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ORIGINAL SCIENTIFIC REPORT

IPOD Study: Management of Acute Left Colonic Diverticulitis in Italian Surgical Departments

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Abstract

Background In recent years, the emergency management of acute left colonic diverticulitis (ALCD) has evolved dramatically despite lack of strong evidence. As a consequence, management strategies are frequently guided by surgeon's personal preference, rather than by scientific evidence. The primary aim of IPOD study (Italian Prospective Observational Diverticulitis study) is to describe both the diagnostic and treatment profiles of patients with ALCD in the Italian surgical departments.

Methods IPOD study is a prospective observational study performed during a 6-month period (from April 1 2015 to September 1 2015) and including 89 Italian surgical departments. All consecutive patients with suspected clinical diagnosis of ALCD confirmed by imaging and seen by a surgeon were included in the study. The study was promoted by the Italian Society of Hospital Surgeons and the World Society of Emergency Surgery Italian chapter.

Results Eleven hundred and twenty-five patients with a median age of 62 years [interquartile range (IQR), 51–74] were enrolled in the IPOD study. One thousand and fifty-four (93.7%) patients were hospitalized with a median duration of hospitalization of 7 days (IQR 5–10). Eight hundred and twenty-eight patients (73.6%) underwent medical treatment alone, 13 patients had percutaneous drainage (1.2%), and the other 284 (25.2%) patients underwent surgery as first treatment. Among 121 patients having diffuse peritonitis, 71 (58.7%) underwent Hartmann's resection. However, the Hartmann's resection was used even in patients with lower stages of ALCD (36/479; 7.5%) where other treatment options could be more adequate.

Conclusions The IPOD study demonstrates that in the Italian surgical departments treatment strategies for ALCD are often guided by the surgeon's personal preference.

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Introduction

Diverticulitis is the most usual complication of diverticulosis, affecting 15–25% of patients [1]. It does include a variety of conditions, ranging from localized diverticular inflammation to fecal peritonitis. It is usually classified in uncomplicated and complicated according to the extension of the infection process to the peritoneum [2].

In recent years, the emergency management of acute left colon diverticulitis (ALCD) has evolved dramatically despite the lack of strong evidence [3]. As a consequence, management strategies are frequently guided by the surgeon's personal preference [4], rather than by scientific evidence.

The aim of the IPOD study (Italian Prospective Observational Diverticulitis study) is to describe the management profiles of patients with ALCD based on data collected over a 6-month period (from April 1 2015 to October 1 2015) from 89 Italian surgical departments. The study was promoted by the Italian Society of Hospital Surgeons (ACOI) and the World Society of Emergency Surgery (WSES) Italian chapter.

Given the broad distribution of the participating medical centers, the study may give a description of the management profiles of ALCD in Italy.

Method

Aim

The primary aim of the IPOD study is to describe the diagnostic and treatment profiles of patients with ALCD in Italian surgical departments.

Study design

This prospective multicenter observational study was performed in 89 Italian surgical departments over a 6-month period (April 1 2015–October 1 2015). All consecutive patients with imaging diagnosis of ALCD were included in the study.

The center coordinator of each participating medical institution collected and compiled clinical data in an online case report database.

The collected data included the following: age, sex, previous episodes of diverticulitis (no episodes, one episode, two or more episodes), comorbidities (immunosuppression, severe cardiovascular disease), sepsis at admission, radiological diagnosis (ultrasound and computer tomography findings), type of management (no treatment, antimicrobial therapy, percutaneous drainage or surgical procedures, admission to Intensive Care Unit (ICU), duration of hospitalization, re-operation and mortality. All patients were monitored until they were discharged or transferred to another ward.

Staging according to WSES classification [2] was requested for all patients undergoing CT scan at admission:

Uncomplicated

Stage 0 Diverticula, thickening of the wall or increased density of the pericolic fat.

Complicated

Stage 1 A Pericolic air bubbles or little pericolic fluid without abscess (within 5 cm from inflamed bowel segment)
Stage 1 B Abscess ≤4 cm
Stage 2 A Abscess >4 cm
Stage 2 B Distant air (>5 cm from inflamed bowel segment)
Stage 3 Diffuse fluid without distant free air (no hole in colon)
Stage 4 Diffuse fluid with distant free air (persistent hole in colon)

Staging according to the Hinchey classification was requested for all patients undergoing surgical intervention [5]:

Stage 1 Pericolic abscess
Stage 2 Pelvic, intra-abdominal, or retroperitoneal abscess
Stage 3 Generalized purulent peritonitis
Stage 4 Generalized fecal peritonitis

The study met the standards outlined in the Declaration of Helsinki and Good Epidemiological Practices.

Differences in daily surgical practice of each center were kept as such. Each center followed its ethical standards. In each center, the coordinator collected and filled in the data in an online case report form. The study was monitored by a coordinating center, which processed and

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verified missing or unclear data submitted to the central database.

Bivariate analyses were performed to analyze the association between risk factors and in-hospital mortality using a two-sided Chi-square test or a two-sided Fisher's exact test, if the expected value of a cell was <5. The level of significance was set at $P < 0.01$. Data were analyzed using Epi Info version 7.2.0.1 software package.

The study protocol was approved by the board of the Italian Society of Hospital Surgeons (ACOI) and the World Society of Emergency Surgery (WSES) Italian chapter, and the study was conducted under their supervision. The board of the Italian Society of Hospital Surgeons (ACOI) and the World Society of Emergency Surgery (WSES) Italian chapter grant the proper ethical conduct of the study.

Inclusion criteria

All patients with suspected clinical diagnosis of ALCD confirmed by imaging and seen by a surgeon were included in the study.

Study protocol provided that all patients with a clinical suspicion of ALCD performed CT scan. Intravenous contrast-enhanced multislice CT scan diagnosis was requested. However, in patients with contraindications to CT scanning such as renal insufficiency, contrast allergy or hemodynamic instability needing emergency surgery abdominal ultrasound was considered sufficient to enroll the patients in the study. A requirement for inclusion was that patients needed to be seen by a surgeon to be considered eligible for the study.

Results

Patients and diagnosis

During the study, 1135 cases were collected, 10 cases did not meet the inclusion criteria because of incomplete submission. A total of 1125 patients were enrolled in the IPOD study; they included 553 (49.2%) women and 572 (50.8%) men, with a median age of 62 years [interquartile range (IQR), 51–74]. One thousand and fifty-four (93.7%) patients were admitted to the hospital, with a median duration of hospitalization of 7 days (IQR 5–10). Seventy-one patients (6.3%) were treated as outpatients.

Six hundred and seventy-six (60.1%) patients had no previous episodes of ALCD, 230 (20.4%) patients had one previous episode of ALCD and 219 (19.5%) patients 2 or more previous episodes. Sixty-one (5.4%) patients were immunosuppressed, and 127 (11.3%) patients suffered from a severe cardiovascular disease.

Table 1 Radiological diagnosis

Radiological diagnosis	Patients no 1125 (100%)
Abdominal X-ray	42 (3.7%)
Abdominal X-ray, CT	189 (16.8%)
Abdominal X-ray, US	52 (4.6%)
Abdominal X-ray, US, CT	123 (10.9%)
CT	470 (41.8%)
US	75 (6.7%)
US, CT	145 (12.9%)
Not reported	29 (2.6%)

US ultrasound, *CT* computerized tomography

Radiological examinations performed by patients are illustrated in Table 1. Nine hundred and twenty-seven patients (82.4%) underwent an abdominal CT scan.

In all patients who underwent CT scan, the WSES staging was recorded: Three hundred and twenty-seven (35.3%) were uncomplicated, while 263 (28.4%) had Stage 1a, 94 (10.1%) Stage 1b, 75 (8.1%) Stage 2a, 47 (5.1%) Stage 2b, 43 (4.6%) Stage 3 and 78 (8.4%) Stage 4.

Among all 284 patients undergoing surgical treatment, Hinchey staging was also recorded in 267 patients: Fifty-six (19.7%) patients had Stage 1, 50 (17.6%) Stage 2, Stage 3 82 (28.9%) and 79 (27.8%) Stage 4. In 17 patients, (6.0%) Hinchey stage was not reported.

Management

Among all patients enrolled in the IPOD study, 828 (73.6%) underwent medical treatment alone, 13 (1.2%) patients had percutaneous drainage, and the other 284 (25.2%) patients underwent surgery as first treatment.

Initial treatment according to the WSES staging is described in Table 2.

Sixty patients underwent a second procedure during the same hospitalization because of a postoperative complication or a worsening of the initial stage after conservative treatment.

Six patients performed a damage control surgery by an "open abdomen procedure" and underwent abdominal re-explorations.

The median interval of time between the first and the second procedure was 8 days (IQR 5–14).

Elective sigmoid resection during a second hospitalization was planned at discharge in 162 patients with acute diverticulitis treated without resection (18.7%, 162/868).

A total of 1017 (1017/1125, 90.4%) patients received antimicrobial therapy during the hospitalization, which was in 796 (796/1017, 78.3%) patients a monotherapy. One hundred and one patients (101/1125, 9.0%) were treated

Table 2 Initial treatment according to WSES staging

	Uncomplicated	Stage 1a	Stage 1b	Stage 2a	Stage 2b	Stage 3	Stage 4
Patients	327 (100%)	263 (100%)	94 (100%)	75 (100%)	47 (100%)	43 (100%)	78 (100%)
No treatment	9 (2.8%)	2 (0.8%)					
Anti-inflammatory therapy alone	6 (1.8%)	2 (0.8%)	2 (2.1%)				
Antimicrobial therapy alone	292 (89.3%)	225 (85.6%)	65 (69.1%)	28 (37.3%)	17 (36.2%)	3 (7.0%)	
Percutaneous drainage			1 (1.1%)	11 (14.7%)			
Laparoscopic lavage and drainage		3 (1.1%)	6 (6.4%)	3 (4.0%)	2 (4.3%)	8 (18.6%)	5 (6.4%)
Open lavage and drainage		7 (2.7%)	1 (1.1%)	1 (1.3%)	3 (6.4%)	2 (4.7%)	
Laparoscopic colonic resection	8 (2.4%)	7 (2.7%)		5 (6.7%)	1 (2.1%)	1 (2.3%)	3 (3.8%)
Open colonic resection	12 (3.7%)	10 (3.8%)	10 (10.6%)	17 (22.7%)	11 (23.4%)	7 (16.3%)	16 (20.5%)
Laparoscopic Hartmann resection			3 (3.2%)			1 (2.3%)	1 (1.3%)
Open Hartmann resection		5 (1.9%)	5 (5.3%)	10 (13.3%)	13 (27.7%)	20 (46.5%)	49 (62.8%)
Paul–Mikulicz exteriorization		2 (0.8%)	1 (1.1%)			1 (2.3%)	4 (5.1%)

with carbapenems and 13 (13/101, 12.9%) of them had an uncomplicated diverticulitis, according to the WSES Staging (Table 3).

Outcome

Among all patients, 71 (6.3%) were managed as outpatients, 1054 (93.7%) patients were admitted to the hospital, and the median duration of hospitalization was 7 days (IQR 5–10). In the early postoperative phase, 152 (13.5%) patients were admitted to ICU.

The overall mortality rate was 1.4%. Characteristics of patients who died during the hospital stay are reported in Table 4.

Bivariate analyses were performed to analyze the association between risk factors and in-hospital mortality using a two-sided Chi-square test or a two-sided Fisher's exact test.

Distribution of predictive variables of in-hospital mortality is reported in Table 5.

Independent variables associated with mortality according to the multinomial logistic regression are reported in Table 6.

Table 3 Antimicrobial therapy administered during hospitalization in 1017 patients

Patients receiving antibiotics	*n* 1017
Metronidazole	586 (57.6%)
Piperacillin/tazobactam	318 (31.3%)
Ciprofloxacin	144 (14.2%)
Amoxicillin/clavulanic acid	117 (11.5%)
Ampicillin/sulbactam	81 (8.0%)
Ceftriaxone	70 (6.9%)
Meropenem	44 (4.3%)
Imipenem/cilastatin	34 (3.3%)
Ertapenem	23 (2.3%)
Rifamixin	17 (1.7%)
Gentamicin	13 (1.3%)
Amikacin	12 (1.2%)
Levofloxacin	11 (1.1%)
Ceftazidime	5 (0.5%)
Tigecycline	5 (0.5%)
Cefepime	1 (0.1%)

The overall number of administered antibiotics (1481) is different from the number of patients receiving antibiotics (1017) since 221 patients received a combined antimicrobial therapy

n number of patients receiving antibiotic treatment

Discussion

Some interesting aspects have emerged from the results of the IPOD study about the management of ALCD in the Italian surgical departments.

CT abdomen has been the most used radiological examination in diagnosing acute diverticulitis (82.4%). This is in keeping with the literature evidence, because CT imaging has become the standard radiological examination in patients with ALCD. In fact, CT imaging with intravenous contrast has sensitivity and specificity reported as high as 98 and 99% [6].

It is well known that the utility of CT imaging may go beyond accurate diagnosis of diverticulitis and the grade of severity on CT may drive treatment planning of patients with acute diverticulitis.

For the past three decades, the Hinchey's classification has been the most commonly used in the international

Table 4 Characteristics of patients who died during hospitalization

Pt.	Age	Sex	Previous episodes	Comorbidities	Clinical conditions at admission	WSES stage	Hinchey stage	First treatment	Time of death post-hospital admission (days)	Cause of death
1	84	F	No	SCD	Severe sepsis	Stage 4	4	OHR	25	SRM
2	79	M	No		Septic shock	Stage 4	4	PME	3	SRM
3	81	F	No	SCD, IS	Severe sepsis	Stage 4	3	OHR	2	SRM
4	84	F	1	SCD	Stable	Stage 2b		AMT	2	SRM
5	65	M	>1	SCD, IS	Septic shock	Stage 4	3	OCRS	50	SRM
6	84	M	No	SCD	Stable	Stage 2b		AMT	9	SRM
7	82	F	1	IS	Severe sepsis	Stage 4	4	OHR	6	SRM
8	83	F	No		Severe sepsis	Stage 4	4	OHR	14	SRM
9	84	F	No	SCD	Stable	Stage 4	4	OCRS	2	SRM
10	69	M	No		Septic shock	Stage 4	4	OCRS	40	SRM
11	78	F	No	SCD,IS	Septic shock	Stage 4	4	OCRS	15	SRM
12	51	F	>1		Stable	Stage 0	4	OCRS	25	SRM
13	84	M	No	SCD	Septic shock	Stage 4	4	OCR	7	SRM
14	85	F	>1	SCD	Severe sepsis	Stage 2b	3	OHR	4	SRM
15	75	M	No		Stable	Stage 4	3	OHR	10	SRM
16	56	M	>1	SCD, IS	Septic shock	Stage 3	4	OHR	2	SRM

M male, *F* female, *SCD* severe cardiovascular disease, *IS* immunosuppression, *OHR* open Hartmann resection, *PME* Paul–Mikulicz exteriorization, *AMT* antimicrobial therapy (alone), *OCRS* open colonic resection with stoma, *OCR* open colonic resection without stoma, *SRM* sepsis related mortality

literature [5]. However, Hinchey's classification is based on surgical findings and therefore can only be applied to patients who have already been operated. As CT imaging has become a primary diagnostic tool in the diagnosis, staging and decision-making of patients with ALCD, there is a clear need for a CT-based classification being well related to the disease stage and the further therapy. The increasing information provided by CT scans led to several modifications of the Hinchey's classification based on CT preoperative findings [7–10].

A new proposal for a CT-guided classification of left colon acute diverticulitis was published in 2015 [2] by the WSES acute diverticulitis working group.

Outpatient treatment of acute diverticulitis has been highly debated within the medical community [11–14]. The DIVER multicenter randomized clinical trial [14] recently demonstrated that outpatient treatment may be safe and effective in selected patients with uncomplicated ALCD, allowing significant cost savings for the health systems without negatively influencing the quality of life of patients. Data from the IPOD study showed that, among 1125 observed patients, 1054 patients (93.7%) were hospitalized, while only 71 patients (6.3%) were treated as outpatient.

The efficacy of antibiotic use in acute uncomplicated diverticulitis is another controversial issue within the medical community [15–17]. Chabok et al. [16] in a randomized clinical trial demonstrated that antibiotic treatment for acute uncomplicated diverticulitis neither accelerates recovery nor prevents complications or recurrence. In our study, among the 327 patients with WSES stage of uncomplicated diverticulitis, 292 (89.3%) received an antimicrobial therapy.

Approximately 15–20% of patients admitted with acute diverticulitis have an abscess on CT scan [18]. The size of 3–6 cm has been generally accepted (all of low level of evidence) to be a limit between antimicrobial therapy alone versus percutaneous drainage and antimicrobial in the management of diverticular abscesses [18–22].

Percutaneous drainage has the advantage of avoiding urgent operation in patients with large abscesses. It may be used as a "bridge" to elective resection. IPOD study highlights a very low use of percutaneous drainage even for larger abscesses where it should be the first-line treatment [23–25]. Only eleven (14.7%) out of 75 patients having WSES stage 2a (CT findings of abscess larger than 4 cm) underwent percutaneous drainage.

The optimal treatment for ALCD with CT finding of distant extra-luminal air without diffuse fluid is still

Table 5 Distribution of predictive variables and mortality

Variables	Patients *n* 1125 (100%)	Dead *n* 16 (1.4%)	Survivors *n* 1109 (98.6%)	RR	*P* value
Age >80 years	143 (12.7%)	9 (56.3%)	134 (12.1%)	1.06 (1.02–1.11)	<0.01
Previous episodes	449 (39.9%)	6 (37.5%)	443 (39.9%)	1.00 (0.98–1.01)	0.84[a]
Immunosuppression	61 (5.4%)	5 (31.3%)	56 (5.0%)	1.08 (1.00–1.16)	<0.01
Severe cardiovascular disease	127 (11.3%)	10 (62.5%)	117 (10.6%)	1.08 (1.03–1.14)	<0.01
Diagnosis of sepsis					
No sepsis	781 (69.4%)	3 (18.8%)	778 (70.2%)	0.97 (0.95–0.99)	<0.01
Sepsis	296 (26.3%)	2 (12.5%)	294 (26.5%)	0.99 (0.98–1.00)	0.26
Severe sepsis	31 (2.8%)	5 (31.3%)	26 (2.3%)	1.18 (1.01–1.38)	<0.01
Septic shock	17 (1.5%)	6 (37.5%)	11 (1.0%)	1.53 (1.08–2.18)	<0.01
Distant air at CT scan	124 (11.0%)	14 (87.5%)	110 (9.9%)	1.12 (1.06–1.20)	<0.01
WSES staging					
Uncomplicated	327 (29.1%)	1 (6.3%)	326 (29.4%)	0.98 (0.96–0.99)	0.03[a]
Stage 1a	263 (23.4%)	0	263 (23.7%)	0.98 (0.96–0.99)	<0.01
Stage 1b	94 (8.4%)	0	94 (8.5%)	0.98 (0.97–0.99)	0.39
Stage 2a	75 (6.7%)	0	75 (6.8%)	0.98 (0.97–0.99)	0.62
Stage 2b	47 (4.2%)	3 (18.8%)	44 (4.0%)	1.05 (0.98–1.13)	0.04
Stage 3	43 (3.8%)	1 (6.3%)	42 (3.8%)	1.00 (0.96–1.05)	0.54
Stage 4	78 (6.9%)	11 (68.8%)	67 (6.0%)	1.16 (1.06–1.27)	<0.01
Not reported	198 (17.6%)	0	198 (17.9%)	NA	NA
Hinchey staging					
Stage 1	310 (27.6%)	0	310 (28.0%)	0.94 (0.91–0.97)	<0.01
Stage 2	90 (8.0%)	0	90 (8.1%)	0.97 (0.95–0.98)	0.09
Stage 3	88 (7.8%)	5 (31.3%)	83 (7.5%)	1.03 (0.98–1.09)	0.15
Stage 4	63 (5.6%)	11 (68.8%)	52 (4.7%)	1.18 (1.06–1.31)	<0.01
Not reported	574 (51.0%)	0	574 (51.8%)	NA	NA

All *P* values calculated using two-sided Fisher's exact test unless otherwise noted

RR risk ratio, *NA* not applicable

[a] Two-sided Chi-square test

Table 6 Results of multinomial logistic regression for the analysis of variables associated with mortality

Variables	OR	95% CI	*P* value
Age >80	2.40	0.51–11.18	0.27
Severe cardiovascular disease	7.55	1.73–33.05	<0.05
Sepsis	0.29	−1.24–1.09	0.26
Severe sepsis	2.00	0.31–13.02	0.47
Septic shock	4.58	0.63–33.33	0.13
Distant free air at CT scan	10.58	1.79–62.42	<0.05
Hinchey stage 4	4.89	1.12–21.26	<0.05

CI confidence interval, *OR* odds ratio

controversial. Free air on CT has already been reported to be a predictor of failure of non-operative management of ALCD [26], Some authors reported that patients with distant air may be treated by conservative treatment alone in selected cases because it may be associated with failure and may need immediate surgical operation [27, 28]. Among 47 patients having WSES stage 2b (CT findings of distant air without diffuse fluid), 17 (17/47, 36.2%) were treated at the beginning by antimicrobial therapy alone and 6 (6/47, 8.5%) needed a surgical treatment because of deterioration of the clinical conditions. Two of these patients died during hospitalization.

Hartmann's resection is still useful in managing diffuse peritonitis with signs of diverticular perforation. Common use of Hartmann's resection in treating diverticular perforation worldwide is confirmed by a recent Australian study, performed in eight tertiary referral centers with specialized colorectal services [29] and by a population-based retrospective cohort study using administrative discharge data, conducted in Ontario (Canada) [30].

In the IPOD study among 121 patients having WSES stages 3 or 4 (CT findings of diffuse peritonitis with or

without distant air), 71 (58.7%) underwent Hartmann's resection. However, Hartmann's resection was used even for lower stages of ALCD where other treatment options could be more adequate.

In the past years, primary colonic anastomosis, with or without defunctioning stoma, has been debated. In clinically stable patients with no comorbidities, primary resection and anastomosis with or without diverting stoma has been considered also in case of diffuse peritonitis [31], even if it may not be defined as the treatment of choice in diffuse peritonitis [32].

In the IPOD study, 27 patients out of 121 (22.3%) having WSES stages 3 or 4 (CT findings of diffuse peritonitis with or without distant air) underwent sigmoidectomy (23 by open and 4 by laparoscopic approach).

In the past years, some prospective trials have been conducted on laparoscopic lavage and drainage with conflicting results [33–36]. In our study, among the 284 patients undergoing initial surgical treatment, 27 (9.5%) underwent laparoscopic lavage and drainage. There was no mortality related to this procedure. The small number of patients submitted to laparoscopic lavage may be justified by the great debate that is still open on this topic, mainly due to the discrepancy and sometime disappointing results of the latest prospective trials such as SCANDIV, Ladies, and DILALA trials [33–37].

In critical ill patients, damage control surgery with open abdomen (OA) procedure may be helpful in managing them. The OA allows to control any persistent source of infection, preventing abdominal compartment syndrome and deferring definitive intervention and anastomosis until the patient is appropriately resuscitated and hemodynamically stable [38]. In our study, six critically ill patients (12.5% of patients with either severe sepsis or septic shock) were treated with an open abdomen procedure and they all were Hinchey stage 4.

The IPOD study underlines a critical issue in antimicrobial treatment for patients with ALCD because of the high number of patients treated by anti-*Pseudomonas* carbapenems (imipenem, meropenem) although they almost all have a community-acquired infection.

In this study, among 1017 (90.4%) patients who received antimicrobial therapy, one hundred and one patients (9.9%) were treated with carbapenems and 13 (12.9%) of them had an uncomplicated diverticulitis, according to the WSES Staging.

Carbapenems have been widely used in many countries due to the increasing rate of ESBL-producing *Enterobacteriaceae* with a consequent impact on the emergence of resistance to these antimicrobials, especially in *K. pneumoniae* [39]. The recent and rapid spread of carbapenem-resistant *K. pneumoniae* [40–42] should pose a serious challenge for clinicians and a preserving carbapenems-approach should always be mandatory in treating ALCD that are generally community-acquired infections. Therefore, the use of carbapenems should be optimized in terms of indication and exposure.

In the last decade, indications for elective sigmoid resection after recovery from uncomplicated acute diverticulitis have changed [23–25]. Some authors have shown that more episodes of uncomplicated AD do not increase the risk of complicated recurrences and the need for emergency operative management and that the highest risk of free perforation is at the time of the first episode of disease [43, 44]. Therefore, routine "prophylactic" elective resection should be no longer recommended after an acute episode of uncomplicated ALCD [45]. Despite current recommendations of more restrictive indications for elective surgery, in the past years there has been a trend toward an increased use of elective operations for ALCD [26]. In IPOD study, an elective resection, during a second hospitalization, was planned in 162 patients (18.7%) with acute diverticulitis treated without resection. One hundred and nine (67.3%) of these patients had a mild disease, within stage 1b, at low risk of severe recurrence. Furthermore, 64 patients (64/162, 39.5%) reported no previous episodes of ALCD. Elective surgery was planned at patient discharge and therefore as prophylactic surgery, apparently not related to persistent symptoms. These data on the elective surgery of the present study show the most significant deviation of the Italian surgical policy from the actual guidelines.

Given the broad distribution of the participating medical centers, IPOD study may give a detailed description of the management profiles of acute diverticulitis in Italian surgical departments.

Nonetheless, we must acknowledge several potential limitations of this study. In fact, the study design, even if data were carefully collected, includes only cases managed in surgical departments. In some hospitals, acute left colon diverticulitis, especially of the early stages, is also managed in medical departments and for some participating centers the reported cases did not represent all cases of left acute diverticulitis.

The IPOD study demonstrated that in Italy ALCD treatment strategy is often guided by the surgeon's personal preference.

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