SUPPLEMENTARY TABLE 1: Electronic search strategy in Pubmed, Embase and Cochrane.

Electronic search strategy
Database: PubMed, Embase, Cochrane and CINAHL **Filters:** Only comparative studies (case-control, case-matched, cohort studies), N≥ 10, no animal studies **Initial search performed:** June 4^{the} 2020 **Last rerun search performed:** January 6^{the} 2021 **Total hits (unique):** 1,772
Search terms Pubmed (N=1,154)
(("Colonic Diseases"[Mesh] OR "Rectal Diseases"[Mesh] OR colorectal*[tiab] OR colo-rectal*[tiab] OR gastrointestinal*[tiab] OR gastro-intest*[tiab] OR colon*[tiab] OR colectom*[tiab] OR hartmann*[tiab] OR rectal[tiab] OR rectum[tiab]) AND ("Emergencies"[Mesh] OR "Emergency Service, Hospital"[Mesh] OR "Emergency Treatment"[Mesh] OR "Critical Care"[Mesh] OR emergenc*[tiab] OR acute*[tiab] OR non-electiv*[tiab] OR urgen*[tiab] OR critical*[tiab])
AND ("surgery" [Subheading] OR surger*[tiab] OR surgical[tiab] OR operation[tiab] OR open[tiab])
AND ("Laparoscopy"[Mesh] OR laparoscop*[tiab])
AND ("Controlled Clinical Trial" [Publication Type] OR "Randomized Controlled Trial" [Publication Type] OR "Cohort Studies"[Mesh] OR "Comparative Study" [Publication Type] OR "Evaluation Study" [Publication Type] OR random*[tiab] OR cohort[tiab] OR controlled clinical trial*[tiab] OR controlled trial*[tiab] OR trial[tiab] OR compar*[tiab]) NOT ("Letter"[Publication Type] OR "Editorial"[Publication Type] OR "Comment"[Publication Type] OR "Case Reports" [Publication Type] OR letter[ti] OR editorial[ti] OR case report[ti])) NOT (("Animals"[Mesh] OR "Animal Experimentation"[Mesh] OR "Models, Animal"[Mesh] OR rat[tiab] OR rats[tiab] OR mice[tiab] OR mouse[tiab]) NOT ("Humans"[Mesh] OR human*[tiab]))
Search terms Embase (N = 1,147)
1. exp colon disease/su or exp rectum disease/su or (colorectal* or colo-rectal* or gastrointestinal* or gastro-intest* or colon* or colectom* or hartmann* or rectal or rectum).ti,ab,kw.
2. open surgery/ or (surger* or surgical or operation or open).ti,ab,kw.
3. emergency/ or emergency treatment/ or exp emergency care/ or hospital emergency service/ or (emergenc* or acute* or non-electiv* or urgen* or critical*).ti,ab,kw.
4. exp laparoscopy/ or laparoscop*.ti,ab,kw.
5. randomized controlled trial/ or controlled clinical trial/ or controlled study/ or cohort analysis/ or comparative study/ or evaluation study/ or major clinical study/ or (random* or cohort or controlled clinical trial* or controlled trial* or trial or compar*).ti,ab,kw.
6. 1 and 2 and 3 and 4 and 5
7. letter/ or editorial/ or note/ or case report/ or conference paper/ or (letter or comment or editorial or case report).ti.
8. 6 not 7
9. (exp animal/ or exp animal experiment/ or exp animal model/ or (rat or rats or mice or mouse).ti,ab,kw.) not (human/ or human*.ti,ab,kw.)
10. 8 not 9
11. limit 10 to conference abstract status
12. 10 not 11
Search terms Cochrane (N = 313)
1. (colonic diseases or rectal diseases or colorectal* or colo-rectal* or gastrointestinal* or gastro-intest* or colon* or colectom* or hartmann* or rectal or rectum):ti,ab,kw
2. (surger* or surgical or operation or open):ti,ab,kw
3. (emergenc* or acute* or non-electiv* or urgen* or critical*):ti,ab,kw 185890
4. (laparoscop*):ti,ab,kw
5. #1 and #2 and #3 and #4 in Trials
Search terms CINAHL (N=227)
1. (MH "Colonic Diseases+") OR (MH "Rectal Diseases+") OR (TI (colorectal* or colo-rectal* or gastrointestinal* or gastro-intest* or colon* or colectom* or hartmann* or rectal or rectum) OR (colorectal* or colo-rectal* or gastrointestinal* or gastro-intest* or colon* or colectom* or hartmann* or rectal or rectum))
2. AND (MH "Surgery, Operative+") OR (TI (surger* or surgical or operation or open) OR AB (surger* or surgical or operation or open))
3. AND ((MH "Emergencies+") OR ((MH "Emergency Service+") OR (MH "Emergency Patients"))) OR (MH "Critical Care+") OR (TI (emergenc* or acute* or non-electiv* or urgen* or critical*) OR AB (emergenc* or acute* or non-electiv* or urgen* or critical*))
4. AND (MH "Laparoscopy") OR TI laparoscop* OR AB laparoscop*
5. ((MH "Clinical Trials+") OR (MH "Randomized Controlled Trials+")) OR (MH "Comparative Studies+") OR (random* or cohort or controlled clinical trial* or controlled trial* or trial or compar*) OR (random* or cohort or controlled clinical trial* or controlled trial* or trial or compar*)

SUPPLEMENTARY TABLE 2: Patient characteristics and study setting.

Study	Detailed indication(s)	Approach	N	Age (mean, SD)	Gender (M:F) N	ASA-score (I:II:III:IV) %	Cardiac Comorbidity N (%)	Pulmonary Comorbidity N (%)	Setting	Definition
Ballian et al.	Intestinal obstruction, malignant neoplasm, diverticulitis, vascular insufficiency, inflammatory bowel disease	Lap	341	10-49 (18%), 50-50 (17%). 60-69 (23%), 70-79 (19%), >80 (22%)	149:192	I&II 43%, III 43%, IV 13%, V 1%	-	70 (21)	Emergency	The NSQIP definition of emergency surgery relies on designation as such by the surgeon and anesthesiologist and includes only operations performed within 12 h of admission or of symptom onset.
		Open	3,211	10-49 (19%), 50-59 (18%), 60-69 (20%), 70-79 (22%), >80 (20%)	1451:1760	I&II 29% , III 42%, IV 26%, V 0%	-	1,048 (33)		
Cassini et al.	Hemodynamically stable patients treated with diffuse diverticular peritonitis (Hinchey III and IV)	Lap	36	66.5 (30-86)	14:22	I: -, II:-, III: 55.6%, IV: 44.4%	-	-	Urgent	NM
		Open	24	65.8 (41-96)	06:18	I:-, II:- , III: 58.3%, IV: 41.7%	-	-		
Catani et al.	Colonic perforation, obstruction, hemorrhage, neoplastic disease, diverticular disease, colonic neoplasms, inflammatory bowel disease, iatrogenic perforation after colonoscopy	Lap	32	50 (19.0)*	19:13	-	-	-	Emergency & Urgent	The treatment was given within 12 hours of admission in the emergent setting. Urgent: if the patient was unable to be discharged because of deteriorating conditions, hence surgery was necessary during the same admission.
		Open	61	55 (16.4)*	29:32	-	-	-		
Cocorullo et al.	Colonic acute diseases or obstruction	Lap	31	>70	-	-	-	-	Emergency	NM
		Open	36	>70	-	-	-	-		
Cui et al.	Colorectal rupture due to oncological, and non-oncological reasons	Lap	65	-	-	-	-	-	Emergency	NM
		Open	63	-	-	-	-	-		
Dunker et al.	Severe acute colitis (including morbus Crohn & ulcerative colitis)	Lap	10	33 (7.7)*	3:7	-	-	-	Emergency	After prior medical treatment.
		Open	32	37 (12.1)*	14:18	-	-	-		
Gietelink et al.	Primary colorectal cancer	Lap	694	-	-	-	-	-	Emergency	Non-elective; Surgery within 48 hours after admission. Including both urgent and emergency cases.
		Open	4,498	-	-	-	-	-		
Harji et al.	Colorectal cancer, diverticular disease, inflammatory bowel disease, other	Lap	33	18-49 (7), 50-59 (4), 60-69 (11), 70-79 (6), >80 (5)	-	I: 18%, II: 67%, III: 15%, IV: -	-	-	Emergency	Patients required surgery within 2 - 6 hours (classification 2A) or 6 - 18 hours (classification 2B)

		Open	31	18-49 (9), 50-59 (4), 60-69 (11), 70-79 (5), >80 (7)	-	I: 32%, II: 45%, III: 23%, IV: -	-	-		
Keller et al.	Colorectal cancer, diverticulitis/ obstruction/ functional disorders, peritonitis/ adhesive disease, bleeding, non-infectious enteritis and colitis	Lap	954	65.4 (16.2)*	527:418	-	-	-	Emergency & Urgent	Emergency: Patient requires immediate medical intervention as a result of severe, life threatening or potentially disabling conditions. Urgent: Patient required immediate attention for the care and treatment of a physical or mental disorder.
		Open	21,774	64.9 (16.5)*	11,934:9,840	-	-	-		
Kim et al.	Obstruction, perforation, bleeding, ischemia	Lap	11	67 (13.0)*	5:6	I: 27%, II: 55%, III: 18%, IV 0%	-	-	Emergency	NM
		Open	23	68 (12.0)*	27:11	I: 5%, II: 61%, III: 32%, IV: 3%	-	-		
Koh et al.	Bleeding, obstruction, perforation with as underlying diagnosis appendiceal mass, diverticular disease, neoplasm, postprocedural perforation	Lap	23	<40 (21.7%), 40-60 (30.4%), >60 (47.8%)	13:10	I: 21.7%, II: 52.2%, III: 26.1%, IV: 0%	3 (13.0)	-	Emergency	NM
		Open	23	<40 (21.7%), 40-60 (30.4%), >60 (47.8%)	13:10	I: 26.1%, II: 39.1%, III: 17.4%, IV: 17.4%	2 (8.7)	-		
Lee et al.	Acute perforated diverticulitis, Hinchey IV	Lap	457	61.8 (13.7)	131:326	I: 1.43% II: 30.8% III: 46.2% IV: 21.5%	2 (0.71)	35 (12.58)	Emergency	Operation within 48h after admission
		Open	3,299	62.8 (13.9)	1,578:1,721	I: 1.89%, II: 30.5%, III: 47.4%, IV: 20.3%	84 (2.54)	641 (19.43)		
Letarte et al.	Complicated diverticular disease; Hinchey I-IV	Lap	39	61.6 (13.7)	12:27	I: 2.6%, II: 76.9%, III: 20.5%, IV: 0%	-	-	Emergency	A total 83 patients received upfront surgery, 42 received surgery after failing medical treatment
		Open	86	60.9 (12.0)	53:33	I: 1.2%, II: 70.9%, III: 24.4%, IV: 0%	-	-		
Li et al. (2009)	Preoperative diagnosis of acute appendicitis for which a diagnostic laparoscopy was done with intraoperative diagnosis of complicated cecal diverticulitis	Lap	6	47 (30-87)'	4:2	-	-	-	Emergency	NM
		Open	12	48.5 (16-68)'	6:6	-	-	-		
Li et al. (2015)		Lap	10	64.5 (9.7)*	6:4	-	-	-	Emergency	NM

	Right-sided obstructive colon cancer	Open	25	62.3 (10.2)*	14:11	-	-	-		
Liu et al.	Left-sided obstructive colon cancer	Lap	55	60.36 (16.8)*	31:24	-	-	-	-	NM
		Open	135	60.86 (14.43)*	84:54	-	-	-		
Marceau et al.	Severe or acute colitis including ulcerative colitis, Crohn's disease and indeterminate colitis (without peritonitis, colonic perforation, or toxic megacolon)	Lap	40	41 (51)*	22:18	2.1 (0.4)	-	-	Acute & Severe	Acute: Surgery after failing medical treatment
		Open	48	37 (16)*	25:23	2 (0.5)	-	-		
Marcello et al.	Acute colitis (ulcerative disease and morbus Crohn)	Lap	19	32 (15-60)'	10:9	-	-	-	Acute	NM
		Open	29	33 (20-58)'	13:16	-	-	-		
Moghadamyeghaneh et al.	Malignant obstruction in coecum, ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid and rectosigmoid	Lap	249	69 (14.0)	117:132	I: 0.2%, II: 30.9%, III: 53%, IV: 14.1%	2 (0.8)	8 (3.2)	Emergency	The NSQIP definition of emergency surgery relies on designation as such by the surgeon and anesthesiologist and includes only operations performed within 12 h of admission or of symptom onset.
		Open	1,044	68 (16.0)	530:514	I: 2.2%, II: 23.3%, III: 52.6%, IV: 21.9%	20 (1.9)	73 (7.0)		
Nash et al.	Ulcerative colitis, Crohn's disease, infectious colitis, volvulus, cancer, diverticulosis/itis, angiodysplasia, other	Lap	36	55 (21-86)	15:21	2.6 (2-4)	-	-	Emergency & Urgent	NM
		Open	32	63 (18-85)	17:15	3.1 (2-5)	-	-		
Ng et al.	Obstructing right-sided colonic carcinoma	Lap	14	68.5 (45-80)'	6:8	I: 21.4%, II: 64.3%, III: 14.3%, IV: 0%	-	-	Emergency	Surgery within 48 hours after admission
		Open	29	71 (44-94)'	14:15	I: 10.3%, II: 62.1%, III: 24.1%, IV: 3.4%	-	-		
Odermatt et al.	Colorectal cancer: pericolic abscess, perforation, obstruction, or unspecified	Lap	36	74.0 (32-93)'	15:21	I: 11.1%, II:47.2%, III: 38.9%, IV: 2.8%	-	-	Emergency	NM
		Open	72	77.5 (30-92)'	97:84	I: 13.3%, II: 44.2%, III: 36.5%, IV: 6.1%	-	-		
Schloricke et al.	Colon perforation by colonoscopy	Lap	24	68 (35-91)	10:14	-	4 (16.7)	2 (8.3)	Emergency	NM
		Open	12	76 (48-89)	17:19	-	1 (8.3)	2 (16.3)		

Stulberg et al.	Bowel obstruction, perforated viscus, fulminant colitis, ischemia, uncontrollable gastrointestinal hemorrhage	Lap	40	61.5 (63)	17:23	I: 30%, II:58%, III: 10%, IV: 2%	15 (40.0)	4 (10.0)	Emergency & Urgent	Emergency as soon as possible. Urgent if a patient was unable to be discharged because of their deteriorating condition and then underwent surgery while in the hospital.
		Open	25	60.1 (65)	11:14	I: 28%, II: 56%, III: 16%, IV: 0%	10 (40.0)	2 (8.0)		
Sujatha-bhaskar et al.	Diverticulitis and colon cancer	Lap	1,039	60 (19)*	460:535*	-	78 (7.8)	17 (1.7)	Emergency	NM
		Open	8,979	65 (16)*	4,197:4,826*	-	999 (11.1)	285 (3.2)		
Turley et al.	Colonic diverticulitis with or without hemorrhage	Lap	67	58.5 (16.3)	41:26	I&II: 47.8%, III&IV: 52.2%	5 (7.5)	-	Emergency	The NSQIP definition of emergency surgery relies on designation as such by the surgeon and anesthesiologist and includes only operations performed within 12 h of admission or of symptom onset.
		Open	67	59.4 (13.5)	40:27	I&II: 40.3%, III&IV: 59.7%	7 (10.4)	-		
Vallance et al.	Perforated diverticulitis (Hinchey III & IV)	Lap	3,435	0-64: 32.7%, 65-74: 27.5%, 75-84: 29.2%, >85 10.7%	1,764:1,671	I: 15.7%, II: 46.1%, III: 32.3%, IV: 6.0%	-	-	Emergency & Urgent	NM
		Open	12,081	0-64: 29.1%, 65-74: 26.4%, 75-84: 31.4%, >85 13.0%	6,120:5,961	I: 9.9%, II: 41.4%, III: 37.7%, IV: 11.3%	-	-		
Vennix et al.	Perforated diverticulitis (Hinchey III & IV)	Lap	39	56.2 (14.2)	14:25	I: 22.6%, II: 38.7%, III: 35.5%, IV: 3.2%	-	-	Emergency & Urgent	Urgent: as soon as possible after resuscitation and usually within 24 hours. Emergency: immediate and life-saving operation, resuscitation simultaneous with surgical treatment with operation usually within two hours.
		Open	78	56.4 (13.3)	24:58	I: 23.6%, II: 52.7%, III: 20%, IV: 3.6%	-	-		
Watanabe et al.	Severe ulcerative colitis	Lap	30	26.9 (13-64)	17:13	-	-	-	Emergency	NM
		Open	30	35.7 (19-84)	19:11	-	-	-		

Suppl. Table 2) definitions of the short-term outcomes as reported in the original studies.
*: mean, SD
^: median, IQR
': median, range

*Sujatha-Bhaskar et al.: numbers presented are from an as-treated analysis.

SUPPLEMENTARY TABLE 3A: Short-term outcomes after laparoscopic vs open emergency colorectal surgery.

Study	Approach	N	Mortality N (%)	Overall morbidity N (%)	ICU admissions* N (%)	Reinter-ventions N (%)	Wound infection** N (%)	Wound dehiscence N (%)	Ileus N (%)	Pulmonary complications*** N (%)	Cardiac complications**** N (%)	LOS***** (mean, SD)
Ballian et al.	Lap	341	18 (5.0)	106 (31.0)	20 (6.0)	34 (10.0)	-	-	-	10 (3.0)	-	11.2 (12.6)
	Open	3,211	420 (13.0)	1,409 (44.0)	546 (17.0)	529 (16.0)	-	-	-	321 (10.0)	-	15 (16.2)
Cassini et al.	Lap	36	6 (16.6)	12 (33.3)	4 (11.0)	-	4 (11.1)	2 (5.0)	2 (5.5)	2 (5.5)	2 (5.5)	8.1 (4-30)*
	Open	24	4 (16.6)	16 (66.7)	2 (8.3)	-	12 (50.0)	6 (25.0)	0 (0.0)	2 (8.3)	0 (0.0)	12.8 (5-23)*
Catani et al.	Lap	32	0 (0.0)	0 (0.0)	-	-	-	0 (0.0)	-	-	-	6 (4-12)’
	Open	61	1 (1.6)	9 (5.5)	-	-	-	3 (1.8)	-	-	-	8 (5-69)’
Cocorullo et al.	Lap	31	1 (3.2)	4 (12.9)	-	-	-	-	-	-	-	-
	Open	36	2 (5.5)	7 (19.4)	-	-	-	-	-	-	-	-
Cui et al.	Lap	65	-	2 (3.1)	-	-	1 (1.5)	-	-	-	-	6.04 (± 1.16)
	Open	63	-	15 (23.8)	-	-	4 (6.3)	-	-	-	-	9.96 (± 1.84)
Dunker et al.	Lap	10	0 (0.0)	6 (60.0)	-	2 (20.0)	-	0 (0.0)	-	-	-	14.6 (12.5)
	Open	32	0 (0.0)	24 (75.0)	-	5 (15.6)	-	2 (8.3)	-	-	-	18 (9.5)
Gietelink et al.	Lap	694	30 (4.3)	-	-	-	-	-	-	-	-	-
	Open	4,498	379 (8.4)	-	-	-	-	-	-	-	-	-
Harji et al.	Lap	33	0 (0.0)	12 (36.0)	-	-	-	-	-	-	-	-
	Open	31	1 (3.0)	13 (42.0)	-	-	-	-	-	-	-	-
Keller et al.	Lap	954	29 (3.1)	274 (29.0)	-	-	-	-	-	-	-	10.8 (8.0)
	Open	21,774	1,442 (6.6)	8,286 (38.1)	-	-	-	-	-	-	-	14.8 (14.0)
Kim et al.	Lap	11	0 (0.0)	4 (36.0)	1 (9.0)	-	-	-	1 (9.0)	1 (9.0)	-	13 (4.0)
	Open	23	0 (0.0)	13 (34.0)	29 (76.0)	-	-	-	3 (7.9)	3 (7.9)	-	17 (10.0)
Koh et al.	Lap	23	0 (0.0)	11 (47.8)	-	1 (4.3)	-	-	4 (17.4)	4 (17.4)	-	6 (3-28)’
	Open	23	0 (0.0)	13 (56.5)	-	1 (4.3)	-	-	7 (30.4)	1 (4.3)	-	7 (3-31)’
Lee et al.	Lap	457	10 (3.6)	123 (26.9)	17 (3.7)	35 (7.7)	27 (5.8)	-	139 (30.5)	33 (7.2)	-	11.2 (8.2)
	Open	3,299	237 (7.2)	993 (30.1)	221 (6.7)	250 (7.6)	280 (8.5)	-	1,141 (34.6)	1,715 (5.2)	-	12.7 (10.2)
Letarte et al.	Lap	39	0 (0.0)	10 (25.6)	-	1 (2.6)	1 (2.6)	-	5 (12.8)	-	-	8 (7-14)^
	Open	86	4 (4.6)	45 (52.3)	-	6 (7.0)	16 (18.6)	-	28 (32.6)	-	-	7 (5-9)^
Li et al. (2009)	Lap	6	0 (0.0)	2 (33.3)	-	0 (0.0)	2 (33.3)	-	0 (0,0)	-	-	7 (2.5)
	Open	12	0 (0.0)	6 (50.0)	-	1 (8.3)	5 (41.7)	-	3 (25,0)	-	-	8 (3.6)
Li et al. (2015)	Lap	10	0 (0.0)	2 (20.0)	-	-	1 (10.0)	-	-	1 (10.0)	-	7 (6-15)’
	Open	25	0 (0.0)	9 (36.0)	-	-	3 (12.0)	-	-	2 (8.0)	-	9 (7-20)’

SUPPLEMENTARY TABLE 3A continued: Short-term outcomes after laparoscopic vs open emergency colorectal surgery.

Study	Approach	N	Mortality N (%)	Overall morbidity N (%)	ICU admissions* N (%)	Reinter-ventions N (%)	Wound infection** N (%)	Wound dehiscence N (%)	Ileus N (%)	Pulmonary complications*** N (%)	Cardiac complications**** N (%)	LOS***** (mean, SD)
Liu et al.	Lap	55	0 (0.0)	18 (32.7)	-	-	3 (5.5)	-	3 (5.5)	1 (1.8)	-	24.22 (17.09)
	Open	135	1 (0.7)	40 (29.6)	-	-	8 (5.9)	-	6 (4.4)	5 (3.7)	-	24.19 (14.76)
Marceau et al.	Lap	40	0 (0.0)	14 (35.0)	-	2 (6.0)	-	-	3 (7.5)	-	-	9 (3.0)
	Open	48	0 (0.0)	27 (56.0)	-	5 (10.0)	-	-	3 (6.3)	-	-	12 (7.0)
Marcello et al.	Lap	19	-	3 (16.0)	-	-	2 (10.5)	-	1 (5.3)	-	-	4 (3-13)’
	Open	29	-	7 (24.0)	-	-	3 (10.3)	-	0 (0)	-	-	6 (4-24)’
Moghadamyeghaneh et al.	Lap	249	8 (3.2)	124 (50.0)	4 (1.6)	22 (8.8)	26 (10.4)	4 (1.6)	58 (23.3)	7 (2.8)	4 (1.6)	10
	Open	1,044	102 (9.8)	644 (61.8)	46 (4.4)	80 (7.7)	130 (12.4)	25 (2.4)	323 (31.0)	91 (8.7)	33 (3.1)	13
Nash et al.	Lap	36	0 (0.0)	20 (56.0)	-	-	-	-	-	-	-	12 (4-68)’
	Open	32	5 (13.0)	23 (72.0)	-	-	-	-	-	-	-	23 (6-108)’
Ng et al.	Lap	14	1 (7.1)	4 (28.6)	-	-	0 (0.0)	-	3 (21.4)	0 (0.0)	-	7 (6-18)’
	Open	29	3 (10.3)	16 (55.6)	-	-	5 (17.2)	-	1 (3.4)	3 (10.3)	-	9 (6-40)’
Odermatt et al.	Lap	36	3 (8.3)	-	-	5 (13.9)	6 (16.7)	-	-	-	-	7.5 (2-45)’
	Open	72	9 (12.5)	-	-	6 (8.3)	3 (4.2)	-	-	-	-	11 (1-61)’
Schloricke et al.	Lap	24	1 (4.2)	6 (25.0)	7 (29.2)	-	-	0 (0.0)	1 (4.2)	1 (4.2)	2 (8.3)	11 (7-25)’
	Open	12	1 (8.3)	8 (66.7)	5 (41.7)	-	-	1 (4.2)	2 (16.7)	1 (8.3)	1 (8.3)	14.5 (7-40)’
Stulberg et al.	Lap	40	1 (3.0)	18 (46.0)	13 (33.0)	2 (5.0)	8 (21.0)	0 (0.0)	-	1 (3.0)	1 (3.0)	7.9 (2-25)’
	Open	25	2 (8.0)	15 (63.0)	12 (48.0)	1 (4.0)	4 (17.0)	1 (4.0)	-	2 (8.0)	2 (8.0)	11.3 (4-36)’
Sujatha-bhaskar et al.	Lap	1,039	48 (4.6)	368 (35.4)	-	60 (5.8)	109 (10.5)	-	208 (20)	41 (3.9)	12 (1.2)	-
	Open	8,979	1,206 (13.4)	5,356 (59.7)	-	708 (7.9)	1,611 (17.9)	-	2,952 (32.9)	856 (9.5)	187 (2.1)	-
Turley et al.	Lap	67	2 (3.0)	17 (25.4)	5 (7.5)	8 (11.9)	4 (6.0)	0 (0.0)	-	3 (4.5)	0 (0.0)	6 (5-11)^
	Open	67	3 (4.5)	20 (30.0)	5 (7.5)	3 (4.5)	12 (17.9)	2 (3.0)	-	0 (0.0)	0 (0.0)	8 (6-11)^
Vallance et al.	Lap	3,435	242 (8.1)	-	-	-	-	-	-	-	-	8 (5-15)^
	Open	12,081	1,302 (13.0)	-	-	-	-	-	-	-	-	12 (8-21)^
Vennix et al.	Lap	39	1 (2.6)	17 (43.6)	11 (36.7)	5 (12.8)	-	-	-	-	-	7 (5-13)
	Open	78	3 (3.8)	51 (66.2)	28 (50.0)	15 (19.5)	-	-	-	-	-	9 (7-14)
Watanabe et al.	Lap	30	0 (0.0)	11 (37.0)	-	0 (0.0)	4 (13.3)	0 (0.0)	4 (13.0)	0 (0.0)	-	23 (14-65)’
	Open	30	1 (3.0)	19 (63.0)	-	4 (13.0)	4 (13.3)	2 (6.7)	4 (13.0)	3 (13.0)	-	33 (18-101)’

Table 3) Short-term outcomes after laparoscopic and open emergency surgery for colorectal disease. ICU: intensive care unit, LOS: length of stay (presented as mean and SD, unless specified differently.)*: ICU admissions included ventilator dependency, **: wound infections included superficial and deep SSIs, ***: pulmonary complications included pneumonia , pulmonary insufficiency, pleural infusion, unplanned intubation, pulmonary complications, respiratory complications, pulmonary embolism, ****: cardiac complications included cardiac complications, myocardial infarction, atrial fibrillation / cardiac arrhythmia, acute coronary syndrome, CPR, acute heart failure (decompensated), *****: length of stay was reported as *: mean and range, ^: median and IQR, ‘: median and range (min-max).

SUPPLEMENTARY TABLE 3B: Short-term outcomes after emergency colorectal surgery laparoscopic vs. open approach.

Study	Approach	Anastomotic leakages N (%)	Intra-abdominal infection/ abscess N (%)	Readmissions N (%)
Ballian et al.	Lap.	-	10 (3.0)	-
	Open	-	193 (6.0)	-
Cassini et al.	Lap.	-	0 (0.0)	-
	Open	-	2 (8.3)	-
Catani et al.	Lap.	-	-	-
	Open	-	-	-
Cocorullo et al.	Lap.	-	-	-
	Open	-	-	-
Cui et al.	Lap.	-	0 (0.0)	-
	Open	-	5 (7.9)	-
Dunker et al.	Lap.	-	1 (10.0)	-
	Open	-	2 (6.3)	-
Gietelink et al.	Lap.	-	-	-
	Open	-	-	-
Harji et al.	Lap.	-	-	-
	Open	-	-	-
Keller et al.	Lap.	-	-	-
	Open	-	-	-
Kim et al.	Lap.	1 (9.0)	-	-
	Open	0 (0.0)	-	-
Koh et al.	Lap.	-	-	-
	Open	-	-	-
Lee et al.	Lap.	23 (5.1)	54 (11.9)	49 (10.7)
	Open	129 (3.9)	369 (11.2)	310 (9.4)
Letarte et al.	Lap.	2 (5.1)	2 (5.1)	-
	Open	2 (3.0)	7 (8.1)	-
Li et al., (2009)	Lap.	-	0 (0.0)	-
	Open	-	1 (8.3)	-
Li et al., (2015)	Lap.	0 (0.0)	-	
	Open	1 (4.0)	-	
Liu et al.	Lap.	1 (1.8)	0 (0.0)	-
	Open	4 (3.0)	1 (0.74)	-
Marceau et al.	Lap.	3 (7.5)	-	-
	Open	3 (6.3)	-	-
Marcello et al.	Lap.	-	-	-
	Open	-	-	-
Moghadamyeghaneh et al.	Lap.	19 (7.7)	21 (8.4)	34 (13.7)
	Open	61 (5.9)	74 (7.1)	120 (11.5)
Nash et al.	Lap.	-	-	-
	Open	-	-	-
Ng et al.	Lap.	-	-	-
	Open	-	-	-
Odermatt et al.	Lap.	1 (3.3)	3 (8.3)	3 (8.3)
	Open	1 (1.8)	3 (4.2)	5 (6.9)
Schloricke et al.	Lap.	-	0 (0.0)	-
	Open	-	1 (4.2)	-
Stulberg et al.	Lap.	0 (0.0)	3 (8.0)	3 (8.0)
	Open	0 (0.0)	2 (8.0)	2 (8.0)
Sujatha-bhaskar et al.	Lap.	48 (4.6)	-	76 (7.3)
	Open	339 (3.8)	-	807 (9.0)
Turley et al.	Lap.	-	3 (4.5)	-
	Open	-	2 (3.0)	-
Vallance et al.	Lap.	-	-	314 (10.5)
	Open	-	-	897 (9.0)
Vennix et al.	Lap.	-	-	-
	Open	-	-	-
Watanabe et al.	Lap.	-	1 (3.0)	-
	Open	-	4 (13.3)	-

Suppl. Table 3) Additional short-term outcomes not reported in main tables.

SUPPLEMENTARY TABLE 4: Long term outcomes after emergency colorectal surgery laparoscopic vs. open approach.

Author	Approach	N	3-year overall survival % (95% CI)	3-year recurrence-free survival % (95% CI)	Incisional hernia N (%)
Kim et al.	Lap	11	90.9*	90.9*	-
	Open	38	94.7*	94.7*	-
Liu et al.	Lap	22	90.9*	86.4*	-
	Open	78	85.9*	78.2*	-
Odermatt et al.	Lap	36	51.1 (34.5-75.7)	34.9 (20.4-59.5)	-
	Open	72	43.2 (32.3-57.9)	36.6 (26.6-50.3)	-
Cassini et al.	Lap	36	-	-	2 (5%)
	Open	24	-	-	6 (25%)
Dunker et al.	Lap	10	-	-	0 (0%)
	Open	32	-	-	2 (6.3%)
Nash et al.	Lap	36	-	-	1 (3%)
	Open	32	-	-	5 (16%)

Suppl. Table 4) *: These studies only reported crude rats, without number of patients at risk, thus without adjustment for patients who were lost to follow-up.

SUPPLEMENTARY TABLE 5: Definitions of outcomes as described in original studies.

Study	Mortality	Overall morbidity	ICU* admission	Reintervention	Wound infection	Wound dehiscence	Ileus	Pulmonary complications	Cardiac complications	LOS***
Ballian et al.	30-day postoperative mortality	30-day morbidity	-	30-day reoperation	-	-	-	Pneumonia, ventilator > 48 hours	-	Length of hospital stay
Cassini et al.	Mortality	Morbidity	ICU	-	Surgical site infection	Wound dehiscence	Ileal obstruction	Pleural effusion, pneumonia, pulmonary insufficiency	Cardiac decompensation	Hospital stay
Catani et al.	30-day mortality	30-day morbidity	-	-	-	Dehiscence	-	-	-	Length of hospital stay
Cocorullo et al.	Mortality	Morbidity	-	-	-	-	-	-	-	-
Cui et al.	-	-	-	-	Wound infection	-	-	-	-	Duration of hospital stay
Dunker et al.	Mortality	Morbidity, minor and major complications	-	Relaparotomy	-	Abdominal burst	-	-	-	Hospital stay
Gietelink et al.	30-day mortality	-	-	-	-	-	-	-	-	-
Harji et al.	30 and 90-day postoperative mortality	30 and 90-day postoperative complications	-	-	-	-	-	-	-	-
Keller et al.	Mortality	All complications	-	-	-	-	-	-	-	Length of stay
Kim et al.	Short-term mortality	30-day complications	ICU admission	-	-	-	Obstruction	Pulmonary complication	-	Hospital stay
Koh et al.	Mortality	Postoperative morbidity	-	Reoperation	-	-	Ileus	Pulmonary complication	-	Duration of hospital stay
Lee et al.	30-day mortality	Any complication	-	Reoperation	Superficial and deep incisional SSI	-	Ileus	Unplanned intubation, pneumonia	-	Hospital length of stay
Letarte et al.	30-day postoperative mortality	30-day overall morbidity	-	Reoperation	Superficial SSI	-	Prolonged ileus	-	-	Length of stay

Li et al., (2009)	Operative mortality	Postoperative complications	-	Image guided percutaneous drainage	Wound infection	-	Prolonged ileus	-	-	Hospital stay
Li et al., (2015)	Postoperative mortality	Postoperative complications	-	-	Incision infection	-	-	Pulmonary infection	-	Postoperative hospital stay
Liu et al.	Short-term postoperative death	Complications (all)	-	-	Incisional infection	-	Postoperative intestinal obstruction		-	Hospital stay time
Marceau et al.	30-day mortality	Overall morbidity	-	Relaparotomy	-	-	-	-	-	Hospital stay
Marcello et al.	-	Complications	-	-	Wound infection	-	Ileus	-	-	Length of hospital stay
Moghadamyeghaneh et al.	30-day mortality	30-day overall morbidity	-	Unplanned reoperation	Superficial and deep SSIs	Wound disruption	Prolonged ileus	Respiratory complications (unplanned intubations, ventilator dependency >48 h, pneumonia), pulmonary embolism	Cardiac arrest requiring CPR****, myocardial infarction	Hospitalization length
Nash et al.	30-day mortality	30-day morbidity	-	-	-	-	-	-	-	Length of hospital stay
Ng et al.	Postoperative death	Total number of complications	-	-	Wound infection	-	Prolonged ileus	Respiratory failure, pulmonary embolism, chest infection	Acute coronary syndrome, atrial fibrillation	Hospital stay
Odermatt et al.	30-day mortality	-	-	Surgical complication needing a reintervention	Wound infection	-	-	-	-	Length of stay
*Schloricke et al.**	Exitus letalis	Postoperative Komplikationen	Intensive-medizinische Behandlung	-	-	Platzbauch	Darmatonie	Pleuraerguss, pneumonie	Kardiale Ereignisse	Krankenhaus-verweildauer
Stulberg et al.	30-day mortality	Early postoperative complications	ICU stay required	Reoperations	SSI	Dehiscence	-	Postoperative intubation, pneumonia, pulmonary embolism	Myocardial infarction	Time to discharge
Sujatha-bhaskar et al.	30-day mortality	Overall morbidity	-	Unplanned reoperations	Any SSI	-	Ileus	Pneumonia	Myocardial infarction	-

Turley et al.	30-day mortality	30-day morbidity/overall complication rate	-	Return to the operating room	Superficial and deep surgical site infections	Wound dehiscence	-	Pneumonia, unplanned reintubation, pulmonary embolism, prolonged ventilator support	Cardiac arrest, myocardial infarction	Length of postoperative hospital stay
Vallance et al.	90-day mortality	-	-	30-day reoperations	-	-	-	-	-	Length of hospital stay
Vennix et al.	In-hospital mortality	In-hospital morbidity	Postoperative ICU admission	Reinterventions (surgical and percutaneous reinterventions)	-	-	-	-	-	Postoperative hospital stay
Watanabe et al.	Mortality	Number of complications during the hospital stay	-	Relaparotomies	Surgical site infections	-	Ileus	P. Jiroveci and fungal pneumonia	-	Postoperative hospital stay

Suppl. Table 5) *ICU: intensive care unit, ** SSI: surgical site infection, ***LOS: length of stay, SSI: surgical site infection, **** CPR: Cardiopulmonary resuscitation. Schloricke et al. exicutis letalis: lethal outcome, postoperative Komplikationen: postoperative complications, Intensivemedizinsche behandlung: Intesive medical treatment, Platzbauch: fascial dehiscence, Darmatonie: atonic bowel, Pleuraeguss: pleura effusion, Pneumonie: pneumonia, Kardiale Ereignisse: cardial events, Krankenhausverweildauer: hospital stay duration.

SUPPLEMENTARY TABLE 6: Quality assessment of the included randomized and non-randomized studies.
SUPPLEMENTARY TABLE 6A: Quality assessment of the included non-randomized studies.

Author	Selection (****)	Comparability (**)	Outcome (***)	Total Score	Quality*
Ballian et al.	***	**	***	8 out of 9	Good
Cassini et al.	***	*	***	7 out of 9	Good
Catani et al.	***	**	*	6 out of 9	Poor
Cocorullo et al.	***		*	4 out of 9	Poor
Cui et al.	***	**	**	7 out of 9	Good
Dunker et al.	***	*	*	5 out of 9	Poor
Gietelink et al.	***	*	***	7 out of 9	Good
Harji et al.					NA
Keller et al.	***	*	***	7 out of 9	Good
Kim et al.	***	*	***	7 out of 9	Good
Koh et al.	**	**	**	6 out of 9	Fair
Lee et al.	***	**	***	8 out of 9	Good
Letarte et al.	***		**	5 out of 9	Poor
Li et al., (2009)	***	*	*	5 out of 9	Poor
Li et al., (2015)	**	**	*	5 out of 9	Poor
Liu et al.	***	*	***	7 out of 9	Good
Marceau et al.	**	**	***	7 out of 9	Good
Marcello et al.	**	**	*	5 out of 9	Poor
Moghadamyeghaneh et al.	***	**	***	8 out of 9	Good
Nash et al.	***		***	6 out of 9	Poor
Ng et al.	***	**	*	6 out of 9	Poor
Odermatt et al.	***	**	**	7 out of 9	Good
Schloricke et al.	***		*	4 out of 9	Poor
Stulberg et al.	***	**	***	8 out of 9	Good
Sujatha-bhaskar et al.	***	**	***	8 out of 9	Good
Turley et al.	***	**	***	8 out of 9	Good
Vallance et al.	***	**	***	8 out of 9	Good
Vennix et al.	***	**	**	7 out of 9	Good
Watanabe et al.	***	*	*	5 out of 9	Poor

Suppl. Table 6A) Assessment of quality of nonrandomized studies according to the Newcastle-Ottawa Scale.

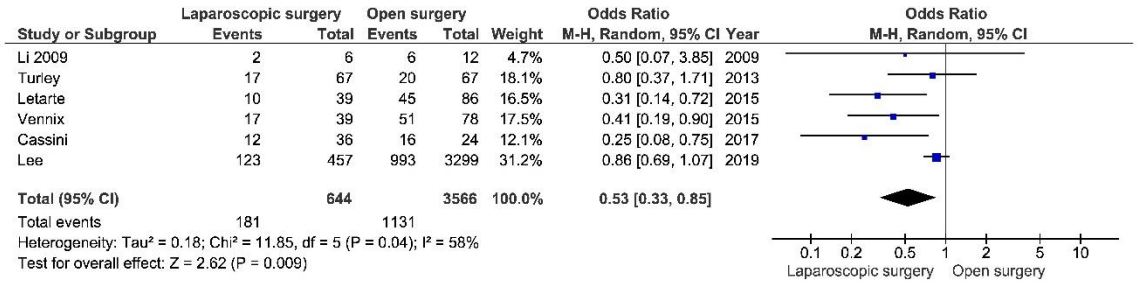
SUPPLEMENTARY TABLE 6B: Quality assessment of the included randomized controlled study.

Domain	Support for judgement	Review authors' judgement	Risk of bias score
Selection bias			
Random sequence generation	Randomization was performed centrally, with patients randomized on a 1:1 basis between laparoscopic or open surgery using minimization of incorporating a random element	Low risk of selection bias due to adequate generation of randomized sequence	+
Allocation concealment	The authors do not describe whether allocation to treatment was concealed prior to assignment	Unknown concealment of allocation prior to assignment	?
Performance bias			
Blinding of participants and personnel	Patients were blinded to the treatment allocation for up to 7 days after surgery, or until the day of discharge if earlier. Personnel was not blinded.	Low risk of performance bias due to blinded patients, however personnel was not blinded to allocation resulting in high risk of performance bias. "	+
Detection bias			
Blinding of outcome assessment	The authors do not describe whether outcomes assessors were blinded for treatment allocation	There could have been detection bias due to knowledge of patients' treatment assignment	?
Attrition bias			
Incomplete outcome data	All randomized patients were included in outcome analysis, unless they were lost to follow-up low risk	Low risk of attrition bias as there was a small amount of incomplete outcome data "Baseline compliance for clinical and "HRQoL data was 99·8 and 93·8 per cent respectively.	+
Reporting bias			
Selective reporting	The authors extensively reported how they collected data, how data compliance was calculated for each of the follow-up time points and reported outcomes completely	Low risk of reporting bias as there was no selective outcome reporting	+

Suppl. Table 6B) Assessment of quality of randomized studies according to the Cochrane Risk of Bias Tool.

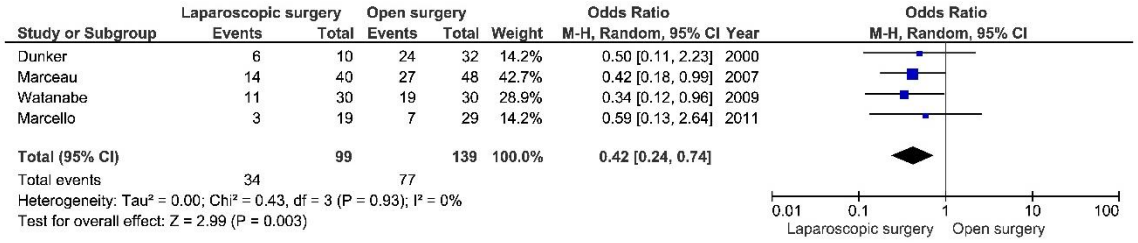
Supplementary figure 1 A-C: Forest plots for overall morbidity after emergency colorectal surgery, laparoscopic vs. open approach for complicated diverticulitis, IBD and colorectal cancer.

Forest plot 1A: overall morbidity complicated diverticulitis.



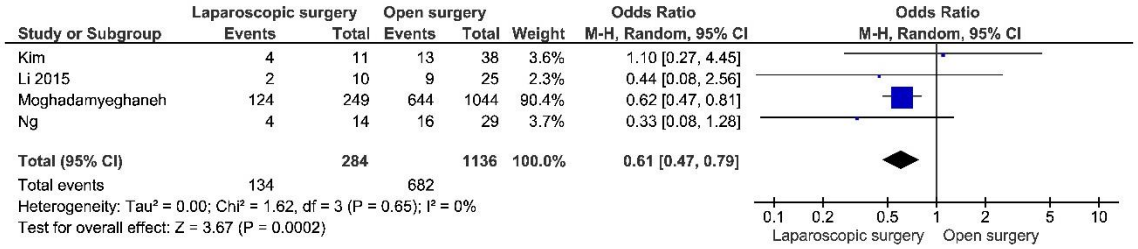
Suppl. Fig. 1A) Overall morbidity after laparoscopic vs open emergency surgery for complicated diverticulitis.

Forest plot 1B: overall morbidity IBD.



Suppl. Fig. 1B) Overall morbidity after laparoscopic vs open emergency surgery for Inflammatory bowel disease.

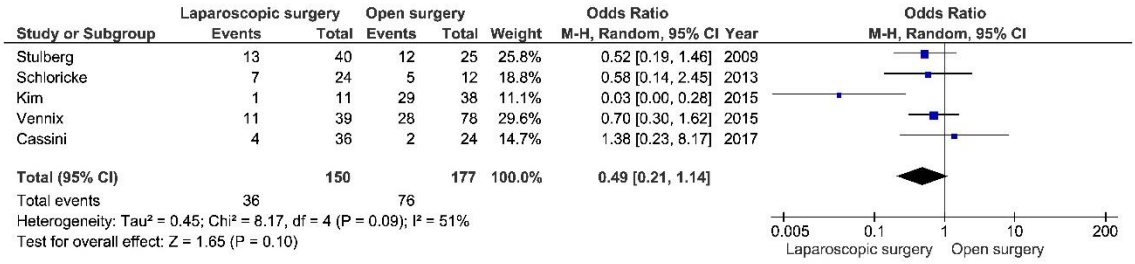
Forest plot 1C: overall morbidity colorectal cancer.



Suppl. Fig. 1C) Overall morbidity after laparoscopic vs open emergency surgery for colorectal cancer.

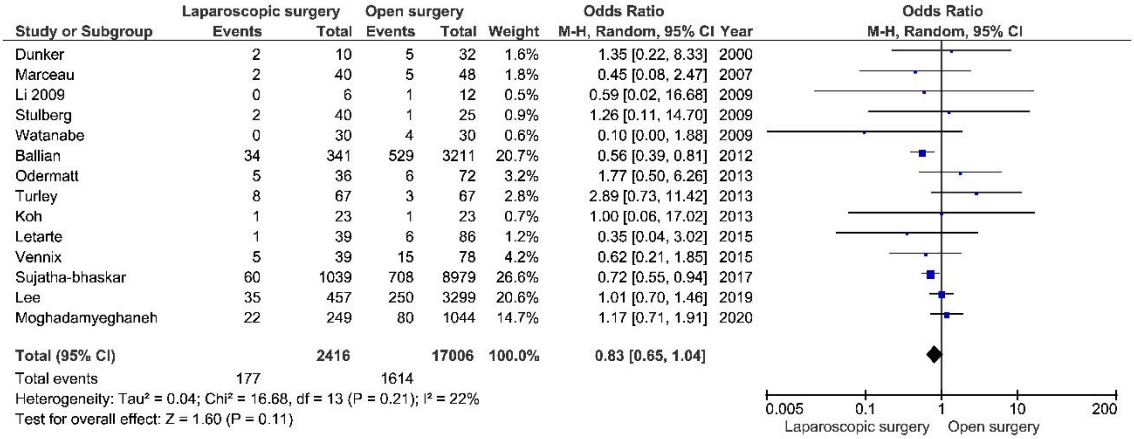
Supplementary figure 2A-E: Forest plots for the secondary outcomes after emergency colorectal surgery, laparoscopic vs. open approach.

Forest plot 2A: ICU admissions.



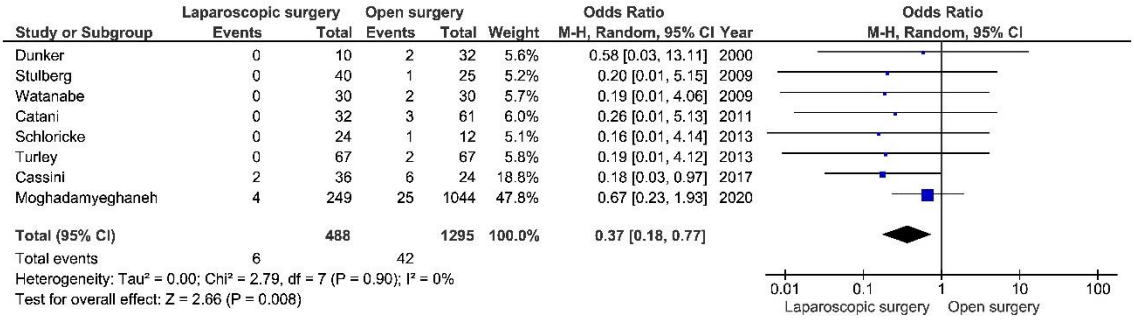
Suppl. Fig. 2A: ICU admission after laparoscopic vs. open emergency colorectal surgery.

Forest plot 2B: Reinterventions.



Suppl. Fig. 2B: Reintervention after laparoscopic vs. open emergency colorectal surgery. Vallance et al. was not included in the meta-analyses, due to discrepancy of numbers in the text and tables for reinterventions.

Forest plot 2C: Wound dehiscence.

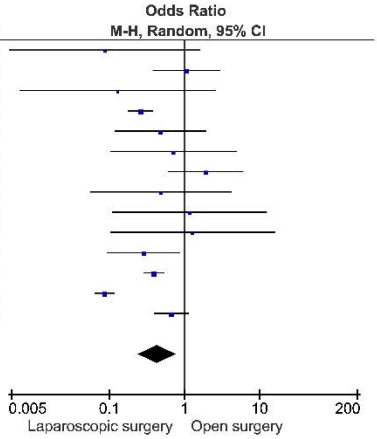


Suppl. Fig. 2C: Wound dehiscence after laparoscopic vs. open emergency colorectal surgery.

Forest plot 2D: Pulmonary complications.

Study or Subgroup	Laparoscopic surgery Events	Total	Open surgery Events	Total	Weight	Odds Ratio M-H, Random, 95% CI	Year
Ng	0	14	8	29	3.0%	0.09 [0.00, 1.63]	2008
Stulberg	15	40	9	25	8.6%	1.07 [0.38, 3.01]	2009
Watanabe	0	30	3	30	2.9%	0.13 [0.01, 2.61]	2009
Ballian	30	341	867	3211	11.2%	0.26 [0.18, 0.38]	2012
Koh	4	23	7	23	7.1%	0.48 [0.12, 1.95]	2013
Schloricke	3	24	2	12	5.2%	0.71 [0.10, 4.98]	2013
Turley	9	67	5	67	8.1%	1.92 [0.61, 6.08]	2013
Liu	1	55	5	135	4.5%	0.48 [0.05, 4.22]	2014
Kim	1	11	3	38	4.1%	1.17 [0.11, 12.48]	2015
Li 2015	1	10	2	25	3.7%	1.28 [0.10, 15.90]	2015
Cassini	8	36	12	24	8.2%	0.29 [0.09, 0.88]	2017
Sujatha-bhaskar	41	1039	856	8979	11.3%	0.39 [0.28, 0.54]	2017
Lee	50	457	1935	3299	11.4%	0.09 [0.06, 0.12]	2019
Moghadamyeghaneh	17	249	103	1044	10.7%	0.67 [0.39, 1.14]	2020
Total (95% CI)		**2396**		**16941**	**100.0%**	**0.43 [0.24, 0.78]**	
Total events	180		3817				

Heterogeneity: Tau² = 0.78; Chi² = 94.44, df = 13 (P < 0.00001); I² = 86%
Test for overall effect: Z = 2.79 (P = 0.005)

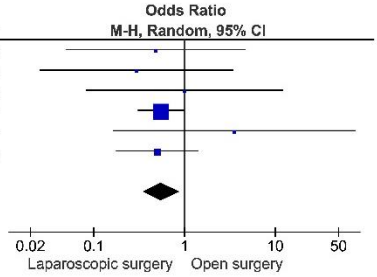


Suppl. Fig. 2D: Pulmonary complications after laparoscopic vs. open emergency colorectal surgery.

Forest plot 2E: Cardiac complications.

Study or Subgroup	Laparoscopic surgery Events	Total	Open surgery Events	Total	Weight	Odds Ratio M-H, Random, 95% CI	Year
Ng	1	14	4	29	4.3%	0.48 [0.05, 4.75]	2008
Stulberg	1	40	2	25	3.7%	0.29 [0.03, 3.43]	2009
Schloricke	2	24	1	12	3.6%	1.00 [0.08, 12.27]	2013
Sujatha-bhaskar	12	1039	187	8979	65.4%	0.55 [0.31, 0.99]	2017
Cassini	2	36	0	24	2.4%	3.55 [0.16, 77.27]	2017
Moghadamyeghaneh	4	249	33	1044	20.6%	0.50 [0.18, 1.43]	2020
Total (95% CI)		**1402**		**10113**	**100.0%**	**0.56 [0.35, 0.90]**	
Total events	22		227				

Heterogeneity: Tau² = 0.00; Chi² = 1.92, df = 5 (P = 0.86); I² = 0%
Test for overall effect: Z = 2.40 (P = 0.02)



Suppl. Fig. 2E: Cardiac complications after laparoscopic vs open emergency colorectal surgery.