RATE AND RISK OF SURGICAL SITE INFECTION FOLLOWING ABDOMINAL SURGERY

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INTRODUCTION

Despite advances in asepsis and surgical technology, surgical site infection (SSI) remains a significant cause of health and financial burden on patients and healthcare providers especially in developing countries. The dangerous health implications of SSI on patients make efforts towards identifying risk factors and strategies for their prevention, therefore, of paramount importance. A paucity of information exists regarding the incidence and risk factors of SSI following abdominal surgery in Alexandria, Egypt.

AIM OF THE WORK

This study aimed to describe the rate and risk factors associated with developing SSI in adult patients following abdominal surgery.

PATIENTS AND METHODS

In this prospective observational study, all patients aged ≥ 18 years undergoing abdominal surgery at the Gastrointestinal surgery unit of the Alexandria Main University Hospital between November 1st, 2022, and April 30, 2023, were included. Excluded from the study were patients undergoing gynecological, urological, vascular, plastic, or transplant surgery. Patients lost to follow-up were also excluded. SSI was diagnosed according to the Center for Disease Control and Prevention's National Health Safety Network definition and data collection was done using a standardized data collection form. Univariate and multivariate analyses were performed to identify risk factors for SSI.

RESULTS

The study included a total of 212 patients. 117 (55.2%) were males and 95 (44.8%) were females. The overall rate of SSI was 32.5% (69/212). Forty (58%) of the patients with SSI had superficial infections, 8 (11.6%) had deep infections, 16 (23.2%) had a combination of superficial and deep infections and 5 (7.2%) had organ/space infections. In the initial comparison of risk variables between patient groups with and without SSI, Diabetes Mellitus, smoking, use of GA, and 30-day postoperative mortality showed no statistically significant difference between both groups. Emergency operations, male gender, and high BMI were identified as independent predictors of SSI. Other factors associated with SSI included lower serum albumin, ASA class of >II, previous laparotomy, intraoperative blood transfusion, contaminated/dirty wound class, longer duration of operation, postoperative ICU admission, > class II of the Clavien - Dindo classification of postoperative morbidity and longer postoperative hospital stay (Table 1 & 2). Serum albumin and HCV-Ab were excluded from multivariate analysis as they were not done for all patients. The most commonly isolated organisms in analyzed cultures were multi/extended drug-resistant gram-negative organisms. Klebsiella spp followed by Escherichia coli were the most common isolates. (figure).

Table 1: Univariate and multivariate logistic regression analyses of Demographic and Preoperative risk variables

Variables	No SSI n=143	SSI n=69	Univariate		Multivariate	
	No. (%) ‡		p	OR (95% C.I)	p	OR (95% C.I)
Gender						
Male	71 (60.7)	46 (39.3)	0.021*	2.03 (1.12 – 3.69)	0.022*	2.68 (1.15–6.22)
Female	72 (75.8)	23 (24.2)		0.49 (0.27 – 0.90)		
Liver disease						
Yes	4 (36.4)	7 (63.6)	0.034*	3.92 (1.11–13.89)	0.134	4.63 (0.62–34.37)
No	139 (69.2)	62 (30.8)				
Previous laparotomy						
Yes	12 (48.0)	13 (52.0)	0.031*	2.53 (1.09–5.90)	0.335	1.75 (0.56–5.44)
No	131 (70.0)	56 (30.0)				
HCV Ab ®						
Positive	1 (16.7)	5 (83.3)	0.025*	12.1 (1.38 – 106.6)		
Negative	109 (70.8)	45 (29.2)				
Albumin≠ Median (IQR)	4.3 (4.0–4.6)	4.0 (3.4–4.3)	<0.001*	0.27 (0.14–0.52)		
Creatinine Median (IQR)	0.7 (0.6 – 0.9)	0.8 (0.6 – 1.0)	0.018*	1.94 (1.12 – 3.36)	0.465	1.11 (0.84–1.47)
Pre-op stay Median (IQR)	6.0 (2.0 – 12.0)	2.0 (1.0 – 9.0)	0.302	0.98 (0.93–1.02)		
BMI Median (IQR)	28 (23.8 – 30.0)	29 (28.0 – 32.0)	0.003*	1.08 (1.03 – 1.13)	<0.001*	1.13 (1.06–1.21)
ASA class						
≤II	113 (77.9)	32 (22.1)				
>II	30 (44.8)	37 (55.2)	<0.001*	4.36 (2.34 – 8.11)	0.466	1.42 (0.55–3.66)

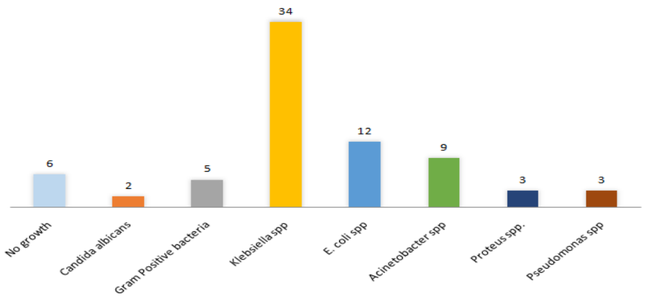

Figure Cultured organisms

Table 2: Univariate and multivariate logistic regression analyses of Intraoperative and Postoperative risk variables.

	No SSI n=143	SSI n=69	Univariate		Multivariate	
	No. (%) ‡		p	OR (95% C.I)	p	OR (95% C.I)
Blood transfusion						
Yes	25 (49)	26 (50)	0.002*	2.85 (1.49 – 5.47)	0.908	0.94 (0.33–2.67)
No	118 (73.3)	43 (26.7)				
Drains						
Yes	118 (64.8)	64 (35.2)	0.052	2.71 (0.99 – 7.43)		
No	25 (83.3)	5 (16.7)				
Duration of surgery Median (IQR)	130.0 (99 – 192)	183.0 (130–215)	<0.001*	1.01 (1.00–1.01)	0.486	1.00 (0.996–1.01)
Urgency						
Elective	107 (75.9)	34 (24.1)				
Emergency	36 (50.7)	35 (49.3)	<0.001*	3.06 (1.67 – 5.60)	0.041*	4.64 (1.06–20.28)
Wound Class						
Class I & II	115 (76.7)	35 (23.3)				
Class III & IV	28 (45.2)	34 (54.8)	<0.001*	3.99 (2.13 – 7.47)	0.117	2.12 (0.83–5.43)
ICU admission						
Yes	23 (48.9)	24 (51.1)	0.003*	2.78 (1.43 – 5.42)	0.683	0.78 (0.24–2.559)
No	120 (72.7)	45 (27.3)				
C-Dindo class						
≤II	121 (73.3)	44 (26.7)				
>II	22 (46.8)	25 (53.2)	0.001*	3.13 (1.60–6.10)	0.809	1.17 (0.33–4.15)
Post-op stay (d) Median (IQR)	3.0 (1.0 – 5.5)	6.0 (4.0–10.0)	<0.001*	1.26 (1.16–1.38)	0.059	1.14 (0.995–1.31)

CONCLUSION

A high rate of SSI following abdominal surgery was observed. The majority of the infections were superficial with no serious consequences. Institution and implementation of well-structured policies of infection control, review of prophylactic antibiotic guidelines, as well as addressing modifiable risk factors have the prospect of reducing SSI and its complications.