

## Acute Appendicitis as Complication of Colon Transit Time Study; A Case Report

Leila Ghahramani<sup>1</sup>, Reza Roshanravan<sup>1</sup>, Shahin Khodaei<sup>2</sup>, Salar Rahimi Kazerooni<sup>1</sup>, Sam Moslemi<sup>1\*</sup>

1. Colorectal Research Center , Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of General Surgery, Shiraz University of Medical Sciences, Shiraz, Iran

### ABSTRACT

Colon transit time study with radio opaque markers is a simple method for assessment of colon motility disorder in patients with chronic idiopathic constipation. We report a case of acute appendicitis that was induced by impaction of radio opaque markers after colon transit time study. We think that this case report is first significant complication of colon transit time study until now.

### KEYWORDS

Colon transit time study; Radio opaque marker; Chronic constipation; Acute appendicitis

Please cite this paper as:

Ghahramani L, Roshanravan R, Khodaei S, Rahimi Kazerooni S, Moslemi S. Acute Appendicitis as Complication of Colon Transit Time Study; A Case Report. *Middle East J Dig Dis* 2015;7:185-8.

### INTRODUCTION

The main functions of colon as a vital organ consists of absorption of water and electrolytes, slow movement of contents distally, retention of fecal material in distal colon and voluntary defecation.<sup>1</sup> Constipation, diarrhea, fecal incontinence, and lower abdominal pain are the most common symptoms of colonic dysmotility. The first line of diagnosis includes careful history taking, precise physical examination, and laboratory tests. An endoscopy or contrast radiological study is conducted to dismiss an organic cause. Functional bowel disorder will be confirmed in the absence of organic reasons for the symptoms.<sup>2</sup> Colon transit can be quantified by different methods; the most commonly used is radiological study. The number of markers in different parts of colon will be counted in serial abdominal radiographs. These methods do not provide a dynamic picture of colon activity and do not always show a meal behavior in the colon. Manometric studies provide a possibility of measurement of colon activity but they are invasive and difficult to relate to the transit of the meal through the bowel.<sup>3,4</sup> The total and segmental colonic transit time makes the identification of motility alteration in different colon segments as the cause of constipation possible.<sup>4</sup> In this technique, patients ingest 20 markers each on the three successive days then the plain radiography of the abdomen is performed on the fourth, seventh, and in some cases on the tenth day. If over 80% of the markers are passed on day<sup>5</sup>, the colon transit is considered normal and if the markers are scattered in the colon, the diagnosis will most likely be hypo-motility or colonic inertia. The functional outlet delay, internal rectal prolapse and anismus will be confirmed with

\* **Corresponding Author:**  
Sam Moslemi, MD  
Shiraz University of Medical Sciences,  
Shiraz, Iran  
Tel: + 98 71 32306972  
Fax: + 98 71 36462529  
Email: tahghighat\_co@sums.ac.ir  
Received: 10 Jan. 2015  
Accepted: 11 Mar. 2015

accumulation of remaining markers in the rectum or rectosigmoid.<sup>5</sup>

Appendicitis is the most common cause of acute abdomen in almost all ages.<sup>6</sup> Appendicitis secondary to hyperplasia of the appendiceal lymphoid follicles following a bacterial or viral infection is the most common etiology of appendicitis in children. While the appendicitis following fecal material or fecalith occurs more commonly in adults.<sup>7,8</sup> Foreign body-induced appendicitis is less common among patients and the first case was reported in 1735.<sup>9</sup> In past centuries, hand-sewing needles or buckshots in the meat from wild hunting games were the main cause of foreign body-induced appendicitis. The management of these cases was appendectomy despite being a controversial issue, especially in asymptomatic patients.<sup>10-12</sup>

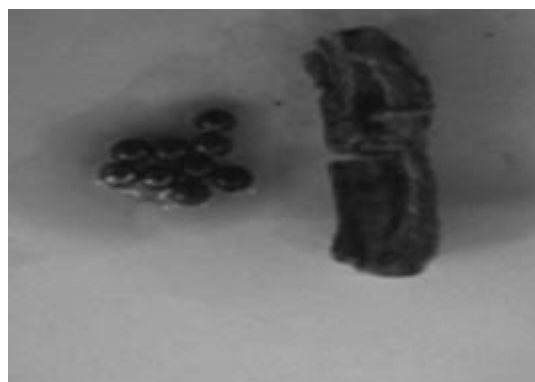
Herein, we present a case of chronic constipation that underwent colon transit time study that was presented with acute appendicitis. To the best of our knowledge, this is the first significant complication of colon transit time study until now.

#### CASE REPORT

A 45-year-old man referred to the Colorectal Research Clinic at Faghihi Hospital, Shiraz University of medical Sciences, Shiraz, southern Iran, because of persistent chronic constipation lasting many years. He underwent colon transit time study to evaluate colon motility. Considering the positive finding for colon inertia, medical management was initially started for him. After one month, he came to our emergency department with the chief complaint of abdominal pain. After primary evaluation, he was admitted to the general surgery department to rule out acute appendicitis. In plain abdominal radiograph, multiple metallic bodies were detected in the bowel (figure 1) and so he scheduled for diagnostic laparoscopy. Upon laparoscopy, because of detecting a hard swelled appendix with significant inflammatory changes, appendectomy was performed. The appendix was opened in the operation room and multiple impacted radio opaque markers were detected (figure 2). The post-operation time was uneventful and he was discharged and referred



**Fig. 1:** Plain Abdominal radiograph showing a chain of metallic bodies in Right Lower Quadrant



**Fig. 2:** Transected Appendix and Metallic Bodies after laparoscopic Appendectomy

to the Clinic for further management of his chronic constipation.

#### DISCUSSION

Foreign body ingestion is usual in pediatric patients, but rare in adults. Prisoners and patients with mental disorders constitute this group.<sup>13</sup> The prevalence of appendicitis caused by foreign body is roughly 0.0005%.<sup>14</sup> Various objects including sewing needles, retained shot pellets, tongue studs, endodontic files, drill bits, dog hair, toothbrush bristle, toothpicks, fishing lines, mercury (after ingestion of the bulb of a thermometer), condom fragments, vegetable seeds, fruit seeds, pits, and worms are trapped in appendiceal lumen.<sup>6,15</sup> It has been reported that needles, pins, screws and buckshots were the most common foreign bodies causing appendicitis.<sup>10-12</sup> These radiopaque objects are heavier

than gastrointestinal (GI) contents and because of the position of cecum and its low motility such foreign bodies tend to be trapped in this part. The entry to appendiceal lumen is affected by some factors including the orifice of appendiceal lumen and anatomical position of the appendix. Considering the upward position of retrocecal appendix, entry of foreign material into the lumen is almost impossible which may be related to partial kinking or narrowing of its orifice. The complicated or uncomplicated appendicitis depends on shape, size, and nature of foreign bodies trapped in the appendix. Foreign bodies can be divided into high-risk and low-risk groups based on their physical characteristics. The high-risk group consists of sharp, elongated, or pointed objects that usually cause perforation, appendicular abscess, and peritonitis while the other group includes objects with blunt or round borders that cause obstruction of the appendiceal lumen and remain dormant for a long time.<sup>10</sup> In one investigation of 256 patients with foreign body induced appendicitis over 10 years, the researchers concluded that in patients with sharp, stiff, or metallic foreign bodies in the appendix, 93% were symptomatic, and inflammation and perforation was seen in 88% and 77% of the patients, respectively. However, only 66% of the patients with blunt or round firm foreign bodies with smooth border in the appendix showed symptoms. Klinger and co-workers reported that appendicitis caused by high-risk objects was seen in about 75% of the patients, while less than 12% of patients had low-risk foreign bodies in their appendix.<sup>10</sup> Since most foreign bodies trapped in the appendix are radiopaque and detectable in serial plain abdominal radiography and can be observed as hyperechoic lesion with shadows in sonography, the suspicion of appendicitis for physicians will be easy. Other symptoms contributing to the recognition of appendicitis are inflammation following at least partial obstruction and McBurney tenderness in asymptomatic patients. Therefore, no more work-up would be necessary in this situation. Most patients with high-risk foreign bodies in the appendix showed obvious symptoms. Therefore, prophylactic appendectomy is considered as a fea-

sible treatment for such patients. It was mentioned that even blunt objects that are usually enclosed by fecal material would lead to the obstruction of appendiceal lumen in the long-term and subsequent sub-acute or chronic appendicitis or occasionally mucocele.<sup>15</sup> Also, poisoning is another complication of buckshot foreign bodies in the appendix. According to these problems, regardless of the type and nature of the foreign bodies and whether or not the patients are symptomatic, all patients should be appendectomized.<sup>8,10</sup> In some publications, there are various recommendations including fluoroscopy-guided colonoscopy and laparoscopy to remove the foreign body contained in appendix before the final decision for appendectomy.<sup>11,16</sup>

In one case report of a 20-year-old man with signs and symptoms of appendicitis with abnormal laboratory tests, a metallic foreign body was found in abdominal radiography, which was confirmed as a needle by computed tomography. During laparoscopic exploration, a slightly thickened and inflamed appendix was found, most likely because of the erosion of the needle close to the neck of the appendix. The patient was discharged with no post-operative complications.<sup>15</sup>

Antonacci and colleagues reported a 45-year-old man with a history of eating marrowbone approximately 15 years prior to the time of admission who presented with lower right-side abdominal pain. Abdominal radiography and computed tomography respectively revealed radio-opaque formation and a massive round filling defect in the iliac fossa. Laparoscopic appendectomy was performed and the patient was discharged 2 days later with no complication.<sup>17</sup>

Appendicitis caused by eating geese hunted by lead pellets from a shotgun was reported in an 8 year-old boy. During laparoscopic appendectomy 57 lead pellets were recovered in the lumen of the appendix.<sup>18</sup>

We reported a case of appendicitis caused by colon transit time study as a complication of this diagnostic method. Since this patient had chronic constipation and was prone for impaction of radio-opaque markers in the appendiceal lumen and

subsequent appendicitis, we believe that long-term follow-up after colon transit time study and taking plain abdominal radiographs a few days later can be feasible. On the other hand, recently, radio nucleotide study has been considered as a beneficial alternative with no recognized complication.

Colon transit time study is a simple method for evaluating colon motor disorders, but it can be dangerous. The position of the appendix and its wide orifice can be a threatening factor for trapping the markers. Long-term observation and use of nonmetallic markers can be suitable.

#### ACKNOWLEDGMENT

Special thanks to Dr. Atefeh Yousefi Pourdargah for editing and final revising of the manuscript. Also thanks to the patient and his family because of their cooperation.

#### CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

#### REFERENCES

- Sarna SK. Physiology and pathophysiology of colonic motor activity. *Dig Dis Sci* 1991;**7**:998–1018.
- Wang SJ, Tsai SC, Lin WY, Chen GH. A simple method for preparing radioactive capsules in colon transit study. *Eur J Nucl Med* 2000;**27**:857–860.
- Proano M, Camilleri M, Phillips SF. Transit of solids through the human colon: regional quantification in the unprepared bowel. *Am J Physiol* 1990;**258**:G856-62.
- Moreno-Osset E, Ballester J, Mínguez M, Mora F, Benages A. Colonic transit time (segmental and total) in healthy subjects and patients with chronic idiopathic constipation. *Med Clin (Barc)* 1992;**98**:201-6.
- Zaslavsky C, da Silveira TR, Maguilnik I. Total and segmental colonic transit time with radio-opaque markers in adolescents with functional constipation. *J Pediatr Gastroenterol Nutr* 1998;**27**:138-42.
- Banani SA. Appendicitis Caused by Metallic Foreign Body in the Appendix. *IJMS* 2010;**35**:335-8.
- Dunn JCY. Appendicitis. In Grosfeld JL, O'Neil JA(eds), pediatric Surgery (6th ed.), Mosby, Inc. 2006, chap. 98.
- Maa J, Kirkwood KS. The Appendix. In) Townsend CM Jr. Beauchamp RD (eds), Sabiston Textbook of Surgery (18th ed). Saunders; 2008, chap.49.
- Creese PG, the first appendectomy. *Surg Gynecol Obstet* 1953;**97**:643-52.
- Klinger PJ, Seelig MH, DeVault KR, Wetscher GJ, Floch NR, Branton SA, et al. Ingested foreign bodies within the appendix: A100-year review of the literature. *Dig Dis* 1998;**16**:308-14.
- Klinger PJ, Smith SL, Abendstein BJ, Brenner E, Hinder RA. Management of ingested foreign bodies within the appendix: a case report with review of the literature. *Am J Gastroenterol* 1997;**92**:2295-8.
- Zampieri N, Zuin V, Ottolenghi A, Camoglio FS. Recurrent abdominal pain due to buckshots in the appendix. *Acta Paediatr* 2008;**97**:983-4.
- Ozkan Z, Kement M, Kargı AB, Censur Z, Gezen FC, Vural S, et al. An interesting journey of an ingested needle: a case report and review of the literature on extra-abdominal migration of ingested foreign bodies. *J Cardiothorac Surg* 2011;**6**:77.
- Simkovic D, Hladík P, Lochman P. Unusual cause of the acute appendicitis. [Article in Czech] *Rozhl Chir* 2004;**83**:365-7. [Abstract].
- Hazer B, Dandin O, Karakaş DO. A rare cause of acute appendicitis: an ingested foreign body. *Ulus Travma Acil Cerrahi Derg* 2013;**19**:570-2.
- Meltzer SJ, Goldberg MD, Meltzer RM, Claps F. Appendiceal obstruction by a toothpick removed at colonoscopy. *Am J Gastroenterol* 1986;**81**:1107-8.
- Antonacci N1, Labombarda M, Ricci C, Buscemi S, Casadei R, Minni F. A bizarre foreign body in the appendix: A case report. *World J Gastrointest Surg* 2013 **27**;**5**:195-8.
- Zardawi I, Siriweera E. Pellets in the Appendix. *N Engl J Med* 2013;**369**:e7.