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An unexpected finding after robotic subtotal gastrectomy: Vomiting of *Taenia Saginata*

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ABSTRACT

INTRODUCTION: Most Human taeniasis are asymptomatic or associated with vague clinical manifestations, but cases of unusual migration of these parasites have been described.

PRESENTATION OF A CASE: A case of challenging diagnosis of human *Taenia Saginata* infection is here presented: during COVID-19 pandemic we performed a minimally invasive robotic subtotal gastrectomy for gastric angulus adenocarcinoma. 10 h after the end of the operation the patient presented an episode of vomiting with expulsion of a 5-meter-long adult form of *Taenia Saginata*.

DISCUSSION: Parasitic infections are more frequent in the developing countries; in our case the transposition of small intestinal loop surely promoted the migration of *Taenia Saginata* through the gastro-jejunal anastomosis into the gastric stump.

Preoperative evaluation (history, physical examination and imaging features) led to gastric cancer diagnosis and hindered the recognition of the taeniasis because of similar clinical presentations and the need to start quickly a therapeutic oncological strategy.

CONCLUSION: Even if these cases are exceptional especially in Western Europe, it is important to obtain a detail clinical history and exclude parasitic infection as a cause of loss of weight and gastrointestinal abnormalities.

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1. Introduction

Human taeniasis is a helminthic disease caused by three types of parasitic infection, *Taenia Solium*, *Taenia Saginata* and *Taenia Asiatica* [1]. Parasitic infections are more frequent in Eastern European countries, African region, Middle East region and Latin America, related to social, cultural, ecologic, hygienic, sanitation and economic status [2,3]; about the 0,7% of world population results infested.

Taenia Saginata infection is related to consumption of raw or undercooked beef containing viable cysticercus's larvae [4,5].

Most human carriers of adult tapeworms are asymptomatic and intermittently patients may pass proglottids in the stool or spontaneously. Associated symptoms are usually vague: nausea, anorexia, epigastric pain, weakness, weight loss, abdominal discomfort, diarrhea or constipation [6]. We describe here a rare case of a taeniasis parasitosis diagnosed in a patient only after he underwent minimally invasive robotic subtotal gastrectomy for gastric cancer. In fact, the loss of weight was strictly ascribed to the gastric cancer and moreover it

was detected during the COVID-19 pandemic, when all the efforts were throughout directed at screening for SARS-CoV-2 detection. To best of our knowledge, this is the first case of taeniasis parasitosis presenting after gastric surgery described in literature.

2. Materials and methods

We report a single case of unexpected *Taenia Saginata* identification in a patient admitted to our Institution with the diagnosis of gastric cancer and treated by minimally invasive robotic subtotal gastrectomy with double loop Roux-en-Y reconstruction.

This case report is reported in line with the SCARE 2018 criteria [7].

3. Case report

A 57-year-old male patient was admitted to our unit of General Surgery with a recent diagnosis of ulcerated gastric angulus adenocarcinoma. In anamnesis he reported a history of emphysematous chronic obstructive pulmonary disease (COPD), previous appendectomy and laparoscopic suture repair of perforated gastric ulcer.

The patient reported a weight loss of about 15 kg in the last 12 months associated with abdominal discomfort, heartburn and

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Fig. 1. *Taenia Saginata* observed in the immediate post-operative time.

repeated vomiting episodes. A gastroscopy was performed and a 25 mm ulcerated lesion with irregular edges was revealed at the gastric angulus towards the antrum. Biopsy confirmed a high grade dysplasia associated to adenocarcinoma. No metastatic disease was detected at the staging chest-abdomen CT scan and no clear imaging compatible with parasite bowel infection was detected. The physical examination revealed a state of under-nutrition and tender abdomen; laboratory values were normal. To complete the pre-operative phase, a pharyngeal swab for testing SARS-CoV-2-PCR was performed and a negative result was obtained. After multidisciplinary discussion and preoperative evaluation, the patient was operated from a skilled surgeon on full robotic subtotal gastrectomy with double loop Roux-en-Y reconstruction with standard D2 lymphadenectomy (according to JGCA 2011 gastric cancer classification, 2017 NCCN gastric cancer guidelines) with the application of the da Vinci Si system (Intuitive Surgical Inc, Sunnyvale, CA, USA). No intraoperative complications were registered and blood loss were minimal; two abdominal drains were placed and nasogastric tube was removed before awakening. In the immediate post-operative time, about 10 h from the end of surgical intervention, the patient presented with vomiting and sero-ematic material with a single, 5 m-long, yellowish-white colored, elastic, motile tenia and one knot were observed (Fig. 1). At the parasitological analysis it resulted in *Taenia Saginata*; a strobilus with a high number of proglottids and eggs were identified and no scolex was clearly detected. After consultation with infectious disease team, as soon as the oral intake restarted in fourth postoperative day (POD), a 3 days-therapy with single oral dose albendazol (400 mg) therapy was achieved and a progressive disappearance of eggs in the stools was registered till negative parasitological stools research was obtained. After a new medical interview the patient reported occasional episode of evacuation of filamentous stools and he assumed that he usually did not eat uncooked meat even if he couldn't be sure that it was never happened.

During the postoperative hospital stay, in fourth POD, a water-soluble-contrast upper gastrointestinal X-ray imaging was performed and gastrointestinal outflow resulted regular in absence of anastomotic leakage.

In sixth POD the patient presented with fever and blood exams revealed an increase in C reactive-protein rate (28 mg/dl) with normal white blood cells count. To exclude Covid-related pneumonia, second pharyngeal swab for testing SARS-CoV-2-PCR was repeated, resulted negative; a chest-abdomen CT scan was performed and posterior basal bilateral segments pneumonia without abdominal abnormalities was described. An intravenous broad spectrum empiric antibiotic therapy was added leading to clinical improve-

ments; a high caloric fractionated diet was optimized and the patient was than discharged in 13th POD.

The histological examination of the tumor revealed a poorly differentiated both intestinal and signet ring cell carcinoma, 57 lymphnodes were harvested and none metastasis were found (pT1b; pN0; pMx; pR0 according to AJCC 8th edition).

4. Discussion

Parasitic infections are more frequent in the developing countries where they represent an important public health problem. A systematic review, focusing on the distribution of anthelmintic drugs, showed that estimated taeniasis prevalence in West Europe ranges from 0.02% to 0.67%, with the lowest rate being reported in Denmark and Italy (0.02–0.04%) [8]. Infection is due to nutrition habits, human is the definitive host of the adult form while the larval stages develop in the tissue of cattle which is the intermediate host. In particular *T. Saginata* is one of the most common pathogenic cestodes in humans and once the cysticercus is ingested, the adult worm develops in about 60 days, inhabiting in the small intestine and attaching to the mucosal surface using four suckers on their anterior scolex.

Taenia Saginata infections are usually asymptomatic; they might cause abdominal pain, nausea, loss of appetite, diarrhea or constipation. In addition, cases of aberrant migration of the proglottids have been reported in literature leading rarely to acute surgical conditions such as acute appendicitis, pancreatitis, cholecystitis, Meckel's diverticulitis, bowel obstruction or perforation, anastomotic leakage (colonic and esophagus-jejunal anastomosis leakage) or appendicular stump dehiscence, liver abscess [9,10]. The certainty diagnosis should be achieved by identification of eggs or proglottids in stool samples or using a cellophane-tape swab in the perianal region, approximately 3 months after infection, conversely serologic tests are not helpful. As far as clinical presentation is concerned, only non-specific symptoms may be involved such as nausea, anorexia, epigastric pain, weakness, weight loss, abdominal or/and anal region discomfort, diarrhea or constipation. In our report, the patient complained of weight loss, a vague abdominal discomfort and heartburn; however, the synchronous diagnosis of gastric adenocarcinoma further hindered the suspicious and recognition of the taeniasis because of similar clinical presentations and the need to get started quickly a therapeutic oncological strategy. Only at the second clinical interview, after taenia expulsion, the patient reported recurrent episodes of impaired stool shape evacuation leaved out before the hospital admission.

Taeniasis is preventable by strict inspection of beef that should be cooked to 60 °C for over 5 min before consumption. Oral assumption of antiparasitic drugs, such as praziquantel (5–10 mg/kg), albendazole (400 mg 3 days long) and niclosamide (4 × 500 mg), represent the standard treatment of the disease because of their effectiveness and low rate of side effects [5,9–18].

In our report surgeons didn't observe the tapeworm during the demolitive phase neither during the surgical reconstruction with the transposition of small intestinal loop, that surely promoted the migration of *Taenia Saginata* through the gastro-jejunal anastomosis into the gastric stump.

To the best of our knowledge, no cases are reported in literature of *Taenia* finding after partial gastrectomy for gastric cancer [19–23] although two cases respectively of rare route of expulsion from anastomotic esophageal leak after esophagectomy for esophageal cancer and an oral expulsion after laparotomy for acute segmental jejunitis were described [24,25]. Interestingly, in these both cases and in our, the finding of *Taenia* occurred in the postoperative time and no direct view of the parasite was gained during the surgery.

5. Conclusion

Most Human taeniasis are asymptomatic or associated with vague symptoms. Rarely the parasite is accidentally found during or after surgical procedure. These cases are exceptional, anyway it's important to achieve a detailed clinical history and keep in mind parasitic infection as a cause of loss of weight and gastrointestinal abnormalities to reduce the risk of an undetected causes that could affect the patient fitness before a surgical procedure.

Declaration of Competing Interest

All authors have no conflicts of interest.

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A.C.O.I. school of laparoscopic surgery.

Ethical approval

The study is exempt from ethical approval in our institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author's contribution

N. Albertini: data collection, writing the paper.
M. Piccoli: study concept.
F. Pecchini: writing the paper.
S. Esposito: study design.
D. Gozzo: data collection.
G. Colli: data interpretation.

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