

Surgical Site Infections in Colon Resection Patients in a Safety Net Hospital National Standards as Compared to National Surgical Quality Improvement Program (NSQIP) Data

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ABSTRACT

Introduction:

Surgical Site Infections (SSIs) in post-colorectal surgery patients is the most common hospital-acquired infection. SSIs in this surgical patient population contributes to over 3 million excess hospital days and almost \$2.0 billion in hospital and patient costs annually. Hospitals and surgeons must adhere to the U.S. Centers for Disease Control and Prevention (CDC) classification of wounds. It is well known that prophylactic antibiotics inhibit the risk of SSI complications. The Surgical Care Improvement Project (SCIP) measures the timing, choice and discontinuation of the prophylactic antibiotics. The national incidence of SSI is measured and a standard is set by Center for Medicare Medicaid and is posted on a public website. LSUHSC-ILH New Orleans has an SSI incidence rate in post colectomy patients 3 times greater than the national accepted value. This Quality Assurance study was started to determine the factors causing this increase above the national average.

Methods and Procedures:

Retrospective analysis of 151 Medical Records of patients who had colon and rectal resections performed at the LSUSHC-ILH in 2013. The CDC Surgical Wound Classification table was used by the Quality Assurance staff. Wounds were classified as being either Clean, Clean-Contaminated, Contaminated, or Dirty¹. Primary data points of the study included information about the surgical case (emergent, traumatic, laparoscopic), patient co-morbidities, and BMI. The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) Risk Calculator was used to compare risks of SSIs in this patient population versus the predicted national values of patients who had a similar procedure.

Results:

The Medical Records of 151 met the inclusion criteria for this study. SSIs were documented in 28 (18.5%) patients. Median age was 51 years (13-83). Operative approaches for patients who developed an SSI included laparoscopic colectomy (n=3), colostomy takedown (n=2), hartmann procedure (n=4), and open colectomy (n=19). Wound classifications for surgical site infections were clean-contaminated (n=7), contaminated (n=19), and dirty (n=2). The location these infections were listed as superficial incisional (n=9), intraabdominal (n=18), and perineal (n=1). Thirteen (46.4%) patients who suffered from surgical site infection underwent colostomy placement or takedown.

Conclusions:

Surgical site infections following elective or traumatic colorectal resections was most common with patients who had contaminated or dirty wounds especially in open laparotomy cases. SSIs are associated with a prolonged hospital length of stay and some may require multiple procedures. This Quality study aim is to determine why there is a higher incidence of SSI in post colectomy patients at LSUHSC-ILH, New Orleans.

BACKGROUND

- Surgical site infections following elective colorectal surgery ranges from 5% to 30%, depending on the procedure².
- Surgical site infections at ILH hospital for patients undergoing elective or traumatic colorectal resections was 18.5%.
- For this study, patient pre-operative and post-operative glucose levels, surgical wound classification, surgical information, and patient BMI were key variables used when calculating the NSQIP risk of developing an SSI.
- All clinical outcomes, including risk of developing an SSI were compared against the National Surgical Quality Improvement Program (NSQIP) clinical data.

OBJECTIVES

- Determine key variables explaining the substantially higher risk of developing an SSI at LSUHSC-ILH using the NSQIP SSI risk calculator and CDC wound classification criteria.
- To Develop a management strategies to improve the incidenc of SSI in post elective or traumatic colorectal resections at LSUHSC-ILH

RESULTS

Patient Number	Emergent	Trauma	Scope	Surgery Performed	Wound Class	BMI	DM / Insulin	Pre-Op Sugar	Post-Op Sugar
1	N	N	N	low anterior colectomy	Perineal	22.51	no	89	150
2	N	N	N	colostomy takedown	Superficial Incisional	50.29	yes/no	160	205
3	N	N	Y	laparoscopic ileocecectomy	Superficial Incisional	38.99	no	80	86
4	N	N	N	ileocecectomy; small bowel resection	Superficial Incisional	29.02	yes/yes	202	174
5	N	N	N	hartmann reversal	Superficial Incisional	36.16	no	97	129
6	N	N	N	diverting sigmoidostomy	Superficial Incisional	26.95	no	109	119
7	Y	Y	N	colectomy; bowel resection	Superficial Incisional	32.13	no	149	131
8	Y	Y	N	left segmental colon resection	Superficial Incisional	25.83	no	n/a	162
9	Y	Y	N	resection of distal sigmoid colon	Superficial Incisional	25.55	no	97	113
10	N	N	N	abdominoperineal resection (APR); colostomy	Superficial Incisional	26.57	no	108	99
11	N	N	N	end colostomy with hartmann pouch	Deep Incisional	33.76	no	n/a	158
12	N	N	N	right colon resection with colostomy closure	Intraabdominal	24.98	no	n/a	121
13	N	N	N	colostomy takedown with low anterior resection	Intraabdominal	24.38	no	112	83
14	N	N	N	sigmoid colectomy and ileocolic resection	Intraabdominal	36.02	no	n/a	113
15	N	N	N	partial colectomy hartmann pouch and end colostomy	Intraabdominal	22.39	no	n/a	158
16	N	N	Y	laparoscopic ileocolic resection	Intraabdominal	28.78	no	97	125
17	N	N	N	extensive lysis of adhesions; Hartmann reversal	Intraabdominal	31.22	no	n/a	165
18	N	N	N	colostomy closure	Intraabdominal	n/a	no	65	95
19	N	N	N	transverse colon resection; ileostomy reversal	Intraabdominal	19.81	no	96	140
20	N	N	Y	laparoscopic right colectomy	Intraabdominal	25.4	no	79	124
21	N	N	N	low anterior resection; loop ileostomy	Intraabdominal	19.53	no	105	156
22	Y	Y	N	repair cecum	Intraabdominal	26.1	no	113	142
23	Y	Y	N	sb resection, repair colon post gsw	Intraabdominal	n/a	no	191	116
24	Y	Y	N	segmental colectomy	Intraabdominal	30.84	no	157	175
25	Y	Y	N	segmental decending colon resection	Intraabdominal	17.78	no	n/a	110
26	Y	Y	N	transverse colon segmental resection;	Intraabdominal	n/a	n/a	n/a	126
27	Y	Y	N	ascending colon repair	Intraabdominal	20.4	no	142	91
28	Y	N	N	left hemicolectomy; colostomy	Intraabdominal	33.46	no	n/a	144

Table 1. Patients who developed an SSI following colorectal surgery

METHODS

- Retrospective review of 151 medical records of patients undergoing elective or traumatic colorectal surgery at the LSUHSC-ILH in 2013
- A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place¹. (CDC Definition)
- Primary outcome measures included information about the surgical case (emergent, traumatic, laparoscopic), patient co-morbidities, patient BMI, and the National Surgical Quality Improvement Program (NSQIP) SSI risk calculations.

CONCLUSIONS

- SSIs following elective or traumatic colorectal resections was most common with patients at LSUHSC-ILH who had contaminated or dirty open-colectomy wounds and was associated with a prolonged hospital length of stay with repeated wound debridement.
- With varying staff interpretation of wound classification using the CDC criteria this may lead to erroneous reporting of SSI at LSUHSC-ILH.

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CDC Surgical Wound Classification

Class I/Clean:	An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow nonpenetrating (blunt) trauma should be included in this category if they meet the criteria.
Class II/Clean-Contaminated:	An operative wound in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.
Class III/Contaminated:	Open, fresh, accidental wounds. In addition, operations with major breaks in sterile technique (e.g., open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, nonpurulent inflammation is encountered are included in this category.
Class IV/Dirty-Infected	Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

Table 2. Center for Disease Control (CDC) Wound Classification¹

WORKS CITED

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- 3) ACS NSQIP Surgical Risk Calculator. <http://riskcalculator.facs.org/>