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Bilharzia Appendicitis: Incidence in a Commune in Mali, about 3CAS

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Abstract

Appendicitis bilharzia is a very rare condition and we report 3 cases of this pathology that sense clinical and biological similarities with bacterial appendicitis. The etiological diagnosis was exclusively histopathological, this allowed to highlight eggs of Schistosome in the appendicular wall in the three patients. The surgical treatment was supplemented by a specific medical treatment based on praziquantel. The surgical suites were simple for 2 patients, complicated by superficial parietal suppuration in a patient.

Keywords

Bilharzial Appendicitis, Endemic, Histopathology, Specific Antiparasitic Treatment

1. Introduction

Schistosomiasis is a public health problem in tropical and subtropical regions of Africa, Asia, the Caribbean and South America, with an estimated 779 million people at risk of contracting this infection [1]. It is the world's second endemic after malaria [2]. Mali is in an endemic bilharzia zone with the presence of

schistosomiasis in almost all regions, the prevalence is variable according to the eco-climatic zones of the country [2].

Acute appendicitis, according to several studies conducted across hospitals in the country, is the leading cause of abdominal surgical emergencies in Mali [3] [4] [5] [6]. The bilharzia etiology of ileocecal appendicitis is increasingly reported, studies in Africa reported a significantly higher prevalence of schistosomiasis-related appendicitis (2.75%) than those in the Middle East (0.49%) [7]. In Japan, an examination of 311 specimens of vermiform appendix pathological records over a 10-year period revealed only one case of schistosomal appendicitis [8]. This contrasts with the prevalence of some endemic areas in Africa. So in Senegal, the Thiam I *et al.* study on the autopsy of 100 appendices showed 2 cases of bilharzia appendicitis, a prevalence of 2% [9]; in Mozambique, out of a total of 145 cases of appendicitis in Beira, 13.1% of appendicitis were linked to schistosomiasis [7]. Work on the epidemiology of appendicitis is rare in Mali and virtually absent for the histopathological type. Thus we present these clinical cases of bilharzia appendicitis with the aim of emphasizing the realization of a systematic anatomopathological examination after each appendicectomy but also highlight the bilharzia origin of acute appendicitis.

2. Observation 1

This is a male patient aged 18, student, resident in Djicoroni-para, a neighborhood along the Niger River, with a history of terminal hematuria, referred from a community health center where he received medical treatment based on antibiotics, antimalarial and antipyretic; for pain of the right iliac fossa evolving for 8 days. This pain was associated with early postprandial food vomiting and a notion of fever. At intake the axillary temperature was 38.2˚C with a good general condition. Physical examination found a defense of the right iliac fossa on palpation with positive Blumberg and Rovsing signs. An ultrasound examination made it possible to objectify a globular appendix, swollen, edematous, measuring 63 × 13 mm, incompressible with the positive ultrasound Murphy. Leukocytosis at 12,000/mm^3 and a reactive C protein positive at 12 mg/l were found on biological examination. The rest of the biological balance was normal.

We retained the diagnosis of acute appendicitis preoperatively and we thus proceeded to an appendectomy and burial of the appendicular stump. At macroscopy, the appendix was phlegmonous and in pelvic position. The patient was put on antibiotic and analgesic treatment. The immediate follow-up was simple.

Pathological examination of the operating room was requested, histology involved sections of the appendicular wall that exhibited a diffuse inflammatory infiltrator throughout the wall with neutrophils and eosinophils forming abscesses associated with schistosome eggs (**Figure 1(a)**), which were terminal spur eggs (**Figure 1(b)**), the mucosa was erosive, the glands were regular.

Before this result of histology, the diagnosis of bilharzia appendicitis was retained. The patient was put on a praziquantel based antiparasitic treatment, 1800 mg in single dose. Immediate operational follow-ups were simple. After one month,

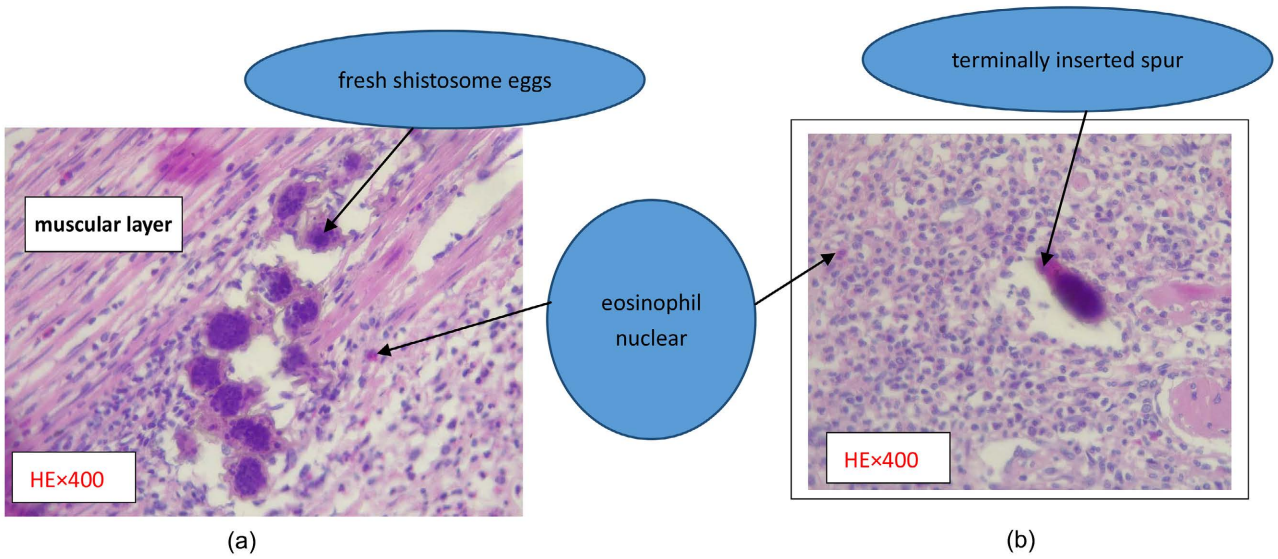

Figure 1. (a) Muscle layer with shistosome eggs; (b) Schistosoma hematobium eggs.

the clinical examination of the patient was normal, there were no complaints.

Examination of stools and urine at schistosomal eggs was normal at 3 months and 6 months post operatory.

3. Observation 2

Mrs TK 37 years, shopkeeper, resident in Sebenicoro (a quarter along the Niger River), multipare (G6P3V3A2), admitted to the emergency department for pain of the right hypochondrium. Only epigastralgia was found as a medical history. In front of this table an abdominal ultrasound was requested by the emergency doctors which concluded to a renal colic, so the patient was referred in first intention in the urology department. After consultation; the urologist refers us for treatment. On clinical examination, she had a good general condition, conjunctivae were pink, there was no jaundice. The main complaint was localized pain in the right iliac fossa for 24 hours associated with headache, dizziness, early postandial food vomiting, diarrhea no scraping lesions. The general signs were dominated by a good general condition with a fever at 38.6˚C, a pulse at 98 pulses per minute and a blood pressure at 110/70mmHg. On physical examination the signs of blumberg and Rovsing were positive, on rectal examination: the Douglas was painful at the top and right. In front of this table, the diagnosis of acute appendicitis was evoked. Treatment consisted of an appendectomy without burial of the appendicular stump associated with a drainage of the right iliac fossa, per-operative diagnosis of an appendicular abscess was retained. Histological examination allowed us to objectify, the submucosa stuffed with schistosome eggs more or less disintegrated fragments of the appendicular walls (**Figure 2(b)**), associated with a significant inflammatory infiltrate rich in neutrophils and eosinophils. It is diffuse, all tunics are infiltrated. The glands are normal (**Figure 2(a)**). The conclusion of the histological study was acute appendicitis bilharzia suppureous phlegmoneuse with signs of peritonitis.

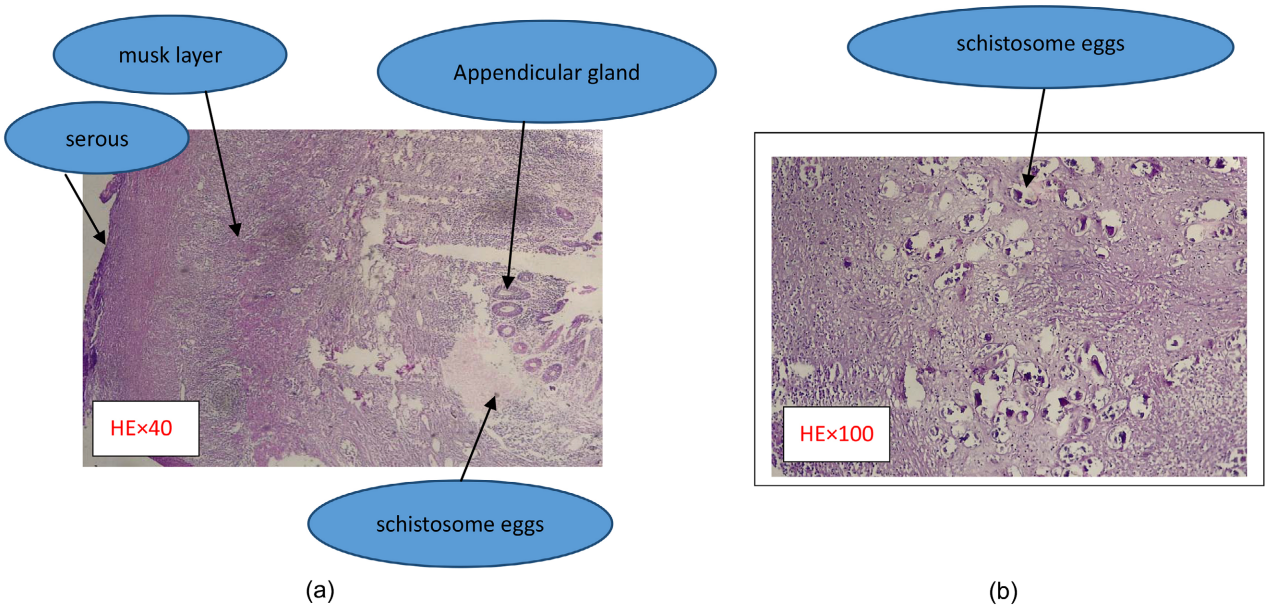

Figure 2. (a) Appendix wall at low magnification; (b) Appendicular wall stuffed with calcified shistosomes eggs.

Faced with this result, the diagnosis of an appendicular abscess of bilharzia origin was finally retained. The therapeutic protocol was supplemented by the implementation of a treatment with praziquantel at a rate of 2400 mg in single dose. The immediate surgical follow-up was simple. The wound has completely healed on post-operative J12 ant the examination of stool control (KOP stool) and urine were without particularity. Clinical examination was normal at J30 post-operative.

Examination of stools and urine at schistosomal eggs was normal at 3 months and 6 months post operatory.

4. Observation 3

28-year-old commercial NC patient, residing in Kalabambougou, received in the general surgery department of the hospital for diffuse abdominal pain.

The beginning of the symptomatology goes back to a 1 week marked by localized pain at the beginning at the level of the left iliac fossa then radiating secondarily in the right iliac fossa then occupying the entire abdominal frame, this pain was intense with intermittent progression accompanied by headache and an unquantified fever. On physical examination, the temperature was 40.7˚ Celsius, the pulse at 108 pulses per minute and blood pressure was 120/60mmHg, the tongue was saburral and the conjunctivae were pink. On physical examination there was a defense at the level of the hypogastrium and the right iliac fossa, on rectal examination there was pain at the top and right of the Douglas. A requested abdominal ultrasound allowed to objectify a thickening of the appendicular wall, an agglutination of the peri-appendicular loops associated with an effusion in the right iliac fossa. Blood count gave 20,000 leukocytosis to neutrophil polynuclear with high CRP, hemoglobin level was 10 mg/dl. In front of this

table we retained the diagnosis of acute appendicitis. Per operative it was a peritonitis localized in the right iliac fossa and hypogastrium with an appendix in latero-caecal position at the long base of about 16 cm and the top at the hypogastrium, gangrenous and perforated at its top. We sucked about 100 ml of foul pus franc. The procedure was an appendectomy without burying the appendicular stump, washing and abdominal drainage; the pus was sent to the laboratory for cytobacteriological examination and antibiogram. At day 3 post-operative we performed the removal of the abdominal drain. The postoperative course was complicated by superficial parietal suppuration. Cytobacteriological examination and antibiogram of pus revealed Escherichia package sensitive to Nutrofurentoin. The histological study made it possible to highlight a conjunctive and infiltrated inflammatory cell chorion rich in neutrophil and eosinophilic polynuclear (**Figure 3(a)**) in the submucosa one notes some bilharzia hematobium eggs (**Figure 3(b)**). The glands are normal. In view of these results, the diagnosis of bilharzia appendicitis was retained and the patient was put on an adapted antibiotic and praziquantel at 40 mg/kg.

The wound has completely healed on J20 post-operative. After one month, the clinical examination of the patient was normal, there were no complaints.

Examination of stool and urine for schistosomal eggs was normal at 3 months and 6 months.

5. Discussion

Acute appendicitis represents the first most frequent surgical emergency in the general surgery department of the district hospital of the commune IV of Bamako with a frequency of 44.7% [5], this trend is confirmed by several recent studies carried out in the various health facilities of the country [3] [4] [6].

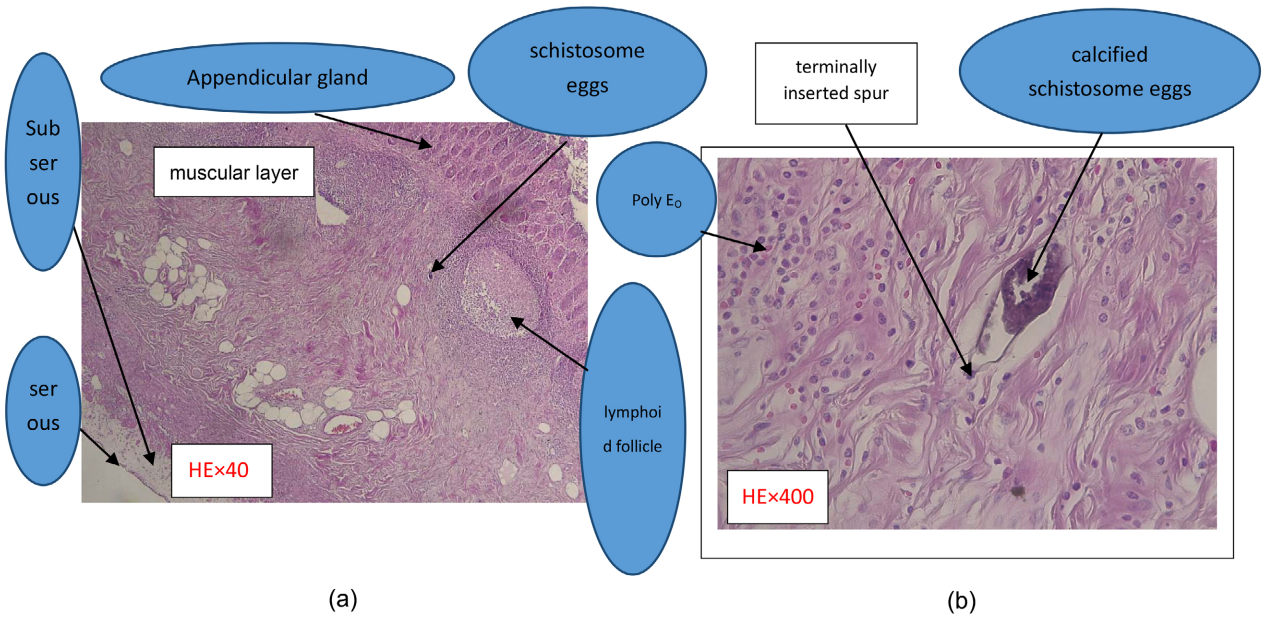

Figure 3. (a) Appendicular wall; (b) Schistosoma hematobium eggs.

According to Lattre J. F., the high frequency of acute appendicitis compared to other emergencies is related to dietary factors, intestinal parasitoses, and contiguity infections [10]. Schistosomiasis is a parasitic disease caused by flatworms called schistosomes [2], it is a global public health issue, as it is the second endemic in the world after malaria, schistosomiasis affects nearly 240 million people worldwide. [11] In the tropical and subtropical regions of Africa, Asia, the Caribbean and South America, approximately 779 million people are at risk of contracting this infection [1].

Schistosomiasis, or swimmer dermatitis, is transmitted to humans by contacting contaminated water by swimming, wading, or bathing in contaminated water [12] [13]. This contamination will be facilitated: Precarious sanitation, Human activities that put people in contact with contaminated water, This explains the prevalence of the disease in endemic areas of developing countries. [12] In Mali, schistosomiasis is endemic and has been present in almost all regions with varying prevalence according to eco-climatic zones [2]. In the district of Bamako, it is more frequent in the riparian areas of the Niger River as the neighborhood Para-Djicoroni place of residence of our patient.

The etiologies of appendicitis are diverse and varied [14]. Schistosomiasis infection should be considered as a possible cause of appendicitis not only in endemic areas but also in developed countries [7]. It was first described by Burfield in 1906 [15]. Bilharzia appendicitis, a rare disease in developed countries, is increasingly visible in sub-Saharan African countries or countries of bilharzia endemics [8]. So after only 12 months of activity we identified 3 cases appendicitis bilharzia 51 histological studies performed or 5.9% of cases, our rate of completion of the pathological examination was 57.30%. In Senegal, in the Thiam study, after analysis of 3208 appendectomy over 10 years, he found 2 cases [14], in Mozambique on a series of 145 cases of appendicitis in Beira 13.1% or 9 cases were bilharzia appendicitis [7]. Similar work was carried out in Hong Kong, Ghana and Nigeria with frequencies of 0.2%, 2.4% and 2.9% respectively [14].

The deposition of parasite eggs into tissues, resulting in an inflammatory response, granulomatosis, and involvement of schistosomal eggs in acute appendicitis is controversial [16]. Some authors believe that the passage of shistosome eggs through the appendicular mucosa would cause ulcerations, inflammatory reactions. In addition, bilharzia granulomas can compress the vessels causing ischemic and necrotic lesions. This hypothesis is similar to our first two patients, who apart from the eggs of schistosomes at the level of the appendicular wall, no other germ could be highlighted to explain the appendicular infection. Other authors believe that the bilharzia infestation would cause obstruction of the appendicular light, thus facilitating a bacterial infection. For these authors, it is a bacterial appendicitis favored by a parasitic infestation [11]. Our third observation can be interpreted by this second argument, since in addition to the presence of schistosome eggs in the appendicular wall, the bacteriological examination of pus has highlighted a bacterium "*Escherichia colis*", both of these factors may explain the appendicular infection.

One of the peculiarities of this condition is the absence of anatomo-clinical correlation and polymorphism of the signs [3] [16]. Also appendicitis is not characteristic of any particular parasite, although some are localized in the cecum as oxyides [15].

The positive diagnosis of appendicitis is essentially clinical and the confirmatory diagnosis is exclusively histopathological [3] [16], so for the case of our patients, apart from their residence in a neighbourhood on the banks of the Niger River and the history of terminal hematuria found in a patient that were elements of diagnostic guidance; the clinical picture of these three bilharzia appendicitis was similar to bacterial appendicitis.

Histopathological examination describes the histopathological status of appendicitis [3]. In our study, this examination allowed us to confirm the bilharzia infestation of the appendix. The presence of Schistosome eggs requires specific antiparasitic treatment after appendectomy, with praziquantel at the single dose of 60 mg/Kg; since appendicular bilharzia is often associated with other visceral locations (bladder, intestinal, hepatosplenic…) [14]. In the absence of treatment, occlusive or neoplastic mechanical complications may occur. Only a histopathological examination can confirm the bilharzia involvement of the appendix, hence the interest of a systematic anatomo-pathological examination in front of any appendectomy piece [14].

6. Conclusion

Mali is in a zone of bilharzia endemic with the presence of schistosomiasis in almost all regions. Although schistosomiasis infection is rarely associated with acute appendicitis, studies in Africa have reported a significantly higher prevalence than in Western countries. Schistosomiasis is an important public health problem and should be considered as a possible cause of acute appendicitis, also acute appendicitis as a major complication of schistosomiasis. In order to avoid bilharzia appendicitis which is a potentially fatal pathology, prevention by the administration of praziquantel on a large scale such as regular neglected tropical disease campaigns, is the most effective and efficient strategy. Since the diagnosis is exclusively histological, all surgeons must systematically request anatomopathological examination of all appendectomy parts.

Ethics Statement

The study protocol was submitted to the National Ethics Committee for validation and approval. Informed consent from all participants was sought and obtained after translation into the Bambara language if necessary. The investigation sheet was signed before any interview.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Organisation mondiale de la santé (2022) Maladie Tropicale négligées: Ligne directrice sur la lutte et l'élimination de la schistomiase humaine; Recommandations fondées sur des preuves. https://www.who.int/fr/publications-detail/9789240041608

[2] Traoré, N.K., Coulibaly, Y.I., Dolo, H., Coulibaly, C.A., Sangho, H. and Doumbia, S. (2020) Étude des facteurs associés à la non compliance au traitement de masse ciblant les Schistosomiases dans le District Sanitaire de Bougouni, Bankass et Tominian. *Mali Santé Publique*, **10**, 71-78. https://doi.org/10.53318/msp.v10i1.1666

[3] Dembele, B.T., Traore, A., Togo, A. and Kante, L. (2023) Pathologies Chirurgicales Digestives. Ouvrage Collective, Figura Editions, Bamako.

[4] Sogoba, G., *et al.* (2021) Aspects cliniques et thérapeutiques des appendicites aiguës à l'Hôpital Fousseyni Daou de Kayes. *Health Sciences and Diseases*, **22**, 102-106.

[5] Karembe, B. (2023) Appendicites aiguës non compliquées a L'hôpital de district de la commune iv de Bamako. Thèse, Université des sciences et des techniques de Bamako, Bamako.

[6] Dicko, A. (2019) Appendicite aiguë au centre de santé de référence de la commune I du district de Bamako. Thèse, Université des sciences et des techniques de Bamako, Bamako.

[7] Zacarias, M., Pizzol, D., de Miranda1, H., Colangelo, A.C., Veronese, N. and Smith. L. (2021) Schistosomal Appendicitis: Case Series and Systematic Literature Review. *PLOS Neglected Tropical Diseases*, **15**, e0009478. https://doi.org/10.1371/journal.pntd.0009478

[8] Terada, T. (2009) Schistosomal Appendicitis: Incidence in Japan and a Case Report. *World Journal of Gastroenterology*, **15**, 1648-1649. https://doi.org/10.3748/wjg.15.1648

[9] Thiam, I., Doh, K., Dial, C., Agbobli, M., Diop, M. and Woto-Gaye, G. (2015) Étude nécropsique de 100 appendices au Sénégal. *Journal Africain d'Hépato-Gastroentérologie*, **10**, 73-79. https://doi.org/10.1007/s12157-015-0643-3

[10] Lattre, J.F. (1997) Appendicites aiguë et ses complications diagnostics, traitement. *Impact International*, 356.

[11] Kokaliaris, C., Garba, A., Matuska, M., Bronzan, R.N., Colley, D.G., *et al.* (2022) Effect of Preventive Chemotherapy with Praziquantel on Schistosomiasis among School-Aged Children in Sub-Saharan Africa: A Spatiotemporal Modelling Study. *The Lancet Infectious Diseases*, **22**, 136-149. https://www.who.int/fr/news-room/fact-sheets/detail/schistosomiasis https://doi.org/10.1016/S1473-3099(21)00090-6

[12] Mugahid, A.S. (2019) A Case of Acute Appendicitis due to Intestinal Schistosomiasis. *Annals of Medicine and Surgery*, **37**, 1-3. https://doi.org/10.1016/j.amsu.2018.11.015

[13] Marie, C. (2023) Shistosomiase. Le Manuels MSD pour le grand public. Verifié/revisé en sept 2023. https://www.msdmanuals.com/fr/accueil/infections/infections-parasitaires-trématodes-douves/schistosomiase

[14] Thiam, I., Doh, K., Seck, M., Kammoun, C. and Woto-Gaye, G. (2015) Appendicite bilharzienne: une lésion rare à propos de deux cas au Sénégal. *Bulletin de la Societe de Pathologie Exotique*, **108**, 161-164. https://doi.org/10.1007/s13149-015-0432-7

[15] Raymond, L. (2014) Schistosomiasis as a Rare Cause of Recurrent Acute Appendicitis—A Case Report. *International Journal of Surgery Case Reports*, **5**, 159-160.

https://doi.org/10.1016/j.ijscr.2014.01.008

[16] Gabbi, C., *et al.* (2006) Acute Abdomen Associated with Schistosomiasis of the Appendix. *Digestive Diseases and Sciences*, **51**, 215-217. https://doi.org/10.1007/s10620-006-3111-5