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Acute suppurative appendicitis with *Blastocystis hominis*

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ABSTRACT

Blastocystis hominis (*B. hominis*) is an anaerobic protozoan parasite, which lives in human and animal's intestines. It is commonly found in the tropical area. The parasite is low pathogen and its infection causes gastrointestinal disease with diarrhea symptom as reported from many studies. *B. hominis* is rarely seen in tissue section. The clinical diagnoses are usually confirmed with the microscopic examination of the stool, which can directly detect the parasite through trichrom stain and Kinyoun acid fast technique. We reported a case of 52 years old man with abdominal pain and suspected as perforated appendicitis and tumor of appendix as the differential diagnosis. The macroscopic features of the appendix mass were 7 cm in length and 1.5–2.5 cm in diameter. The cut section showed a widening of the appendix lumen, and the distal part filled with a gelatinous mass. The microscopic examination with HE stain showed the infiltration of PMN inflammatory cells in the muscle layer of the appendix and foci of a number of round structures in the sub mucosal layer known as *B. hominis*. Some authors reported results from the endoscopic and biopsy examinations that *B. hominis* does not infiltrate in the intestinal mucosa; nevertheless, in this case we found the infiltration of the parasite towards the mucosal and sub mucosal layers of the appendix.

1. Introduction

Blastocystis hominis (*B. hominis*) is an anaerobic protozoan parasite[1,2]. In 1991, Zierdt identified the parasite as a sporozoa that causes blastocystosis (Zierdt–Garavelli Disease)[1] in human. *B. hominis* was firstly reported by Alexieff in 1911, followed by Brumpt in 1912[2]. The parasite not only inhabits in human but also in several animals such as monkeys, apes, pigs, and maybe hamsters, reptiles, cockroaches, rats and other animals[2]. Vacuolated–form of *B. hominis* has been proven to be found in home rats' feces[3]. On the other hand, the parasite is rarely found in both dogs and cats[4].

B. hominis is predominantly found in the tropical area. The parasite is mostly found within soldiers who come home from battle fields or among travelers[2]. In a routine examination performed to 932 immigrants in Taiwan's Eastern Sea, it is reported that 188 people (20.2%) of them had been infected by *B. hominis*. Such prevalence, compared with immigrants who come from Southeast countries such

as Indonesia, Vietnam, and Philippines (26.4%, 20.6% and 19.3%, respectively) is higher than those from China (7.6%)[5].

The epidemiology of *B. hominis* in the United States had been reported to be found in 48 states and Columbia between 2002 and 2004. The annual prevalence of the parasite shows downward trend, from 23% in 2002 to 11% in 2004. Infection of the parasite is higher within September and October months than other periods, particularly in the coastal countries. Women are infected twice than men, especially between 40 and 49 year–old ages[6]. In an epidemiologic study performed in Canada, the average age of incidence of the populace who are infected by *B. hominis* is 37 years old, 55% of them are women[7].

The pathogenesis of *B. hominis* remains uncertain[1]. There is a controversy whether the parasite is commensal or pathogen[2,9]. Some textbooks describe that *B. hominis* is a low pathogen–protozoa and only induces intestinal disease within great amount[8]. Some expertise show that there is a negative correlation between the subsistence of *B. hominis* with diarrheal symptoms, which have been reported to increase, especially for patients with immunocompromise disease, travelers or tourists, homosexuals, and the abandoned children[9]. As a protozoan agent, *B. hominis* plays role and has pathogenic potency to provoke diarrheal

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symptoms according to a study conducted in Baghdad, which concludes that *B. hominis* is a pathogen within patients with symptomatically diarrheal syndromes^[10]. As a human parasite, *B. hominis* causes abdominal disturbances, manifested as anorexia, diarrhea and flatus^[11].

Biopsies from those who are infected by the parasite mostly show normal appearances in the intestinal mucosa. The abnormal appearances only demonstrate the infiltration of mild and unspecific inflammatory cells. Hardly ever, the parasite provokes mucosal destruction; as well, the parasite generally does not penetrate nor invade the tissues^[1,8]. Moreover, through endoscopic procedure, the intestinal mucosa can be seen normally^[1]. *B. hominis* can also be diagnosed by cytological examination from intestinal flushing matter^[1].

B. hominis infection is also associated with ulcerative colitis, terminal ileitis and enteritis that can be cured by metronidazole^[1]. What is more, *B. hominis* infection has been reported to be found in a four year child who showed diarrheal symptom with fever and bloody feces. Through colonoscopy, the patient's colon demonstrated superficial ulcer with pseudo-membrane throughout the colon; also, through feces examination, *B. hominis* was found. According to the histological examination from the biopsy tissue of the patient, inflammatory cells within the mucosa of the large-intestine were found. Also, within the ulcer of the same patient, spherical or oval forms of *B. hominis* with central granulated vacuole and single nucleolus were found along with the infiltration of inflammatory cells^[2].

More than 34.7% of *B. hominis* may be present within individuals who are clinically asymptomatic. On the other hand, those who show symptomatic signs are mostly marked by abdominal pain, watery diarrhea, constipation, anorexia, nausea, flatulence, and weight losses; such symptoms and signs may demonstrate more than two weeks^[1,2]. Some authors have reported that *B. hominis* is one of the diarrheal-causal agents^[12]. *B. hominis* infection has also reported within patients with irritable bowel syndrome (IBS)^[13]. Likewise, the same circumstance has also been found in the patients with inflammatory bowel disease (IBD), and chronic diarrheas^[14].

Furthermore, *B. hominis* has also been described as an opportunistic pathogen, found among immunosuppressive and immunocompromise patients. Clinical symptoms are associated with both the severity of the infection and the virulence of *B. hominis* strains^[2].

Conventionally, diagnosis of *B. hominis* is established through direct examination beneath microscope from the feces-flushing matter of the patients processed by trichrom stain and Kinyoun acid fast technique. Usually, through the procedure positive result is marked by the discovery of vacuolar form of the parasite. The result is considered to be significant if we discover more than 5 parasites per 400 × high-power field^[2]. What is more, *B. hominis* can also be detected by polymerase chain reaction technique^[15].

Acute appendicitis in human may occur in every stage of life span; however, the disease mostly occurs among the adults and young adults and men (7%) are more affected than women^[16]. At first, acute appendicitis appears because of

the increase of intra-luminal pressure that disturb venous circulation. For about 50%–80% cases are associated with the obstruction of appendix's lumen, usually due to the feces mass resembling a little stone, called feces stone (fecolite). The rarer etiologies are bladder stones, tumors, or masses from helminthes (*Oxyuris vermicularis*). Ischemic injury and static condition from the lumen's contents facilitate bacterial proliferation and precipitate inflammation process, tissue edema and polymorphonuclear infiltration from the lumen unto muscular wall and peri-appendicular soft tissue. At the first stage of the acute appendicitis there are edema and congestion of sub serous layer and infiltration of polymorphonuclear cells throughout all layers of the appendix's wall^[16].

Diagnosis of acute appendicitis can be established if there is infiltration of polymorphonuclear cells penetrating muscular layers. In severe cases, inflammatory exudates and polymorphonuclear cells may cause fibrinopurulent reaction, and if the process develops progressively, focal abscess within appendix's wall can be called acute suppurative appendicitis^[16].

Initially, clinical appearance of appendicitis is marked by a pain within peri-umbilical region, which subsequently shifts to the lower-right quadrant. Pressure pain within the lower-right quadrant is termed Mc Burney's point. Another symptoms are nausea, vomiting or both; whereas the abdomen is palpated tightly, accompanied with mild fever and the increase of peripheral blood leukocytes^[16].

2. Case report

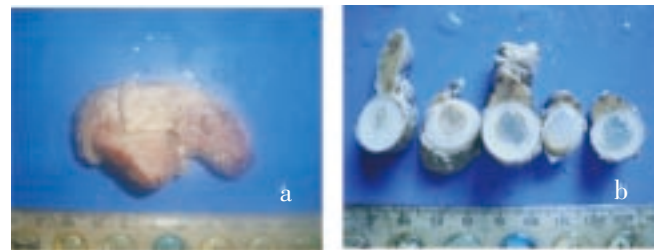


Figure 1. Macroscopic appearance of the patient's appendix. a) Long section of the appendix's mass with 7 cm in length; b) Transversal section of both distal and proximal parts of the appendix; at distal, the section is lack of mucosa layer whilst at proximal, mucosal part remains exist shown as gelatin.

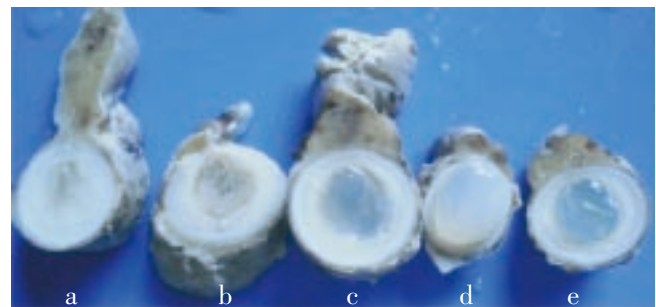


Figure 2. Transversal section of the patient's appendix from proximal to distal parts. a, b show the proximal fraction of the appendix: all layers of the appendix (from mucosal up to serous layers); c, d, e show the distal fraction of the appendix: the wall becomes thin, mucosa disappears, and lumen is filled by gelatinous mass.

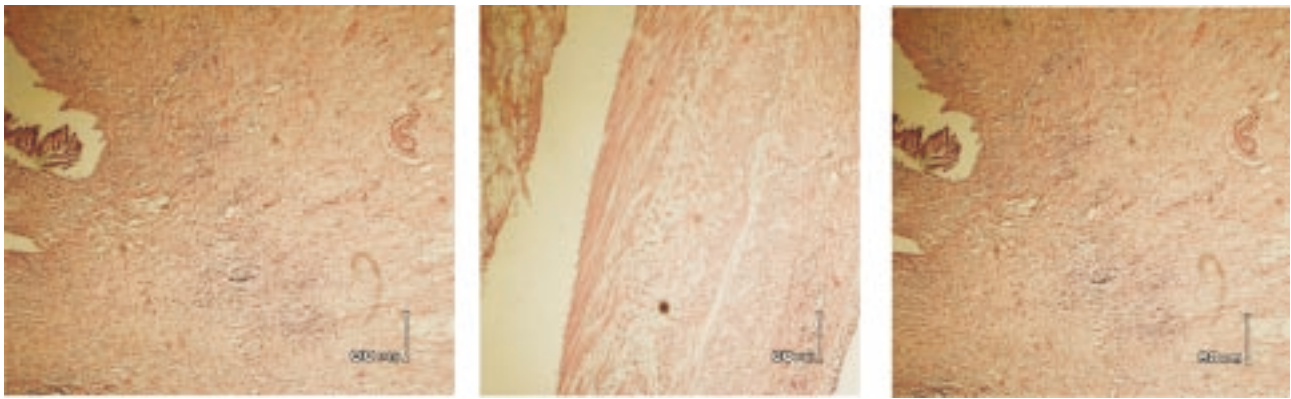


Figure 3. Microscopic appearance of the patient's appendix in the proximal fraction. The mucosal, sub mucosal, and muscular layers still appear, there are sub mucosal edema and the infiltration of inflammatory cells unto muscular layers.

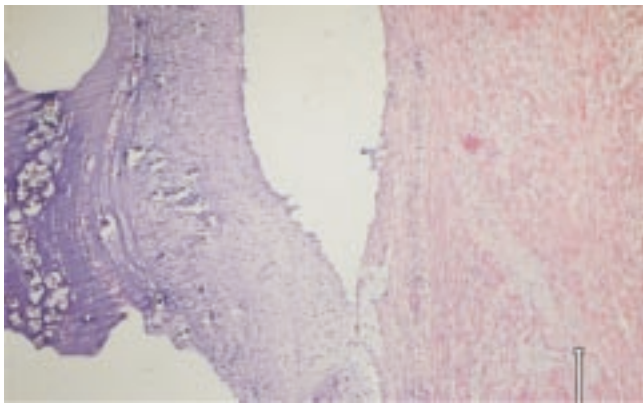


Figure 4. Microscopic appearance of the distal fraction of the patient's appendix. Mucosal layer is replaced by mucosal substance with numerous *B. hominis* parasites.

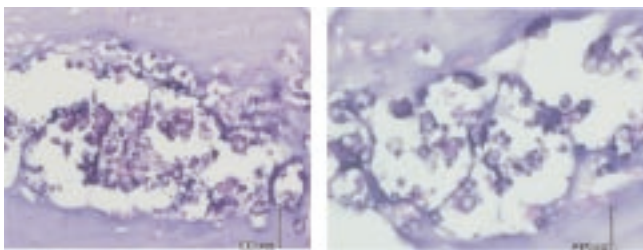


Figure 5. Microscopic appearance of *B. hominis* with vacuolar forms or central bodies that compose 50%–95% of the cells and arranged concentrically to the outer membrane. The parasite's nucleus and cytoplasm are pushed to the edge of the cells so that cells are looked empty.

A 52-year-old male patient was hospitalized with abdominally painful symptoms. The patient was diagnosed with perforated appendicitis by surgeons and differentially diagnosed with appendix tumor. Subsequently, after appendectomy, the appendix tissue was sent to pathologists. By macroscopic examination, the appendix mass was measured with 7 cm in length and 1.5 cm × 2.5 cm in diameter (Figure 1). Transversal section demonstrated the widening of the appendix's lumen, and the distal part was filled with a gelatinous mass (Figure 2). Microscopic examination with routine Hematoxylin–eosin stain toward the appendix's transversal shape showed appendix in the proximal part (Figure 3), the mucosal, submucosal, and

muscular layer were still appear, but the appendix in the distal part showed that muscular wall was tightening and thin (Figure 4). What is more, the lumen was filled by mucous substance in large amount, particularly within distal part, where most of the mucous layers were disappeared, and only left insignificantly in the proximal part. Interestingly, at the sub mucous layers of the distal section of the appendix, there was found numerous spherical structures that indicated *B. hominis* (Figure 5). In addition, there was infiltration of inflammatory cells, predominantly with polymorphonuclear cells (neutrophil) along with edema at sub mucous layer (Figure 6). Finally, according to both gross appearance and microscopic finding, the appendix mass was concluded as acute suppurative appendicitis with *B. hominis*.

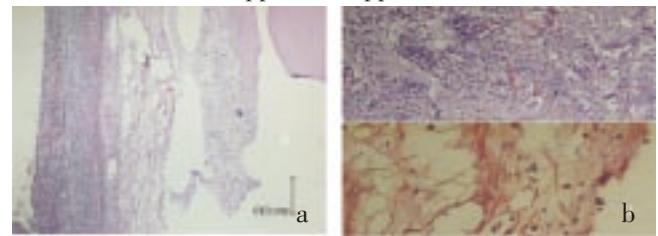


Figure 6. Microscopic appearance of acute suppurative appendicitis. Infiltration of inflammatory polymorphonuclear cells from lumen unto serous layer (a is 40 times enlargement, b is 400 times magnification).

3. Discussion

The diagnosis of acute suppurative appendicitis is established due to the subsistence of polymorphonuclear cells' infiltration from mucous unto serous layers[16], this circumstance accords with microscopic finding shown in our patient. What is more, the patient was a 52-year-old male, and base on the literatures, the condition was in accordance with the incidence of acute appendicitis that mostly affects men rather than women and frequently found within adult period[16].

The major cause of acute appendicitis is obstruction (50%–80%). Obstruction may provoke incessant mucosal secretions into appendix's lumen so that the intra-luminal pressure may increase and cause venous collapse. As a consequent,

blood supply to the appendix may be decrease, leads to the ischemic injury that facilitates bacterial growth[16]. In our case, the obstruction occurs because of the *B. hominis* parasite, which filled the appendix's lumen and invade its mucous layers. Macroscopically, appendix's wall became thin (at the distal region) and composed by gelatinous substance. Interestingly, this is a rare cause of acute appendicitis since most cases of acute appendicitis are generally caused by feces stones (fecolites). Another rarer etiology is obstruction by *Oxyuris vermicularis*[16]; notwithstanding, *B. hominis*, as the causal agent of the disease has never been reported. *B. hominis* is a parasite within protozoan group that morphologically has 4 forms, which are vacuolar, granular, amoeboid, and cystic[2]. In our case, *B. hominis* found by microscopic finding is in the vacuolar form, with spherical appearance where in the middle of its body there is a transparently vacuolar structure. The vacuole is termed as central body surrounded by peripheral cytoplasm that contains nucleolus, mitochondria and Golgi apparatus[2]. The vacuolar form is the commonest form found in feces or culture[2]. In our case, vacuolar bodies of *B. hominis* have invaded and destroyed mucous layers of the appendix, albeit literally the parasite hardly ever destroys mucosa and invades tissues[1,8]. However, according to several cases that have been reported, *B. hominis* infection is also associated with ulcers within mucosal layers[2].

B. hominis infections of symptomatic patients generally show clinical manifestation as diarrhea[1,2,8,12,14]. Yet, in our case there is no diarrheal symptom, as the patient only complains about abdominal pain. The circumstance may due to the obstruction of appendix's lumen by the vacuolar bodies of *B. hominis*, which had also destroyed and invaded the mucosa, so that the clinical symptoms that appeared was the manifests of acute appendicitis.

We have reported a case of acute suppurative appendicitis of a 52-year-old male patient. The etiology of the case is obstruction by *B. hominis* infection within vacuolar-form, which filled the appendix's lumen, invaded and destroyed its mucous layers; a phenomenon with a very rare cause. Diagnosis was established based on histopathological examination of the appendix tissue with routine Hematoxyllin–eosin stain.

Uniquely, in addition to the aforementioned finding, the patient showed clinical manifestation of acute appendicitis, especially abdominal pain; whilst the commonest symptom of *B. hominis* infection, which is diarrhea, was not demonstrated in this case.

Conflict of interest statement

We declare that we have no conflict of interest.

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