

# Left Colonic Acute Diverticulitis. Level of Consensus and Clinical Guidelines Implementation

## Paper to apply for SACP active membership

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### ABSTRACT

**Background:** Implementation of clinical guidelines aims to provide support in decision-making regarding a specific health problem, summarizing in recommendations the best available evidence. Regarding acute diverticulitis, despite the large number of guidelines that have been developed, even today a low level of consensus is observed in various aspects of its management.

**Objective:** This paper represents the first survey that measures the level of consensus and the application of international guidelines on the management of acute diverticulitis among members of the SACP, or among any other national medical group.

**Methods:** An online survey was sent to 313 SACP members. The responses were collected over a period of 2 months.

**Results:** The response rate was 19.5%. Only 17 statements surpassed the 70% consensus level cut-off. Of these, 11 statements were in agreement, while 2 statements were in disagreement with the recommendations of the international guidelines, and in the remaining 4 statements, the agreement could not be assessed due to lack of univocal response in the guidelines.

**Conclusions:** The wide heterogeneity in the management of acute diverticulitis among of SACP members, together with the low evidence of scientific papers, the poor methodology used in the international guidelines, and the need for local data on costs and preferences, make it necessary starting a systematic research to achieve national guidelines and consensus.

**Keywords:** Acute Diverticulitis; Clinical Guidelines; Consensus Level; Survey

## BACKGROUND

In order to standardize the diagnosis and treatment of acute diverticulitis, multiple guidelines and consensus have been developed. Despite this, great therapeutic uncertainty persists because almost all of the recommendations have moderate to low level of evidence. This fact is evident in several surveys carried out at the regional and international levels.<sup>1-4</sup>

At the time of writing this paper, there are no guidelines published by any national medical entity regarding the management of acute diverticulitis, nor there are any studies that assess among members of the Argentine Society of Coloproctology (SACP) the level of consensus or the application of the recommendations published by international guides. With this objective, a survey among members of the SACP that included the clinical settings and recommendations expressed in the clinical practice guidelines and consensus published in the last 10 years was carried out. It should be mentioned that the present study is limited exclusively to acute diverticulitis of the left colon (LCAC) as it is the predominant presentation in western countries.

**The author has no conflicts of interest.**

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## MATERIALS AND METHODS

A search in the MEDLINE/ PUBMED database of the guidelines, consensus, and surveys on acute diverticulitis published in English during the last 10 years as of March 2019 was performed. The clinical guidelines and guidelines included in consensus were used as a model for the creation of the survey. Instead, the surveys and those consensuses that did not include guidelines were only used to enlarge the theoretical framework. Six international guidelines were found<sup>5-10</sup>, and based on the statements and recommendations contained in them a survey was created that the SACP sent to 313 full and adherent members by email with a link to the Google forms platform. The survey was organized in the form of clinical settings in order to avoid interpretation errors in the used taxonomy, which is described below to facilitate the description of the findings.

Acute diverticulitis is the presence of an inflammatory process in colonic diverticula. It is classified as:

1. Acute complicated diverticulitis (ACD) when it presents as abscesses, peritonitis, fistula, or stenosis
2. Acute uncomplicated diverticulitis (AUCD) when it only affects the colonic wall

Although there are multiple classifications, the Hinchey classification modified by Vasvary et al. in 1999 was used.<sup>11</sup> The WSES acute diverticulitis working group to-

mography classification was chosen for its descriptive qualities, since it gathers other previous classifications and adds other tomography findings not previously taken into account.<sup>12</sup>

The level of consensus was expressed as the percentage reached by each answer to each question. It was arbitrarily taken as an acceptable level of consensus when an answer was chosen by 70% or more of the surveyed population, except for the measures to prevent recurrences that were measured as an average because it was a numerical scale.

In addition, 2 clinical guidelines<sup>13,14</sup> published after the preparation of the survey were incorporated due to the importance of the entities that prepared them with the most recent scientific evidence. A synthesis of recommendations of the 8 published guidelines was made, which was used to qualitatively measure their application by the surveyed population.

### Statistical analysis

As it was a descriptive cross-sectional study, only percentages, averages, and ranges were calculated, since the results were not compared with any other population or historical moment.

## RESULTS

The survey was carried out from May to July 2019. The response rate was 19.5% (61/313), which, although not significant, is acceptable because it is an online survey, the modality with the lowest response rates.<sup>15-17</sup> Tables 1 to 3 group the data of the respondents. In summary, 88.5% were men with an average age of 46.4 years and almost 15 years of professional practice as proctologists. CABA was the place of training for more than 2/3 of the respondents and together with GBA represent 61.6% of the workplace of the sample. Regarding experience, 48.3% performed more than 100 laparoscopic colorectal procedures and 47.5% are exclusively proctologists.

Regarding diagnosis, 82% of those surveyed considered it necessary to carry out complementary tests even in an AUCD setting with minimal inflammatory response and absence of comorbidities. The 18% respondents that did not routinely indicate tests would only indicate them in the presence of:

1. Fever (100%)
2. Immunocompromised patient (90.9%)
3. Comorbidities (63.6%)
4. Evacuation disturbances (36.4%)
5. Age over 60 years (18.2%)

Imaging were the most requested studies in all settings (Table 4). Of these, CT was chosen by 78.7% respondent, considering it as the most important test (Table 5). The vast majority requested it with oral and intravenous contrast material (72.1% and 88.5% respectively). Of the serological markers the most used was the leukocyte count (100%), followed by erythrocyte sedimentation (36.1%) and C-reactive protein (31.1%).

Table 6 groups the treatments chosen according to tomography findings. Outpatient management was indicated only by 23% of the respondents in AUCD (stage 0), and the vast majority chose hospitalization and IV antibiotics in both, stage 0 and stage Ia. Regarding the treatment of abscesses, in this classification stage Ib uses the 4 cm diameter as cut-off. Since there is controversy in the literature as to whether this limit should be 3 cm, a setting was created with an abscess of 3.5 cm, and for it 26.2 % of respondents indicated percutaneous drainage with antibiotics. In stage IIa, 63.9% indicated drainage with antibiotics, and almost 20% without antibiotics. For peritonitis, 59% of respondents indicated surgical resection, while 41% laparoscopic peritoneal lavage. Tables 7 and 8 show the indication of analgesics and antibiotics in outpatient management. The management of therapeutic failures and the type of resection indicated in each setting is shown in Tables 9 and 10. Regarding damage control surgery in case of hemodynamic instability, 44.3% mentioned it as their first option, 47.5% reserve it only if the hemodynamic status cannot be controlled during surgery, and 8.2% never use it.

The technical details of the elective surgical resection that reached consensus were the mechanical bowel preparation, the resection to the margin of healthy colon and rectum, the laparoscopic approach, and the assessment of anastomosis leakage (Table 11).

Regarding the elective indication of colonoscopy and surgical resection (Tables 12 and 13), only colonoscopy reached consensus after percutaneous drainage. Indications to prevent recurrences are shown in Table 14.

In order to compare the results of the survey, a summary of recommendations of the guidelines published in recent

TABLE 1: GENDER, AGE, AND EXPERIENCE OF THE COLORECTAL SURGEON

	n	%	Mean Age	Range	Years of practice as Coloproctologist	Range
Male	54	88.5	47.0	30-69	15.4	0-40
Female	7	11.5	41.9	30-48	10.6	0-18
Total	61	100	46.4	30-69	14.9	0-40

years was carried out and is shown in Figures 1, 2, and 3.

Only 17 statements surpassed the 70% consensus level cut-off. Of these, 11 statements were in accordance with the recommendations of the guidelines, while 2 statements

were in disagreement and the remaining 4 could not be assessed for agreement due to lack of univocal response in the guidelines.

## DISCUSSION

This study represents the first survey that measures the level of consensus and the application of international guidelines on the management of acute diverticulitis among members of the SACP, or among any other national medical group. The results showed a wide heterogeneity in the indication and choice of diagnostic studies, the therapeutic management in the emergency department and the follow-up of the acute episode, achieving a level of consensus equal to or greater than 70% in only 17 of the statements. Only 11 were in accordance with international recommendations. This fact replicates the findings of other international surveys. The possible causes of this heterogeneity despite the multiple published guidelines should be sought in the interaction between the publications, the guidelines themselves, and the professionals who use them.

Regarding the publications, it is observed that the vast majority have a moderate to low level of evidence and selection biases abound, since there are few randomized studies and many lack a clear question to guide the research. Another important aspect is that in general they are publications of referral or hyper specialized centers, making it difficult to achieve an adequate level of external validation, for example, regarding urgent surgical treatment. A recently published retrospective study with more than 10,000 patients showed very significant differences in morbidity and mortality between general surgeons and coloproctologists performing resection with primary anastomosis and protective ileostomy in diverticular peritonitis.<sup>18</sup> This question the recommendation of bowel transit reconstruction following resection due to poor results in the group of general surgeons.

Regarding the guidelines, although it was possible to summarize the recommendations of the 8 guidelines published in the last 10 years, the disparity in the methodo-

TABLE 2: GEOGRAPHICAL DISTRIBUTION ACCORDING TO TRAINING AND WORKPLACE

RegiOn	Place of training n=61 (%)	Work- place n=60 (%)
CABA	41 67,20%	23 38,30%
GBA	7 11,50%	14 23,30%
PAMPEANA	4 6,60%	9 15,00%
PATAGÓNICA	2 3,30%	6 10,00%
NOROESTE	3 4,90%	5 8,30%
NORESTE	2 3,30%	3 5,00%
CUYO	0 0,00%	0 0,00%
ABROAD	2 3,30%	NA NA

NA: Not applicable.

TABLE 3: LAPAROSCOPIC TRAINING AND DEDICATION TO THE SPECIALTY

No of Lapa- roscopic Colorectal Procedures	n=60 (%)	% of Work Devoted to Colo- proctology	n=61 (%)
>100	29 48,30%	>90%	29 47,50%
75-99	5 8,30%	76-90%	12 19,70%
50-74	6 10,00%	51-75%	11 18,00%
25-49	7 11,70%	26-50%	8 13,10%
<25	13 21,70%	<26%	1 1,60%

TABLE 4: COMPLEMENTARY TESTS ACCORDING TO CLINICAL SETTING

Type of test and setting	AUCD without SIRS	AUCD with SIRS, abces- sess	Perito- nitis
Imaging	96,70%	98,40%	83,60%
Inflammatory res- ponse markers	42,60%	75,40%	57,40%
Colonoscopy	0%	1,60%	0%
Emergency surgery	Nc	Nc	50,80%

AUCD: Acute uncomplicated diverticulitis. SIRS: Systemic inflammatory response syndrome. NA: Not applicable. That option was not given for that question.

TABLE 5: IMAGING TESTS REQUESTED

How was the test requested	Alone	With other tests	n=61	%
Abdominal/pelvic CT scan	28	20	48	78,7
Ultrasound	2	19	21	34,4
Plain abdominal X-ray	0	19	19	31,1
CT after other negative imaging (X-ray/ Ultrasound)	NA	NA	11	18
MRI if CT is contraindicated	0	7	7	11,5
MRI	0	0	0	0

NA: Not applicable. That option was not given for that question.

TABLE 6: TREATMENT ACCORDING CT FINDINGS

Tomographic classification*		Outpatient management	Hospitalization and IV antibiotics	Percutaneous drainage	Drainage and IV antibiotics	Peritoneal	Surgical resection
		%	%	%	%	%	%
Stage 0	Colonic wall thickening, fat stranding,	23	77				
Stage Ia	Pericolic air bubbles, small amount of pericolic fluid without abscess within 5 cm from inflamed bowel		80,3		13,1	4,9	1,7
Stage Ib	Abscess ≤ 4cm		62,3	4,9	26,2	3,3	3,3
Stage IIa	Abscess > 4cm			19,7	63,9	11,5	4,9
Stage IIb	Distant air > 5 cm from inflamed bowel,	1,6	59		6,6	16,4	16,4
Stage 3**	Diffuse free fluid with no distant air (no perforation)					41	59
Stage 4**	Diffuse free fluid with distant air (persistent perforation)					41	59

\* WSES acute diverticulitis working group, \*\* Stages 3 and 4 were unified in the survey to assess the peritonitis approach and avoid differences in interpretation (amount of free air, location, etc.).

TABLE 7: USE OF ANALGESICS IN OUTPATIENT MANAGEMENT OF AUCD

Analgesic use	n=61	% Total
None	26	42,60%
Regular	28	45,90%
Selective	7	11,50%

TABLE 8: USE OF ANTIBIOTICS IN OUTPATIENT MANAGEMENT OF AUCD

Antibiotics use	None	7 days	14 days	21 days	% Total
None	3				4,90%
Regular		32	17		80,30%
Selective		7	2		14,80%
(comorbidities, SIRS)					
Routinely used 7 days and selectively extended to			7	1	13,10%

AUCD: Acute uncomplicated diverticulitis. SIRS: Systemic inflammatory response syndrome.

TABLE 9: MANAGEMENT OF THERAPEUTIC FAILURES OF NON-RESECTIVE TREATMENTS IN ACD

	Surgical resection	Peritoneal lavage	Percutaneous drainage
Percutaneous drainage failure	56,70%	33,30%	10,00%
Peritoneal lavage failure	96,30%	1,90%	1,90%

ACD: Acute complicated diverticulitis.

TABLE 10: TYPE OF SURGICAL RESECTION ACCORDING TO CLINICAL SETTING

Type of surgical resection	Purulent peritonitis	Fecal peritonitis	Elective surgery
Hartmann's procedure	46,70%	77,40%	0
Primary anastomosis	23,30%	3,20%	98,30%
Primary anastomosis with protective ostomy	30%	19,40%	1,70%
TOTAL	100%	100%	100%

TABLE 11: TECHNICAL DETAILS OF SURGICAL RESECTION

Technical details	Emergency surgery n=61 (%)	Elective surgery n=59 (%)
Mechanical bowel preparation	4 (6,6)	50 (84,7)
Laparoscopic approach if feasible	50 (82)	57 (96,6)
Resection to healthy margins of colon and rectum	53 (86,9)	53 (89,8)
Preservation of superior rectal artery	5 (8,2)	13 (22)
Regular mobilization of splenic flexure	24 (39,3)	31 (52,5)
Regular anastomosis assessment with air leak test	35 (57,4)	54 (91,5)
Primary anastomosis, even in fecal peritonitis in optimal conditions	15 (24,6)	NA

NA: Not applicable. That option was not given for that question.

TABLE 12: INDICATION OF COLONOSCOPY AFTER FAVORABLE RESPONSE

Indication	Outpatient management	Percutaneous drainage	Peritoneal lavage
Regular	38,30%	29,80%	20,40%
In case of first episode or not recent colonoscopy	28,30%	70,20%	NA
Not necessary, to follow CCR screening protocol	33,30%	NA	NA

NA: Not applicable. That option was not given for that question.

TABLE 13: INDICATION OF ELECTIVE SURGERY AFTER FAVORABLE RESPONSE

Indication	Outpatient management	Percutaneous drainage	Peritoneal lavage
Agreed with the patient	NA	61,00%	NA
Regular	NA	3,40%	48,10%
Selective (patient's factors)	63,90%	35,60%	NA
Patients < 50 years	1,60%	NA	NA
Never	34,40%	NA	NA

NA: Not applicable. That option was not given for that question.

**Definition of suspected AD**

- \*Abdominal pain, spontaneous and under palpation in lower left quadrant (WSES, EAES-SAGES).
- \*Absence of vomiting and previous history of diverticulitis (Holland).
- \*C-reactive Protein >50mg/L (WSES).

**Diagnostic protocol and severity assessment**

- \*Clinical diagnosis is not enough to make diagnosis nor indicate treatment.
- \*Incorporate C-reactive Protein (EAES-SAGES).
- \*CT is the best test (Denmark, ASCRS, Italy, WSES, Japan and EAES-SAGES).

Graphic 1: Summary of international guidelines. Diagnosis and severity of acute diverticulitis (AD).

**AUCD, Hinchey 0-Ia**

- \*For SIRS or immunosuppression all guidelines recommend antibiotics.
- \*For immunocompetent patients the vast majority advise omitting antibiotics under proper control. Outpatient regimen is acceptable.

**Hinchey Ib-II**

- \*Antibiotics are the first-line treatment for abscesses; percutaneous drainage is indicated for large abscesses (>3-4cm), those that do not resolve with antibiotics, and/or in the presence of clinical deterioration.
- \*Emergency surgery: indicated when non-operative treatments have been exhausted, or in case of no clinical improvement some guidelines explicitly recommend surgical resection.
- \*Free pericolic air without contrast media extravasation: in stable patients antibiotics are indicated.
- \*Distant free air: antibiotics are initially indicated in selected patients, with strict monitoring to detect therapeutic failures.

**Hinchey III-IV**

- \*All the guidelines indicate emergency surgery as a treatment for peritonitis.
- \*Laparoscopic peritoneal lavage: although many guidelines advise against it, the most recent accept it as a valid treatment for Hinchey III, in selected cases and with well-trained hands.
- \*Surgical resection: Recommended in Hinchey IV by all guidelines. There is controversy over whether or not to perform primary anastomosis with or without a protective ostomy. In summary, in appropriate patients perform primary anastomosis, and in unstable patients perform Hartmann's procedure or damage control surgery.
- \*It is recommended to limit the resection to the inflamed bowel and not to mobilize the splenic flexure if Hartmann's procedure is decided.
- \*Some guidelines recommend the laparoscopic approach in selected cases, in well-trained hands.

Graphic 2: Summary of international guidelines. Treatment according to severity. Modified Hinchey's classification. AUCD: Acute uncomplicated diverticulitis. SIRS: Systemic Inflammatory Response Syndrome.

**AUCD, Hinchey 0-Ia**

- \*For SIRS or immunosuppression all guidelines recommend antibiotics.
- \*For immunocompetent patients the vast majority advise omitting antibiotics under proper control. Outpatient regimen is acceptable.

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- \*Free pericolic air without contrast media extravasation: in stable patients antibiotics are indicated.
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- \*It is recommended to limit the resection to the inflamed bowel and not to mobilize the splenic flexure if Hartmann's procedure is decided.
- \*Some guidelines recommend the laparoscopic approach in selected cases, in well-trained hands.

Graphic 3: Summary of international guidelines. Management after overcoming the acute episode. ACD: Acute complicated diverticulitis. AUCD: Acute uncomplicated diverticulitis.

TABLE 14: RELEVANCE SCORE TO AVOID RECURRENCE

Indication	Mean relevance score*
High-fiber diet	7.4
Laxatives	2.5
To avoid seeds	2.8
To avoid NSAIDs or aspirin	3.2
Mesalazine	3.6
Rifaximine or other non absorbable antibiotics	4.6
Probiotics	4.3
Regular physical activity	6.1
Actividad física rutinaria	6,1

\* Relevance score: 1 definitively not relevant, 9 definitively relevant.

logy used in their preparation was notable, despite mentioning for the most part the GRADE system (Grading of Recommendations, Assessment, Development and Evaluation) as the method used.<sup>19-22</sup> in this system, the recommendations originate from a clear question that should include 4 components:

1. Patients
2. An intervention
3. A comparison
4. An interesting result

As an example, in the most recent guidelines the questions have this structure:

"What are the optimal nonsurgical strategies in the management of AUCD?"<sup>14</sup>

"Is antibiotic therapy effective for diverticulitis without abscesses or perforation?"<sup>13</sup>

According to GRADE it would be:

What is the effect in?

1. Immunocompetent patients with AUCD
2. The use of antibiotics
3. Compared to not using them

TABLE 15: CONSENSUS STATEMENTS AND APPLICATION OF THE GUIDELINES

	Responses	Agreement with the guidelines
The diagnosis and evaluation of the patient with acute diverticulitis require complementary studies. The clinical presentation is not sufficient.	82	Yes
CT is the best imaging study.	78,7	Yes
CT should be requested with oral contrast media.	72,1	Not evaluable
CT should be requested with IV contrast media.	88,5	Not evaluable
Uncomplicated diverticulitis (Stage 0) is routinely treated with antibiotics (adding up outpatient and in-hospital treatment).	95,5	No
Outpatient treatment requires routine antibiotics.	80,3	No
The presence of pericolic air bubbles or a small amount of pericolic fluid without abscess within 5 cm of the inflamed segment (Stage 1a) requires hospitalization and IV antibiotics.	80,3	Yes
In the event of laparoscopic lavage failure surgical resection is indicated.	96,3	Not evaluable
In case of fecal peritonitis the procedure of choice is the Hartmann procedure.	77,4	Not evaluable
In elective surgery the procedure of choice is the primary anastomosis.	98,3	Yes
In elective surgery, systematic mechanical bowel preparation is mandatory.	84,7	Yes
In elective surgery the laparoscopic approach for resection is preferable, if feasible.	96,6	Yes
In elective surgery, resection to healthy margins of the colon and rectum is mandatory.	89,8	Yes
In elective surgery, systematic leak assessment of the anastomosis is mandatory.	91,5	Yes
In emergency surgery the laparoscopic approach for resection is preferable, if feasible.	82	Yes
In emergency surgery, resection to healthy margins of the colon and rectum is mandatory.	86,9	Yes
After a favorable response to percutaneous drainage, colonoscopy is indicated only if it is the first episode or the patient does not have recent colonoscopy.	70,2	Yes

4. In terms of reduced morbidity and mortality, accelerated healing, progression to abscesses or peritonitis, adverse effects, antibiotic resistance, availability and costs?

There are also other aspects to consider when determining the strength of the recommendation. Namely:

1. Balance between desirable and undesirable effects
2. Quality of evidence
3. Values and preferences of the population (doctors and patients)
4. Costs (allocation of resources).

These last issues make it difficult to extrapolate international guidelines to our local area.

## CONCLUSION

If we consider the low evidence of scientific papers, the

poor methodology used in international guidelines to prepare questions and recommendations, and the need for local data on costs and preferences, the need for begin our research, either from our institution or any other, becomes evident. The aim is advancing towards the realization of national guidelines that consider the realities and resources of each region, with the ultimate objective of validating through consensus the recommendations for proper management of diverticulitis in our environment.

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## COMMENT

The prevalence of diverticular disease has increased steadily in recent decades, probably due to the development and improvement of diagnostic techniques, and the aging of the population. Its therapeutic approach also mutated in this period, constantly generating controversies regarding the premises that until a few years ago few dared to question.

The present study describes the results of a national survey that reflects the lack of consensus that exists in our environment on various therapeutic aspects of the disease, a fact that also happens at the international level. It should be noted, in contrast to what is recommended in international guidelines, that in Argentina the use of antibiotics is more frequently indicated for uncomplicated diverticular disease. On the other hand, despite the heterogeneity of the survey's results, it is notable that more and more professionals consider peritoneal lavage as an option, and primary anastomosis with or without protection for complicated diverticulitis with failure of non-surgical treatment.

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