

Yersinia enterocolitica intestinal infection with ileum perforation: report of a clinical observation

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Abstract. *Yersinia enterocolitica* infection is responsible in human beings for ileocolitis appearing with abdominal pain, diarrhoea and fever. This kind of disease usually heals spontaneously with no remarkable complication. Intestinal perforation is a rare complication of the disease. To date only eleven cases of surgical complications arising from abscess and intestinal perforation due to *Yersinia enterocolitica* have been reported in literature. In our clinical case the patient, who had previously undergone appendectomy, required urgent surgery for pelvi-peritonitis due to intestinal perforation on necrotic-ulcerative ileitis with adenomesenteritis from *Yersinia enterocolitica*. The surgical treatment combined with intestinal resection and targeted antibiotic therapy have proved to be effective.

Key words: *Yersinia enterocolitica*, intestinal infection, ileal perforation

Introduction

Yersinia enterocolitica was identified for the first time as pathogenic in human beings in 1939 by Schleifstein (1). It is a pleomorph, gram-negative, asporogeneous and facultative anaerobe bacillus. It belongs, together with its homologue *Yersinia pestis*, to the family of Enterobacteriaceae.

As far as (2) 54 serum groups according to antigen O have been described but O:3, O:5, O:8, O:9 and O:27 are usually prevalent in human pathology.

These are entero-invasive and/or destructive strains (infective dose 10⁸-10⁹ organisms/ml) which in a typical way invade the colon and terminal ileum multiplying within the mucous cells, the mastocytoma and the Peyerian glands or patches. Besides, they can elaborate enterotoxins responsible for food poisoning.

Spread all over the world (3), *Yersinia enterocolitica* is a bacterium isolable from the earth, from water,

from a variety of foodstuffs and from human beings and animals that are without doubt its host carriers. It is found in rodents, sheep, cattle, horses, rabbits, dogs, cats and above all in pigs which host the bacterium as commensal mostly in the tonsil area.

Transmission may occur zoonotically, interpersonal or through consumptions of foodstuffs (in particular raw or undercooked pork products), unpasteurized milk or water not treated with chlorine. Sepsis after blood transfusion has been observed when preserved for over three weeks at 4°C (4). The source of contagion often remains, even retrospectively, unknown and many epidemics are unexplainable.

Since eighties thanks to the greater physicians'-scientific knowledges about the range of diseases caused by *Yersinia enterocolitica* there has been a constant increase in diagnoses concerning this bacterium. From the 23 cases reported in world literature in 1966 the number rose to 4000 in 1974 and there we-

re 200000 reported cases in Denmark only in 1979 (5).

The Center of Disease Control and Prevention (CDE) estimates that about 17000 cases occur every year in USA. Diffusion has strangely occurred above all in the most technologically advanced countries like USA, Canada, Japan and South America. In Europe it is more common in the North.

From a cursory reading of literature the first documented case of intestinal perforation was described by Moeller in 1985 in USA (6). In 1994, Rosato related about the first case in Italy of infection with ileocecal valve abscess and ileum perforation (7). In world literature there are only 11 reported cases of surgical complications due to abscess and intestinal perforation.

One of these complications was shown in our patient whose clinical case is described hereafter.

Case report

F.F., a 30 years old woman, who had previously undergone appendectomy, was admitted in our department for sudden exacerbation of abdominal pains with clinical and semiotic signs of "acute abdomen", principally in the lower quadrants, with neutrophilic (87.9%) leukocytes (14400). The abdominal pains had been present for over 15 days together with daily febricula, diarrhoea and asthenia.

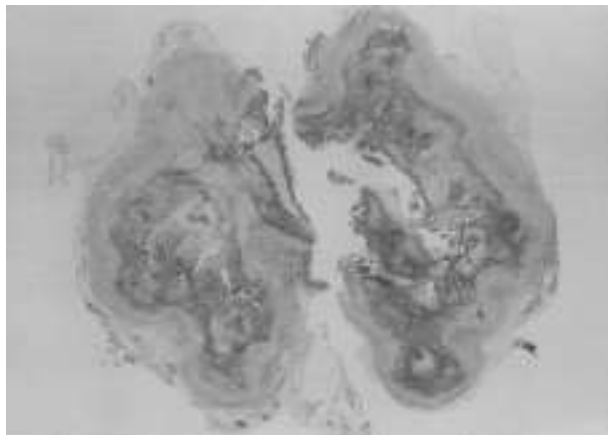


Figure 1. Thickened intestinal wall with loss of substance of mucous membrane and granular-necrotizing phlogosis

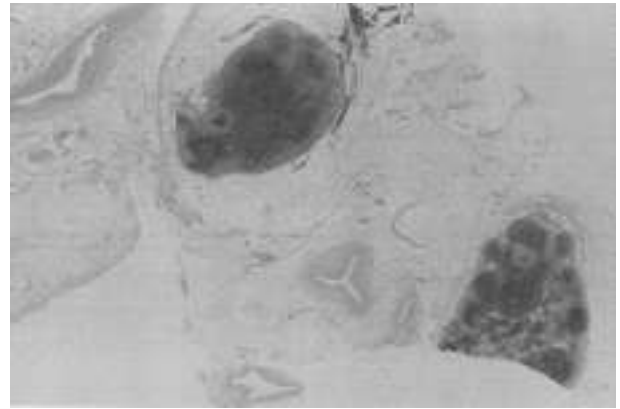


Figure 2. Mesenteric lymph nodes: lymphadenitis with pseudo-tubercular granulomas and central necrosis with peripheral border of epithelioid histiocytes

The patient underwent some diagnostic tests including an abdominal echography that highlighted effusion within and direct abdomen x-rays revealing the presence of a small crescent of air under the diaphragm. Emergency surgery was required together with explorative laparotomy.

During surgery, a pelvi-peritonitis due to perforation of the last ileal loop was observed at about 30 centimetres from the ileocecal valve with seropurulent intraabdominal effusion, with phlogosis of the terminal ileum which appeared congested and violaceous and with thickening of the antimesenteric wall partially affected by necrosis via fistula.

The mesentery appeared thickened and the regional lymph nodes increased in volume. In the proximity of caecum there was a necrotic nodular spot which was sent for histological tests. An ileum tract (about 10 centimetres) site of the perforation was resected. After accurate peritoneal washing, surgery was completed positioning a drainage tube in the pouch of Douglas.

Broad-spectrum antibiotic therapy with lincosamide (clindamicin 0,6 grammes x 3 die intravenous) and third generation cephalosporin (ceftazidim 2 grammes x 2 die intravenous) was started awaiting the histological and culture tests of the surgical samples; moreover, copro-culture and parasite test of faeces were performed.

The copro-culture and parasite test of faeces were negative. The histological test showed: 1) Ileal seg-

ment: macroscopic test: intestinal segment 9,5 centimetres long with congested peritoneum and presence of greyish plaque of 2 centimetres displaying a focal area with loss of necrotic-perforative substance. The mucous side showed aspects of hyperaemia. 2) Para-caecal nodule: macroscopic tests: roughly nodular tissue lip of 2 centimetres with rough phenomena of necrotic cavity. Microscopic tests for 1) and 2): chronic phlogosis of granular-necrotizing kind in the absence of giant cells in the para-caecal area with extra-mucous focal involvement of the ileal segment examined. The lesion is consistent with Yersinia-induced phlogosis.

The culture test performed on a lymphnode and on the endoabdominal effusion confirmed diagnosis of infection from Yersinia enterocolitica. Following such results a targeted antibiotic therapy with tetracycline was started.

On the eleventh day post surgery the patient was discharged, in good clinical conditions.

Discussion and conclusions

Infection from Yersinia enterocolitica usually affects young children. Symptoms (fever, diarrhoea sometimes bloody and abdominal pain) develop nearly after a week from exposure to the source of contagion and they last for about 1-3 weeks or even more. Such a symptomatic pattern is non-specific i.e. common in various enteric infections (8).

Symptomatology often presents the features of acute appendicitis. Actually a normal vermiform appendix may be correlated to clinical suspicion together with adeno-mesenteritis which is also indistinguishable from acute viral one. Phlogosis may affect the ileum and sometimes spread to the caecum simulating macroscopically Crohn's disease in its acute phase. In Crohn's disease though the affection involves not only the terminal ileitis but also healthy intestinal tissues as the omentum or other stucked intestinal loops. The surgical pattern may sometimes be confused with a neoplastic process in which a thickened caecum is more prominent or even looks like a neoplastic process in which there is a weak inflammatory component. Some very rare cases are reported with abscess and/or in-

testinal perforation and peritonitis with great risk *quoad vitam*.

Among further complications there is a monarticular arthritic syndrome (to the knee, ankle or wrist) of obscure pathogenesis both with or without previous Yersinia enterocolitica enteritis which usually arises one month from the occurrence of diarrhoea and which spontaneously resolves within 1-6 months. A rare but severe disabling form is non suppurative arthritis. Even a reactive polyarthritis has been associated to it. This affects especially patients with Histocompatibility Antigen HLA-B27. Erythema nodosum to feet and trunk in patients with a history of past acute enterocolitis resolves spontaneously within 1 month.

Within the spectrum of possible clinical onsets and of systemic complications associated with Yersinia enterocolitica infection, endocarditis, myocarditis, hepatic and spleen abscesses, meningitis, Reiter's syndrome, Haemolytic anemia, panophtalmitis and erysipeloid rash are describes while septicaemia is rare (50% mortality rate) and is found in subjects suffering from immuno-depression, neoplasias, alcoholism, diabetes and cirrhosis (9-12) or undergoing dialysis or in patients with haemochromatosis or with martial overload under treatment with deferoxamine.

Diagnosis may be determined by testing for Yersinia enterocolitica directly in the blood (haemoculture), in faeces (coproculture), in biological liquids as ascites or in other biological matter (culture test of purulent matter, of lymph nodes or of samples taken from fistulas and from ileal and caecal mucosa). Samples may be cultivated in blood-agar or Mac-Conkey agar (optimum temperature of 28-29° C, with optimal pH values between 7.0 and 8.0 and with a maximum NACL concentration of 5%). Yersinia enterocolitica grows in bull's eye colonies surrounded by a transparent halo (13). When a sample of faeces is sent to laboratory for Yersinia enterocolitica the diagnosis suspicion must be always made so as to allow the microbiologist to use special cold enrichment techniques (4°C) and to incubate the sample for 3 or more weeks because of the slow growth rate of this pathogen (14).

Under microscopic analysis Yersiniae appears like gram-negative bacilli with the classic "safety-pin" form.

Indirect diagnosis occurs through anti-Yersinia enterocolitica antibody titration, specifically against

human pathogen serotypes. Antibodies reach maximum concentration after 8-10 days and they remain high for about 18 months after the infection. One single dosage of antibody titer (haemagglutination, RIA, ELISA) is sufficient to make diagnosis as recommended by the Public Health Laboratory Service in Leicester (UK) (15).

In normal cases *Yersinia enterocolitica* infection heals spontaneously. However, antibody therapy decreases seriousness and length of the disease reducing the period of faecal elimination. *Yersinia enterocolitica* in vitro is susceptible to different antibiotics (amino-glycosides, CAF, tetracyclines, trimethoprin-sulfamethoxazole, ciprofloxacin) while it is in general resistant to penicillin, to ampicillin and to first-generation cephalosporin. The use of drugs with antiperistaltic effects (opiates, diphenoxilate, loperamide and atropine) in order to prevent diarrhoea could worsen the clinical progress of the disease.

As concerns the forms that appear like an acute appendicitis, surgery is required. In these cases, the surgeon might find himself in front of a pattern of ileitis and/or tiplitis and/or adeno-mesenteritis with "healthy" vermiform appendix. In order to make a correct diagnosis the best behaviour is to "sacrifice" the vermiform appendix to be sent to a histological and cultural tests (appendicular mucosa) so as to fix the correct antibiotic therapy, although resection is not necessary (16).

In cases of peritonitis for abscess and/or perforation surgery is of paramount importance and resection of the affected intestinal tract together with accurate washing are required (17) as shown in the clinical case above described; an appropriate antibiotic therapy has to be followed.

As for prevention, routine handwashing after exposure to a potential source of contagion is fundamental, also avoiding raw meat, unpasteurized milk, unchlorinated water while, at the same time, ensuring food and water hygiene and the drainage of human and animal faeces. In Belgium the change in the procedures in pig slaughtering as well as of the food customs of the population has been followed by a gradual decrease in cases of infection by *Yersinia enterocolitica* since 1987 (18).

To date no vaccine is yet available.

According to what is reported in literature such an infection is to be considered much more frequent in our country. A conspicuous under-estimate of the incidence of intestinal infections due to *Yersinia enterocolitica* is to be ascribed to a poor knowledge of the clinical-pathological frame and to difficulties in providing specific culture and serologic diagnostic methods.

It is therefore useful to have brought to the surgeons' attention a rare case of potentially mortal complication due to an intestinal infection from *Yersinia enterocolitica* which usually heals spontaneously. Thanks to the timely minimum ileal resection followed by appropriate antibiotic therapy, our case had a brilliant outcome.

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