

## Is early enteral nutrition dangerous in acute non surgical complicated diverticulitis ? About 25 patients fed with oral fiber free energetic liquid diet

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### Abstract

**Background and study aims :** Complicated Acute Colonic Diverticulitis (ACD) is usually treated by parenteral way thus keeping the bowel at rest. To date there are no clear recommendations regarding the route of nutrition administration. We study the safety of early feeding by oral energetic fiber-free liquid diet in non-surgical complicated ACD patients.

**Patients and methods :** From February 2008 to October 2011, 25 patients were admitted with complicated ACD and took part in this prospective study. Surgical and medical assessments were performed at admission. Initial treatment was given with perfusion, intravenous antibiotics and hydric diet. Within 72 hours of admission, antibiotic therapy was switched to oral administration for 5 up to 15 days depending on the progression of the disease. At the same time the patient received oral liquid fiber-free feeding. Solid but fiber-free diet was introduced 24h hours before discharge.

**Results :** 25 cases of ACD were complicated with covered perforation and/or abscess. Mean hospitalisation time was 10.4 days. 23 cases had good recovery and discharged, while 1 case progressed to colonic stenosis during hospitalisation, requiring a sigmoidectomy with a one-time anastomosis with good recovery. One patient relapsed his abscess during hospitalisation despite CT guided drainage and required sigmoidectomy with transient ileostomy. The mean daily treatment and nutrition cost for the non-surgical 23 patients was 30 euros.

**Conclusions :** Early enteral nutrition in complicated ACD is feasible, not harmful, and reduce both, mean hospitalization time and treatment cost. Further studies comparing enteral with parenteral nutrition are necessary to confirm our hypothesis. (*Acta gastroenterol. belg.*, 2013, 76, 235-240).

**Key words :** non-surgical complicated diverticulitis, colonic abscess, enteral nutrition, conservative treatment.

### Background and Study aims

Acute Colonic Diverticulitis (ACD) is a common disease in gastroenterology. Guidelines about surgical indications and operative treatment exist, but clear guidelines for its medical treatment and nutritional management are lacking. Thus, treatment and nutrition in non-surgical ACD vary widely.

When dealing with a mild uncomplicated ACD, patients could be treated either as outpatients or inpatients depending on their symptoms. Oral fiber-free diet is prescribed and accepted by most physicians without recommendations. In complicated ACD, the hypermetabolic state requires an adequate nutritional support, and doubt about the optimal route of nutrition exists because of the severity of the complicated disease and the lack of data concerning the route of nutrition. Up to now, bowel rest

has been proposed during the acute phase and parenteral nutrition often remains the initial nutrition route in severe complicated non-surgical ACD, both to support metabolic demand and to put the bowel at rest, this without proven data. Some authors advocate it as the harmless route of nutritional support, while waiting for the resolution of the acute inflammatory process (1). However, this route may offer higher risks of bowel dysfunction and promotes bacterial translocation which can be resolved by early enteral nutrition. Moreover some authors advocate that enteral nutrition is beneficial when given earlier by stimulating the immune system and enhancing systemic inflammatory response to aggression.

If not contraindicated, enteral feeding remains the only route which maintains the intestinal integrity and hence decreases the risk of bacterial translocation across the gut (2).

Moreover, following ESPEN guidelines, the non-surgical complicated ACD group are not among the contraindications to enteral nutrition (3,4).

There may therefore be a place for enteral fiber-free energetic liquid diet in non-surgical complicated ACD.

We performed a feasibility study to assess the efficiency, safety and harmless use of early enteral nutrition in complicated non-surgical ACD. Economic factors (mean hospitalization stay and costs) have also been considered.

### Patients and methods

#### Patients

Were included in the study patients who presented clinical, laboratory and CT-scanning features of complicated non-surgical ACD, such as lower abdominal pain, tenderness, leucocytosis ( $> 10.000 \text{ mm}^3$ ) and/or CRP  $> 12 \text{ mg/dL}$ . The patients included in the study were aged between 38 and 85 years (mean age : 62-years-old  $\pm 10$  years). Patients presenting risks factors that could worsen the progression of the ACD, and patients to

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Fig. 1. — Uncomplicated ACD showing a wall thickening larger than 5 mm and abnormalities of pericolic fat.

whom conservative treatment was no longer possible were excluded, according to the modified Hinchey Classification (Fig. 1) (5).

Patients on Glucocorticoids, immunomodulators or chemotherapy ; those with major renal failure, or transplant patients, or with HIV infection, who present with diverticulitis have much less successful response to medical treatment and higher postoperative morbidity and mortality, and were therefore excluded(6-8).

The Ethics committee of the CHWapi Notre Dame Tournai approved our study and informed consent was taken from all patients.

#### *Radiological features*

Computerized Tomography of the abdomen and pelvis seems to be the most appropriate imaging modality in the assessment of suspected diverticulitis (Level III, grade of recommendations A) (9). It has been reported to have > 90 percent of sensitivity and specificity with a low false positive rate (9,10). It helps not only to establish the diagnosis, but also to identify patients who are at high risk of developing complications or recurrence (9-13). This is correlated to the detection of extracolonic contrast or gas on CT. Indeed, bubbles of gas smaller than 5mm in diameter are not predictive of failure of conservative treatment, while larger pockets correlated with an unfavourable outcome (13).

To allow selection of patient that will most likely respond to conservative treatment, we make a difference between mild and severe non-surgical ACD, based on scientific references (9-14). The uncomplicated ACD is related to ACD with a wall thickening larger than 5 mm and abnormalities of pericolic fat. It is widely recognized as a mild disease with a good prognosis which in the majority of cases can be treated orally and therefore is not included in our study.

Many studies defined severe or complicated ACD when there is abscess or extraluminal air or gastro-



Fig. 2. — CT of a complicated ACD showing a wall thickening larger than 5 mm with small extraluminal gas bubble of maximum 5 mm of diameter.



Fig. 3. — Complicated ACD with pericolic abscess of maximum 4 cm of diameter.

grafin (13-16). When there is a pericolic abscess larger than 4 cm of diameter, the requirement of percutaneous drainage is according to the physician's evaluation.

#### *Medical management*

At admission, the diagnosis was always confirmed by Computerized Tomography (CT).

Initial treatment was given with Glucose 5% perfusion and intravenous antibiotics. Antibiotics were selected to treat the gram-negative rods and anaerobic bacteria, with Ciprofloxacin – 400 mg BID – and Metronidazole – 1500 mg/day. Hydric diet lasted maximum 48 hours. At

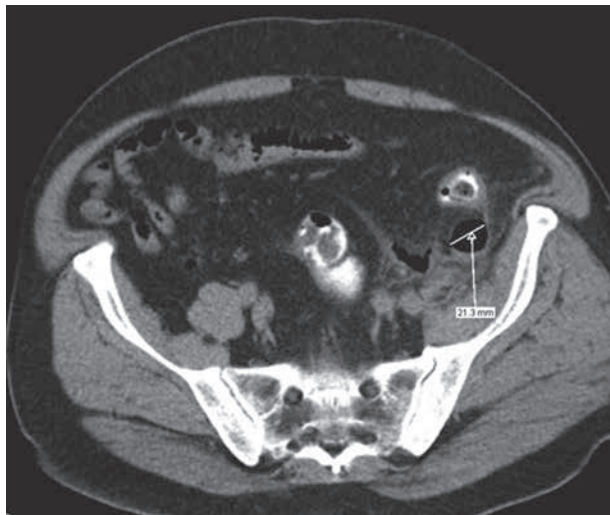


Fig. 4. — CT of ACD with small extraluminal gas pocket of 21 mm in diameter.

day 3 after admission, the antibiotherapy was switched from intravenous to oral administration for 5 up to 10 days. At the same time, depending on the severity of ACD and the progression of the disease, patients would already receive oral liquid fiber-free diet on the second day. Energy requirements had to be determined with an added stress factor of 1.5. Intake target of calorie/nitrogen was therefore  $20\text{-}30 \times 1.5$  kcal/kg/day reaching 35-40 kcal/kg/day. We proposed drinkable bottles with 400 kcal and 20 g of protein each. Patients had to drink approximately 4 drinkable bottles of 200 ml of fiber-free energetic and high protein drink per day (Fresubin® 2 kcal drink). Laboratory tests for leucocytosis and CRP were checked every day for the first 48 hours and then every other day. If the patient had a good evolution, solid but low-fiber diet was introduced 24 h before discharge. If patient developed fever or abdominal pain with elevation of the CRP, the antibiotics were switched to Piperacilline-Tazobactam IV 4 g QDS, until better bio-clinical evolution.

On day 15, discharged patients had further laboratory tests and an outpatient appointment to check their favourable evolution. Computerized tomography and colonoscopy were performed after one month to exclude any other etiology of bowel inflammation, such as malignancy.

## Results

Twenty five patients with non-surgical complicated ACD have been included from February 2008 to June 2011.

Ten patients had complicated ACD with a wall thickening larger than 5 mm and abnormalities of pericolic fat, and small extraluminal gas bubble of maximum 5 mm of diameter. They all had good recovery and were discharged without surgery and were free of symptoms.

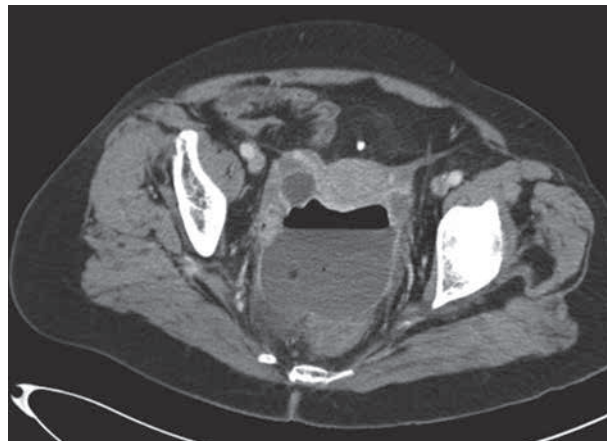


Fig. 5. — ACD with a large pericolic abscess

Five patients with wall thickening and pericolic abscess of maximum 4 cm of diameter also presented an uneventful outcome.

One patient with wall thickening and extraluminal gas pocket larger than 5 mm of diameter progressed to colonic stenosis during his hospitalization requiring a sigmoidectomy. This was done by a single-stage resection with primary anastomosis despite oral refeeding. The enteral nutrition did not worsen the recovery of the patient. No other colonic complication had been considered.

Nine patients had large abscesses (larger than 4 cm diameter) at admission.

The first one benefited from a percutaneous drainage 4 days after his admission (Fig. 6). The CRP level was 24.1 mg/dl. Liquid refeeding started 24 hours after admission. He presented good recovery after ten days of antibiotic therapy and abscess drainage. He was discharged after 16 days, when CRP was 0.6 mg/dl. Patient underwent successful conservative treatment and the complete healing of his abscess was confirmed on a follow-up CT (Fig. 7). He underwent elective surgery a few months later.

Seven patients had good recovery without surgery. Five of them benefit from CT guided percutaneous drainage, and 2 with only antibiotics treatment, because radiological drainage was technically not feasible.

The last patient progressed to colonic stenosis. He benefited from a single-stage sigmoidectomy with primary anastomosis, with good outcome.

Mean hospitalization stay for the 25 complicated ACD patients was 10,4 days.

Mean daily cost for medical management and feeding was 30 euros (excluding surgery).

## Discussion

Approximately 30 percent of the population acquire colonic diverticula by the age of 60. Almost 60 percent of





Fig. 6. — Percutaneous CT guided drainage of the stage E pericolic abscess.

those aged 80 years and over are affected. 10 to 25 percent of those will develop diverticulitis (13). Left Colonic Diverticular Disease is common in western countries, accounting for about 130.000 hospitalisations yearly in the USA (14). When diverticulitis occurs, inflammation can be either localised to the colonic wall with fat infiltration, or complicated by an abscess, a covered perforation, a fistula or a free perforation with pneumoperitoneum and/or stenosis. The Modified Hinchey classification (Fig. 1) is still helpful to differentiate between the stages of diverticulitis (5), but it is rather for surgical purpose. Surgical management of ACD is well documented and uniform, but all stages don't require surgical procedure. Less than 10% of the admitted ACD cases require surgical treatment during the same admission (17). In spite of the high incidence of the non-operative ACD, medical and especially nutritional management ACD are poorly documented in the literature and there are still no uniform guidelines.

Despite the absence of clear recommendations in managing ACD, in mild non complicated stage A ACD, it seems evident that enteral free-fiber diet is an appropriate mean of nutrition. On the other side, controversial opinions in the management of the complicated ACD persist because of the absence of recommendations.

Our study permitted to select only patients who presented complicated ACD and didn't require surgical management at admission according to the Modified Hinchey Classification. In fact to better assess the severity of ACD, we divided it between complicated and uncomplicated ACD. Therefore, we needed specific radiologic criteria in addition to the clinical and biological selection on admission. CT scanner with a water-soluble contrast enema is known as the method of choice to confirm the diagnosis and perform percutaneous drainage (15,18,19,20,21). It offers high sensitivity and high specificity. Poletti (13), in a swiss large retrospective

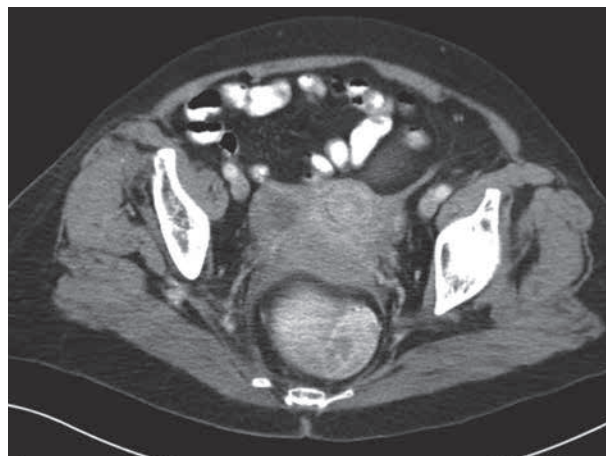


Fig. 7. — Follow-up CT one month after drainage of the abscess showing complete healing.

study subdivided complicated severe ACD into abscess, extraluminal pocket gas (> 5 mm) with predictive of failure of nonoperative response, and extraluminal gas bubbles (< 5 mm) with a better nonoperative treatment response, but he asserted that further prospective studies are needed to confirm it ; therefore we could propose a new radiological classification of non surgical ACD which will help when challenged with a medical treatment.

Once the patient is selected and the severity of his disease determined, a medical-surgical approach management is started.

Referring to literature for recommendations concerning the choice of medications as well as nutrition support is controversial.

Nutritional support and diet in non-surgical ACD are unclear, even a fiber-free liquid diet in non complicated ACD has not been rigorously studied yet (14). To our knowledge, only 2 weak trials have been made to date. One Japanese trial studied the enteral nutrition with liquid diet (by sports drinks) in mild ACD. Patient received outpatient treatment. It gathered positive results (22). Rafetty et al also encouraged enteral route and thus outpatient treatment also in non-complicated ACD (23). Paradoxically the new guidelines of the European society for parenteral and enteral nutrition (ESPEN) don't mention the route of nutrition to use in non surgical ACD yet (4). They don't mention as well the non-surgical ACD among the contraindications to enteral nutrition, unlike poorly intestinal functioning like ischemia, perforated or obstructed gut, fistula, fulminant sepsis and severe shock with impaired splanchnic perfusion. Actually in intestinal pathology requiring the same nutritional approach as ACD (eg. Severe Ulcerative Colitis), there is no place for parenteral nutrition (unless there are contraindications for enteral nutrition like Toxic megacolon, colonic perforation or massive intestinal hemorrhage). Also according to ESPEN, enteral nutrition can be used

in Crohn's disease even with inflammatory intestinal stenosis.

Classically, oral feeding should be stopped to allow bowel rest, and logically conservative treatment with parenteral nutrition has been proposed as supportive therapy until the acute inflammation episode begins to resolve. Some authors advocate it as the preferable route of nutritional support, especially in severe cases (1).

But there is also substantial evidence that increased permeability and therefore increased bacterial translocation occurs soon after bowel rest. Lack of enteral nutrients decrease intestinal mucosal function as early as 36 hours of starvation (24,25). Therefore early enteral refeeding may improve antibacterial host defences, maintaining mucosal mass and preserving barrier function (2,26), thus lowering the risks of bacterial translocation and subsequent infection. Furthermore, there are every day at least 6 litres physiologically secreted in the intestinal lumen even if the patient is on nothing per oral diet, suggesting no risk in liquid diet.

For all these reasons we propose oral enteral nutrition in this study. But the choice of liquid diet had to be reassuring because if a surgical procedure was to become mandatory in emergency, it had to be still possible, especially in this new fast track period. Traditional Hartmann procedure is commonly performed on patients who failed conservative treatment (sigmoidectomy, colostomy and closure of the rectal stump), requiring a later second-stage surgery to reverse the colostomy, if possible. As shown in the previous paragraph, a single-stage surgery could be performed to any of our patients who required emergency surgery. Primary anastomosis improved enormously patient's comfort (27).

Furthermore percutaneous drainage was also feasible despite an enteral nutrition support. And even if it is known that this procedure doesn't decrease the mortality rate, it shortens the hospitalisation stay and allows a later planned surgery procedure because of the risk of recurrence otherwise (20,22).

If uncomplicated ACD is frequent and seems easy to manage by its route of nutrition, severe complicated ACD are seldom encountered in clinical practice, and they are managed medically in a heterogeneous manner because of lower incidence and absence of guidelines (23).

Despite the small number of patients in this study, we reached our aims demonstrating that enteral feeding during the acute phase of complicated ACD could be safe, with a reduced mean hospitalisation time and low daily cost compared to previous common treatment of non-surgical ACD with parenteral nutrition and intravenous antibiotics. We chose Ciprofloxacin-Metronidazole as suggested by Jacobs in NEJM (17) and also because Ciprofloxacin keeps a good bioavailability when switched in 24 hours from IV to oral administration, but other regimens are also effective.

In this trial the only problem we met is that the energetic goal was sometimes difficult to reach. According to

Harris-Benedict international accept formula, energy requirements given to our patients were less than theoretically needed especially when we use a stress factor of 1,5. This latter was chosen because we considered complicated ACD as a severe infection.

But due to the short mean hospitalisation stay (10,4 days) and that the patient ate solid meals quickly, the maximal theoretic energetic goal seemed relative. However if hospitalisation is longer, a complementary nutrition by a nasogastric feeding tube is important to reach the daily energetic target.

There are also some limits to our trial. The fact that we studied only one group of patient without any comparative group is the major one. Despite this, our results are encouraging and obviously further and larger studies are required to compare enteral versus parenteral nutrition in complicated non-surgical ACD.

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