.3%, respectively),⁶ appendectomy⁸ and colorectal surgeries (0% vs 9.5%, respectively).^{9,10} Although one study has reported higher infection rates with laparoscopic colectomy (13.5% vs 10.9%), 10.8% of infections in our study has been in extraction site, and only 2.7% in the trocar site. For easy comparison, the incidence rate of wound infection among laparoscopic surgeries as well as open methods has been summarized in Table 3. Although laparoscopy have been outstanding in most digestive surgeries, its recommendation for more complex surgeries and those for cancer, awaits the development of well-established operative techniques and availability of appropriate equipments to ensure patients safety and excellent outcomes.

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