Intraoperative Bile Spillage as a Risk Factor for Surgical Site Infection – A Propensity Score Matched NSQIP Analysis

Background

Laparoscopic cholecystectomy (LC) is one of the most commonly performed operations in the United States. Surgical site infection complicates 1-2% of these operations and can be associated with significant morbidity. Bile spillage (BS) occurs in many of these operations and has been demonstrated to be associated with increased risk of surgical site infection (SSI).

Methods

NSQIP registries between 2005 and 2018 were queried using Current Procedural Terminology codes 47562 and 47563 to identify patients undergoing elective laparoscopic. Patients were considered to have BS if the wound classification was annotated 3 or 4. Patients were propensity scored for bile spillage and matched for pre-operative risk factors. The rates of surgical site infections, morbidity, and mortality and length of stay were analyzed.

	Spill (N=15973)	No spill (N=31946)	P-value
Superficial SSI			
Yes	98 (0.6%)	167 (0.5%)	0.23
No	15875 (99.4%)	31779 (99.5%)	
Deep SSI			
Yes	9 (0.1%)	12 (0.0%)	0.49
No	15964 (99.9%)	31934 (100.0%)	
Organ-space SSI			
Yes	92 (0.6%)	81 (0.3%)	<0.01
No	15881 (99.4%)	31865 (99.7%)	
Minor complication (Clavien-Dindo 1 or 2)			
Yes	339 (2.1%)	450 (1.4%)	<0.01
No	15634 (97.9%)	31496 (98.6%)	
Major complication (Clavien-Dindo 3 or higher)			
Yes	161 (1.0%)	215 (0.7%)	<0.01
No	15812 (99.0%)	31731 (99.3%)	
Death within 30 days of surgery			
Yes	11 (0.1%)	22 (0.1%)	1
No	15962 (99.9%)	31924 (99.9%)	
Length of stay (days)			
Mean (SD)	0.313 (2.32)	0.207 (1.52)	<0.01

Results

47,919 (31,946 with no spillage and 15,973 with spillage) patients were matched and included in the analysis. After matching, a significant difference was demonstrated in rates of organ-space SSI (0.58% vs. 0.25%; p = <0.01). In the matched cohort, the odds ratio of developing an organ-space SSI with BS was 2.28 (95% CI 1.69-3.08). The group with BS had small but significant increases in both minor (1.41% vs. 2.12%; p = <0.01) and major (0.67% vs. 1.01%; p = <0.01) complications. There was no difference in mortality rates (0.07% vs. 0.07%; p = 1).

Conclusions

This database analysis demonstrates a small association between BS and organ-space infections. It is unclear if routine antibiotic prophylaxis or post-exposure antibiotic treatment after bile spillage.