Outcomes of Ileocolic Resection versus Ileocolic Resection with a Concomitant Procedure in Crohn's Disease: What is the Added Risk?

Doulia Hamad, Maria Abou Khalil, Andrea Petrucci, Gabriela Ghitulescu, Carol-Ann Vasilevsky, Nancy Morin, Julio Faria, Marylise Boutros
Division of Colon and Rectal Surgery, Sir Mortimer B. Davis Jewish General Hospital, Montreal, QC, Canada

FIGURE 1. Patient & Subgroup Characteristics

Introduction

Despite recent advances in medical management, up to 80% of patients with Crohn's disease will require surgery in their lifetime. Ileocolic resection is the most commonly performed surgical intervention however the added risk of a concomitant procedure remains unknown.

Purpose

To compare the outcomes of patients with Crohn's disease who undergo an ileocolic resection alone compared to an ileocolic resection with a concomitant procedure.

Methods

- After institutional review board approval, we performed a retrospective cohort study using the ACS-NSQIP database.
- Patients with Crohn's disease who underwent an ileocolic resection or an ileocolic resection with a concomitant procedure between 2005-2015 were identified.
- A concomitant procedure was defined as any additional intervention on bowel related to Crohn's disease. Concomitant procedures were further subdivided into five subgroups based on the type of procedures performed.
- Univariate analysis, multivariate logistic regression and negative binomial regression were performed to identify differences in outcomes between patient groups.

TABLE 1. Patient Characteristics (Univariate Analysis)

	Ileocolic resection n = 4831	Ileocolic Resection with a Concomitant Procedure n = 741
Preoperative Characteristics (%) * p < 0.05		
Age (years)	40.20*	38.91
Male Gender	43.67	53.31*
Caucasian Race	83.62*	83.13
ASA Class 1 & 2	71.39	71.72
BMI	-	-
<18	7.18	10.93*
≥ 18 to < 25	49.29	51.01*
≥ 25 to < 30	24.98*	24.28
≥ 30 to < 35	12.06*	8.77
≥ 35	6.49*	4.99
Diabetes Mellitus	2.34	1.75
Smoker	27.82	25.51
Hypertension on medication	15.78*	10.53
Albumin <3 mg/dL	12.65	22.15*
Steroids	49.15	50.07
Bleeding disorder	1.58	1.75
Transfusion > 4U	0.41	1.21*
>10% weight loss	7.71	10.12*
Sepsis, SIRS or septic shock	5.8	7.16
Operative Characteristics (%) * p < 0.05		
Emergency procedure	4.29	4.59
Laparoscopy	54.66	27.94*
Stoma	0.00	9.04*
Contaminated or dirty wound	30.55	47.91*

TABLE 2. Postoperative Outcomes (Multivariate Analysis)

2.1 Logistic Regression - Organ Space Surgical Site Infection

Variable	OR (95% CI)
Male gender	1.33 (1.02 - 1.74)
BMI ≥ 35 (vs BMI 30-35)	2.22 (1.07 - 4.60)
Albumin < 3 mg/dL	1.55 (1.10 - 2.17)
Contaminated or dirty wound	1.78 (1.36 - 2.33)
Steroid immunosuppression	1.52 (1.16 - 1.99)
Smoker	1.48 (1.12 - 1.95)
Concomitant procedure	1.46 (1.04 - 2.06)

TABLE 2 (cont'd). Postoperative Outcomes (Multivariate Analysis)

2.2 Negative Binomial Regression - Length of Hospitalization

Variable	IRR (95%CI)
Male gender	1.08 (1.12 - 1.03)
BMI < 18	1.14 (1.02 - 1.27)
Medically treated hypertension	1.07 (1.01 - 1.14)
Preoperative transfusion	1.64 (1.35 - 2.08)
Open approach	1.27 (1.22 - 1.33)
Albumin <3 mg/dL	1.54 (1.45 - 1.64)
Contaminated or dirty wounds	1.11 (1.08 - 1.16)
Steroid immunosuppression	1.05 (1.01 - 1.10)
Diabetes	1.52 (1.07 - 2.13)
Smoker	1.11 (1.16 - 1.06)
Concomitant procedure	1.06 (1.001 - 1.15)

TABLE 3. Postoperative Outcomes by Subgroups (Univariate Analysis)

	Ileocolic Resection n = 4360	Ileocolic Resection with Concomitant Procedure n = 741	Fistula repair/ abscess drainage n = 270	Entero- cutaneous fistula repair n = 54	Small bowel resection n = 273	Partial colon resection n = 121	Stricturo- plasty n = 105
30-day outcomes - Univariate Analysis (%) * P < 0.05							
Surgical site infection (all)	12.06	15.92	15.56	14.81	16.12*	28.93*	11.43
Deep incisional	1.15	2.02*	2.59*	3.70	0.73	3.31	2.86
Organ space	5.34	8.64*	7.78	7.41	9.89*	18.18*	5.71
Composite infectious complications	15.30	19.84*	21.11*	18.52	19.41	30.58*	13.33
Sepsis/Septic shock	5.23	8.91*	10.00*	11.11	8.79*	14.88*	4.76
Re-operation	4.39	7.14	4.00	16.67	7.41	12.50	22.22
Anastomotic leak	4.40	5.36	5.51	3.70	4.92	12.50	5.00
Major morbidity	12.80	18.49*	19.63*	20.37	17.58*	25.62*	14.29
Length of stay (days)	7.13	8.74*	8.94*	8.48*	8.99*	9.48*	7.70*
Mortality	0.11	0.27	0.37	0.00	0.37	0.00	0.00

Discussion

- To date, this is the largest study investigating the added risk of a concomitant procedure in ileocolic resection for Crohn's disease.
- Patients undergoing fistula repair/abscess drainage, small bowel resection or partial colon resection present a higher rate of complications. Stricturoplasty and enterocutaneous fistula repair did not lead to a higher rate of complications.
- A concomitant procedure was a significant predictor of organ space surgical site infection and predicted a significant increase in length of hospitalization.
- The addition of a concomitant procedure did not increase the odds of sepsis/septic shock, composite infectious complications, re-operation, anastomotic leak, major morbidity or mortality.
- Limitations: 1) Retrospective study design, 2) Restricted cohort size for procedure subgroups, 3) Lack of details regarding causes of reoperation and anastomotic leaks, 4) Generalizability to institutions not participating in ACS-NSQIP

Conclusion

A concomitant procedure was a significant predictor of organ space surgical site infection and predicted a slight increase in length of hospitalization.