Guideline Protocol

EAES Rapid Guideline: Management of Complicated Diverticulitis

with participation of ESCP

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The authors declare no direct or indirect conflicts of interest. SAA has participated as panel member in a EAES/SAGES guideline on the management of diverticular disease.

Introduction

The rate of diverticula in the European population is 27.3%, representing over one million people.[1] Treatment for acute diverticulitis can range from conservative management for uncomplicated disease to surgical intervention for patients with complications.[1] These include abscesses, perforations, or generalized peritonitis.[2] Traditionally, Hartmann's resection (HR) has been the standard of care for patients with Stage III-IV perforated diverticulitis accompanied by purulent or fecal peritonitis.[3] HR consists of removal of the compromised colon segment, creation of a proximal colostomy, and closure of the distal stump, resulting in a temporary or sometimes permanent colostomy.[4]

However, the surgical management of acute diverticulitis has evolved with the introduction of techniques like primary resection and anastomosis (PRA) and laparoscopic peritoneal lavage (LPL). PRA offers a single-step procedure and restores bowel continuity, while LPL is less invasive and cleanses the infected peritoneal fluid without colon resection.[5,6] Still, the optimal method for managing acute diverticulitis lacks consensus. Some studies champion the advantages of PRA, emphasizing quicker postoperative recovery and fewer stoma-related complications,[5] whereas others point towards potential anastomotic leaks and their repercussions.[7] On the other hand, while LPL boasts a minimally invasive approach, its efficacy remains disputed due to variable trial outcomes, with concerns about recurrent rates and subsequent surgical needs arising in some studies.[8,9]

In 2018, the European Association for Endoscopic Surgery (EAES) and Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) created recommendations for the diagnosis and management of acute diverticulitis.[10] However, recent literature combined with the range in perspectives and implementation in practice necessitates an updated synthesis of the evidence. The contemporary use of both direct and indirect data comparisons will aid in the establishment of clear guidance in the form of clinical practice guidelines for clinicians, hospital managers, and policymakers in the management of acute diverticulitis.

Objectives

Our aim is to apply rigorous methodology of the highest standards to create evidence-based recommendations that will guide gastrointestinal, endoscopic, and general surgeons, gastroenterologists, other healthcare professionals, and patients in navigating the management of acute diverticulitis. The objective is to mitigate complications associated with the treatment of acute diverticulitis while optimizing patient experience and health-related quality of life.

Methods

Guideline Development Process

The guideline proposal was registered on the International Guidelines Library [International Guidelines Library. Available in: https://guidelines.ebmportal.com/eaes-rapid-guideline-management-complicated-diverticulitis. Accessed 3 October 2023]. This guideline protocol adheres with best applicable reporting standards from the Preferred Reporting Items for Systematic reviews and Meta-Analysis Protocols (PRISMA-P),[11] PRISMA for Systematic Reviews and Meta-Analysis of Individual Patient Data (PRISMA-IPD),[12] and the Appraisal of Guidelines for Research and Evaluation (AGREE) II extension for surgical interventions (AGREE-S).[13] Members of the EAES will have the opportunity to provide input on the content of this protocol through engagement via social media and the EAES email newsletter. The steering group

will consider all comments for integration into the protocol, and any amendments to the protocol will be explicitly stated in the final publication.

This guideline will follow the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) standards,[14] facilitating the appraisal of the certainty of evidence from a network meta-analysis, the Confidence in Network Meta-Analysis (CINeMA) methodology, and the GRADE evidence-to-decision framework to assess multiple interventions.[15–18]

Funding

The EAES will fund this clinical practice guideline. The funding agency will have no input in the planning, development, final report, or decision for publication submission of this work.

Steering Group

The steering group will include a certified master guideline developer and chair, as well as a colorectal surgeon. Both members will have no financial or indirect conflicts of interest.

Guideline methodologist

A certified master guideline developer and chair (International Guideline Development Credentialing & Certification Program - INGUIDE certificate number: 2022-L3-V1-00014) with extensive experience in evidence synthesis will oversee the methodological implementation of this guideline. This member has actively contributed to the development of over 15 clinical practice guidelines. Additionally, two trainee methodologists completing INGUIDE certification will assist in the guideline development.

Guideline panel and external advisors

The guideline panel will consist of 7 general and colorectal surgeons and 2 patient partners. We will also recruit 5 opinion leaders, authors of randomized trials on the topic of interest, as external advisors as per standards from the Guidelines International Network.[19] We will consider the contributions of panel members and external advisors for recognition through authorship in the journal publication of the guideline report according to the International Committee of Medical Journal Editors (ICMJE) criteria for authorship.[20]

Guideline Questions

We will answer the following question: Should Hartmann's resection (HR), primary resection and anastomosis (PRA), or laparoscopic peritoneal lavage (LPL) be used in the surgical management of acute diverticulitis?

Subgroup questions will address the use of these interventions in immunocompromized patients, frail patients, patients with sepsis, and patients with Hinchey class 1b, 2, 3 and 4; a subgroup question will address the use of laparoscopy for the interventions HR and PRA.

Outcome Selection and Determination of Utility Values

The steering group will draft a list of potential outcomes. To identify outcomes of interest and establish minimal important differences, panel members will independently assess the importance of each outcome using the GRADE scale.[21] They will also have the opportunity to propose additional outcomes

considered significant or critical. The steering group will calculate the median score for each outcome to identify important (score 4-6) and critical (score 7-9) items for inclusion. If substantial variation is obtained among panel evaluations of outcomes, a synchronous meeting will be held online to resolve conflicts and reach consensus. This discussion will be guided by placing emphasis on patient-important outcomes while adhering to Cochrane guidance in focusing on the most relevant outcomes for patients, clinicians, and policymakers.[18]

The steering group will ask panel members to provide their judgements on the utility of each outcome, with 0 being the worst possible health state/death, and 10 the best possible health state.

We will present questions such as "What do you consider is the utility value of major postoperative complications (Clavien-Dindo ≥3b; eg reoperation, abdominal abscess requiring drainage)? Utility represents the strength for an individual's preference for a given outcome. Zero reflects states of health equivalent to death/worst imaginable health, and 10 reflects perfect health/best imaginable health." We will select the median utility value for each outcome unless there is significant variation in responses, in which case a synchronous, online meeting will be hosted by the master guideline developer to achieve consensus among panel members.

Utility values will be converted to absolute risk difference thresholds according to the equation Absolute Risk Difference = [coefficient/(1 - Utility)] * 1000. We will use research-informed anchors as coefficients indicating trivial-to-small effect threshold (0.0135), small-to-moderate effect threshold (0.0321), and moderate-to-large effect threshold (0.0625). We will obtain absolute risk thresholds for trivial/small, small/moderate, and moderate/large effects. Additionally, utility values will be conversed to coefficients according to the equation Coefficient = Absolute Risk Difference * (1 - Utility). We will aggregate these values (positive and negative). The judgements on the effect sizes of each outcome will inform discussions on the evidence-to-decision framework by comparing absolute risk differences to empirically derived absolute risk thresholds, and the net benefit or harm/burden using the aggregate coefficient compared to coefficient thresholds.[22] The outcomes will be considered within a fully contextualized evidence-to-decision process.[23]

Systematic Literature Search

The guideline methodologist and trainee methodologists have developed a comprehensive literature search strategy with the help of an academic health sciences librarian who is an expert in systematic reviews (see Appendix). An experienced systematic reviewer will oversee the systematic review process and will lead an evidence synthesis team comprised of two surgeons or surgical trainees with experience in conducting systematic reviews. The team will query online databases including MEDLINE via Ovid, Embase via Elsevier, Cochrane Central Register of Controlled Trials, & Scopus to identify eligible articles of interest published prior to October 2023. Table 1 illustrates inclusion and exclusion criteria which will be applied in selecting articles for evidence synthesis.

	Inclusion Criteria	Exclusion Criteria

Design	• RCTs
	• Conference proceedings of RCTs will be included in the absence of full-text manuscripts.
		• Cohort studies
		  ○ Prospective
		  ○ Retrospective
		• Case-control studies
		• Non-primary literature.
		  ○ Systematic reviews (SR), meta-analyses (MA).
		  ○ Narrative reviews

	Inclusion Criteria	Exclusion Criteria
		○ Standards of practice. ○ Case reports ○ Cross-sectional studies ○ Commentaries ○ Editorials ○ Letters to the editor ○ Opinion articles.
Population	• Adults with acute diverticulitis	• Animal studies. • Veterinary studies. • Pediatric studies. • Adults with diverticulosis. • Adults with any type of cancer.
Intervention	• Hartmann's resection	•
Comparators	• Primary resection with or without anastomosis • Laparoscopic peritoneal lavage	•
Aims	• Studies assessing clinical outcomes related to the operative management of acute diverticulitis. • Studies assessing clinical outcomes related to the conservative management of acute diverticulitis. • Studies assessing costs related to the operative management of acute diverticulitis. • Studies assessing costs related to the conservative management of acute diverticulitis.	• Studies assessing basic science topics related to the conservative management of acute diverticulitis. • Studies assessing basic science topics related to the operative management of acute diverticulitis. • Studies assessing interventions related to the operative management of acute diverticulitis with novel, innovative technology which is not yet readily implementable in practice based on regulatory approval.

Table 1. Inclusion & Exclusion Criteria.

Once articles are identified, we will upload them to Covidence. The systematic review team will then conduct pilot screening round with a sample of 25 abstracts using an Excel spreadsheet to record decisions. We will then hold a synchronous meeting led by the systematic review coordinator to resolve discrepancies. Next, the systematic review team will complete two rounds of screening. Systematic review team members will conduct screening independently in a blinded manner, and two members will screen each record. We will complete the initial round of screening by title and abstract while using the inclusion and exclusion criteria listed in Table 1.

Prior to the second round of screening, we will conduct another pilot screening round with a sample of 5 full-text articles using an Excel spreadsheet to record decisions. Another synchronous meeting led by the systematic review coordinator will be held to discuss discrepancies. The systematic review team will then screen included articles by full-text. A synchronous meeting will be held at the end of both rounds of screening to discuss discrepancies until consensus is reached, with the systematic review coordinator in attendance as the third member to resolve any outstanding conflicts.

Individual Patient Data Analysis

We plan to perform individual patient data network meta-analysis, if sufficient individual patient data will be available, relative to the full randomized patient data. We will contact the corresponding authors and/or other members of the authors' group of all randomized trials to request the raw study data. We will request a spreadsheet (e.g., Microsoft Excel) with de-identified individual patient data. We will

discuss any queries with the study investigators. We will consider other methods of data sharing, if individual patient data can be appropriately extracted.

We will request the following individual patient data:

- Age
- ASA class
- Comorbidities
- Disease stage (Hinchey class; or Hinchey class will be defined based on imaging or other information)
- Imaging findings
- Status of sepsis (or status of sepsis will be defined based on supporting information)
- Temperature
- Heart rate
- Respiratory rate
- White blood cell count
- Intervention (laparoscopic/open HR, laparoscopic/open PRA +/- loop ileostomy, LPL)
- Comparator (laparoscopic/open HR, laparoscopic/open PRA +/- loop ileostomy, LPL)
- Technique description
- Outcomes (as prioritized by the panel)
- Follow-up for outcome(s) in days
- Comments/Notes

If no sufficient individual patient data will be available, we will either perform individual patient data meta-analysis and downgrade by one or by two levels for publication bias, or we will perform aggregate patient data network meta-analysis.

Aggregate Patient Data Analysis

After the screening process, two members from the systematic review team will independently perform full-text data extraction from included studies. The systematic review coordinator will resolve discrepancies and if necessary, a synchronous meeting will be held to achieve consensus. A third reviewer with content expertise will be available to resolve any discrepancies. The following data extraction template will be used:

- Study number
- Author's last name
- Year of publication
- Title
- DOI
- Country
- Inclusion criteria
- Exclusion criteria
- Patient characteristics (disease stage, age, ASA class, comorbidities)
- Intervention
- Comparator(s)
- Technique Description
- Gender
- Age
- Outcomes
- Follow-up for outcome(s) in days

- Comments/Notes

Risk of Bias (Quality) Assessment

For each outcome or group of outcomes with similar follow-up features, two reviewers will independently assess the risk of bias in related studies using the Risk of Bias (RoB) 2.0 tool.[24] The systematic review coordinator will hold a final synchronous meeting to resolve discussions and settle conflicts as the third reviewer if necessary. We will use the Robvis tool to provide detailed judgements on the risk of bias assessments.[25]

Methodology for Evidence Synthesis

To assess the effectiveness of HR, PRS and LPL, we will meta-analyze the studies that compare the same interventions for each outcome through the R-package 'meta'.[26] To account for potential methodological or clinical discrepancies across studies, we will use the random-effects meta-analysis model. Heterogeneity between trials will be evaluated using $\tau 2$ which will be estimated using the Restricted Maximum Likelihood, the I2 statistic and by visually examining forest plots.

In the case where the eligible studies create a connected network, a random-effects network meta-analysis will be conducted using graph theory approaches through the R-package 'netmeta',[27] to identify which interventions are the most promising. Benefits of network meta-analysis includes the ability to compare interventions that have never been directly compared before, more precise estimates since it synthesizes both sources of evidence, direct and indirect, and the ability to rank the interventions based on their effectiveness.[28] Network's geometry will be displayed through the network plot, while results of network meta-analysis will be presented though forest plots, league tables and tables displaying ranking metrics such as P-scores.

The assessment of the network meta-analysis findings' validity will involve the examination of transitivity from both clinical and epidemiological perspectives. To statistically evaluate transitivity, consistency will be used as a proxy. The existence of a notable difference between direct and indirect evidence signifies the presence of inconsistency, thereby posing a challenge to transitivity. Network consistency will be tested both globally and locally by treating the inconsistency detection as a variable selection problem, using the R-package 'ssifs'.[29] Moreover, the between-designs Q-statistic under the full design-by-treatment interaction random-effects model and the node-split method will be used.[30,31] Network heterogeneity will be evaluated through $\tau 2$ and I2 statistic.

Subgroup analyses or (network) meta-regression will be performed for the following potential effect modifiers:

- Status of immunodeficiency
- Frailty
- Sepsis
- Hinchey class 1b
- Hinchey class 2
- Hinchey class 3
- Hinchey class 4
- Laparoscopic/open intervention

Contingent upon the availability of individual participant data, we will evaluate the effectiveness of interventions exclusively based on individual patient data, using the one-stage approach. Alternatively, if individual patient data are not accessible for each study, we will combine both aggregate data and individual patient data under the two-stage approach. The latter approach will also be used when individual patient data are accessible via sponsors' platforms. Broadly, the one-stage approach provides flexibility, as it allows for the assignment of more complex models and is recommended when most studies in individual patient data meta-analysis are small.[32] However, it may be computationally demanding and prone to issues related to singularity.[33] On the contradictory, two-stage modeling is simpler and can easily synthesize aggregated data with individual patient data. Both approaches give similar results under the same assumptions.[33] Estimations from IPD will be acquired in accordance with the intention-to-treat analysis and will be adjusted to account for potential effect modifiers. Imputation techniques may be employed to enhance statistical power.

We intend to conduct the following sensitivity analyses:

1. (Network) meta-analysis using studies where individual patient data are available
2. (Network) meta-analysis for the primary outcome using crude estimates
3. (Network) meta-analysis using studies that are on low risk of bias.

Finally, the analysis team will assess for the presence of reporting bias using the Egger's test (for pairwise meta-analysis) and comparison-adjusted funnel plots.

GRADE Summary of Findings

We will assess the certainty of evidence from the network meta-analysis using the GRADE approach.[34] The methodology team will assess the certainty of the evidence for five domains including risk of bias, publication bias, indirectness, inconsistency, imprecision, and magnitude of effect. The data analysis team will perform proportion meta-analyses of frequencies of baseline risks/effects to inform calculations of absolute effect differences. We will use the CINeMA platform to summarize the risk of bias contributed by each study to the network for each outcome, and the overall risk of within study bias will be determined by the highest proportion of risk of bias contributed to the network.[17] We will use comparison-adjusted funnel plots to make judgements regarding publication bias, while indirectness will be determined based on between study differences in populations, settings, and interventions, and the presence of direct evidence. The master methodologist will advise the panel to downgrade the evidence certainty by one level in the event that only indirect evidence is present, as the assessment of inconsistency would not be possible. The data analysis team will provide calculations for heterogeneity and consistency to inform judgements surrounding heterogeneity. We will rate down the certainty of evidence by one or two levels if substantial heterogeneity is found as it impacts inconsistency. The team will use data provided by the analysis team in combination with minimal important differences for each outcome set a priori by the guideline panel to make judgements regarding imprecision. Ratings on minimal important differences will be made using a fully contextualized approach, based on the assumption that each outcome is the only outcome of interest.[35] We will use these assessments to separately assign a certainty rating of high, moderate, low, or very low for each pairwise comparison for a given outcome, illustrated with the use of GRADE evidence profiles using MAGICapp.

Evidence-to-Decision Framework

The steering group will provide the panel with GRADE evidence summaries and supporting material two weeks prior to a synchronous consensus meeting, held in-person. The meeting will begin with a detailed presentation of the guideline development methodology. The panel will then discuss concerns surrounding the evidence summaries as well as the evidence-to-decision framework and will resolve disagreements by consensus.[36]

As the panel develops recommendations, we will use the evidence-to-decision framework to support our statements by considering the following factors:[37]

- Benefits and harms of the intervention
- Certainty of the evidence
- Values and preferences of patients and healthcare providers
- Resources required
- Acceptability of the intervention
- Feasibility of implementing the intervention
- Equity

Note that external advisors may participate in discussions but will not be permitted to make judgements about the evidence-to-decision domains.

Following the consensus meeting, panel members will vote on the direction and strength of the recommendation(s) and will also have the opportunity to suggest additional recommendation(s) or modifications to existing recommendation(s) according to the GRADE methodology.[35] We will consider consensus as agreement among >80% of panel members and when full consensus is not achieved, it will be stated in the final report.

Target Users

This guideline applies to gastrointestinal, endoscopic, and general surgeons, gastroenterologists, other healthcare professionals, policymakers, and patients. We will develop a patient-friendly version of the guideline.

Publication and Dissemination

We will publish this clinical practice guideline *in Surgical Endoscopy and Other Interventional Techniques* as the official journal of the EAES. The steering committee will also arrange for wide dissemination via peer-reviewed scientific meetings, social media, letters to the editor, and other channels.

Feedback

The steering group will consider feedback on the guideline report from a variety of sources, including social media, letters to the editor, and other feedback mechanisms. This feedback will be considered in future updates to the guideline.

Monitoring and Updates

This clinical practice guideline will be reviewed by members of the EAES two years after initial publication via an online questionnaire. Updates to the guideline will be made under the guidance of the steering committee based on the availability of new literature on relevant topics, and will otherwise be considered for an update five years post-publication.

Implications for Practice and Research

These clinical practice guidelines will guide patients, surgeons, gastroenterologists, other healthcare providers, professionals, and policymakers in making evidence-informed clinical and policy-related decisions surrounding the management of acute diverticulitis. The systematic review, network meta-analysis, and evidence-to-decision framework will also identify evidence gaps as areas for future research.

Strengths and Limitations

This clinical practice guideline will be developed according to the highest methodological standards including standards from GRADE, & CINeMA. The use of an expert health sciences librarian will ensure that evidence is synthesized in a robust, comprehensive manner. These guidelines will produce patient-centered recommendations, informed by the diverse perspectives of an expert multidisciplinary panel.

Limitations include general challenges with the development of clinical practice guidelines including the inevitable element of subjectivity present with interpreting evidence. Thus, we will use an a priori defined methodology to increase transparency and mitigate relevant bias. Additionally, heterogeneous study designs and outcomes make it challenging to synthesize data in a conclusive manner. Furthermore, patient partners may not necessarily reflect the opinions of all patients. Moreover, guidelines are intended to guide, not dictate clinical practice and clinicians should always consider making evidence-informed, patient-tailored decisions. Additionally, the advantages of rapid reviews in terms of efficiency and similar output must be weighed against the disadvantages including inconsistency in research techniques and reporting, as well as varying definitions of rapid reviews. Overall, rapid reviews play a significant role in policy-making and clinical decision-making.

Research Ethics

All members of the Guideline Development Group will be prompted to provide direct financial or indirect (intellectual) conflicts of interest. Conflicts will be managed according to the principles of the Guidelines International Network (GIN). Any member with relevant direct or indirect conflicts will participate as external advisors and will not participate in discussions about the direction or strength of the recommendations, the voting procedure, or the Delphi process following the consensus meeting.

Conclusion

This clinical practice guideline will provide rigorous, evidence-informed recommendations to guide healthcare professionals and other key stakeholders in making patient-centered decisions in the surgical management of acute diverticulitis.

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Supplementary Appendix

Appendix 1. Search Syntax

Ovid MEDLINE(R) ALL <1946 to September 19, 2023>

1 diverticulitis/ 3566
2 diverticulitis, colonic/ 3922
3 diverticulitis.ti,ab,kf. 7840
4 colonic diverticulitis.ti,ab,kf. 680
5 sigmoid diverticulitis.ti,ab,kf. 690
6 left colonic diverticulitis.ti,ab,kf. 43
7 left-sided diverticulitis.ti,ab,kf. 61
8 left-sided colonic diverticulitis.ti,ab,kf. 51
9 perforated diverticulitis.ti,ab,kf. 461
10 purulent diverticulitis.ti,ab,kf. 12
11 faeculent diverticulitis.ti,ab,kf. 1
12 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 9952
13 hartmann's/ 1528
14 hartmann's.ti,ab,kf. 1785
15 hartmann's resection.ti,ab,kf. 40
16 hartmann's procedure.ti,ab,kf. 964
17 hartmann's operation.ti,ab,kf. 254
18 13 or 14 or 15 or 16 or 17 3252
19 Anastomosis, Surgical/ 35391
20 colostomy/ 9407
21 surgical stomas/ 2430
22 primary resection with anastomosis.ti,ab,kf. 35
23 primary resection.ti,ab,kf. 1722
24 19 or 20 or 21 or 22 or 23 47187
25 peritoneal lavage/ 2214
26 laparoscopic peritoneal lavage.ti,ab,kf. 78
27 peritoneal lavage.ti,ab,kf. 3191
28 therapeutic irrigation/ 18312
29 25 or 26 or 27 or 28 22171
30 18 or 24 or 29 71363
31 12 and 30 1215
32 colon/ 65732
33 colon, sigmoid/ 8342
34 rectum/ 43548
35 descending colon/ 460
36 32 or 33 or 34 or 35 108491
37 intestinal perforation/ 13878
38 peritonitis/ 26395
39 37 or 38 38420
40 36 and 39 2443
41 12 or 40 12091
42 30 and 41 1579

Embase <1974 to 2023 September 19>

1 exp diverticulitis/ 10071
2 exp acute diverticulitis/ 461
3 exp chronic diverticulitis/ 24
4 exp colon diverticulosis/ 7341

5 diverticulitis.ti,ab,kf. 10881
6 colonic diverticulitis.ti,ab,kf. 851
7 sigmoid diverticulitis.ti,ab,kf. 946
8 left colonic diverticulitis.ti,ab,kf. 59
9 left-sided diverticulitis.ti,ab,kf. 113
10 left-sided colonic diverticulitis.ti,ab,kf. 59
11 perforated diverticulitis.ti,ab,kf. 699
12 purulent diverticulitis.ti,ab,kf. 15
13 faeculent diverticulitis.ti,ab,kf. 0
14 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 18573
15 exp colon/ 100402
16 exp colon, sigmoid/ 19899
17 exp rectum/ 41853
18 exp descending colon/ 11473
19 15 or 16 or 17 or 18 131720
20 exp intestinal perforation/ 31745
21 exp peritonitis/ 62806
22 20 or 21 89868
23 19 and 22 3912
24 (diverticulitis* adj3 (perforated* or puruelent* or feculent*)).ti,ab,kf. 1019
25 14 or 23 or 24 21966
26 14 or 24 18573
27 14 or 23 21966
28 exp hartmann procedure/ 1449
29 hartmann's.ti,ab,kf. 2901
30 hartmann's resection.ti,ab,kf. 67
31 hartmann's procedure.ti,ab,kf. 1599
32 hartmann's operation.ti,ab,kf. 342
33 28 or 29 or 30 or 31 or 32 3891
34 exp Anastomosis, Surgical/ 275500
35 exp colostomy/ 17837
36 exp surgical stomas/ 14792
37 primary resection with anastomosis.ti,ab,kf. 41
38 primary resection.ti,ab,kf. 2566
39 34 or 35 or 36 or 37 or 38 303522
40 exp peritoneal lavage/ 5256
41 laparoscopic peritoneal lavage.ti,ab,kf. 138
42 peritoneal lavage.ti,ab,kf. 4078
43 exp therapeutic irrigation/ 97155
44 40 or 41 or 42 or 43 98482
45 33 or 39 or 44 402512
46 25 and 45 3998
47 26 and 45 3088
48 27 and 45 3998

Cochrane CENTRAL: 130 (129 trials)

#1 MeSH descriptor: [Diverticulitis] explode all trees 251
#2 MeSH descriptor: [Diverticulitis, Colonic] explode all trees 106

#3 (diverticulitis):ti,ab,kw 585
#4 (acute diverticulitis):ti,ab,kw 221
#5 (perforated diverticulitis):ti,ab,kw 80
#6 (purulent diverticulitis):ti,ab,kw 37
#7 (feculent diverticulitis):ti,ab,kw 1
#8 (colonic diverticulitis):ti,ab,kw 172
#9 (sigmoid diverticulitis):ti,ab,kw 107
#10 (left colonic diverticulitis):ti,ab,kw 34
#11 (left-sided diverticulitis):ti,ab,kw 32
#12 (left-sided colonic diverticulitis):ti,ab,kw 18
#13 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 585
#14 (hartmann's):ti,ab,kw 337
#15 (hartmann's procedure):ti,ab,kw 139
#16 (hartmann's operation):ti,ab,kw 55
#17 (hartmann's resection):ti,ab,kw 87
#18 #14 or #15 or #16 or #17 337
#19 MeSH descriptor: [Anastomosis, Surgical] explode all trees 2945
#20 (primary resection):ti,ab,kw 12817
#21 (primary resection with anastomosis):ti,ab,kw 612
#22 (colostomy):ti,ab,kw 707
#23 (surgical stoma):ti,ab,kw 614
#24 #19 or #20 or #21 or #22 or #23 16560
#25 MeSH descriptor: [Peritoneal Lavage] explode all trees 103
#26 (peritoneal lavage):ti,ab,kw 299
#27 (laparoscopic peritoneal lavage):ti,ab,kw 84
#28 MeSH descriptor: [Therapeutic Irrigation] explode all trees 2643
#29 #24 or #25 or #26 or #27 16816
#30 #18 or #24 or #29 17064
#31 #13 and #30 130