PJSS Vol. 66, No. 3, July-September, 2011

PJSS PHILIPPINE JOURNAL OF SURGICAL SPECIALTIES

Appendiceal Duplication

Jefferson U. Nodad, M.D.

Department of Surgery, Quezon City General Hospital and Medical Center

A case of a 23 year old male, presenting with signs and symptoms of acute appendicitis is presented. Intra-operative findings consisted of two appendices, both in acute appendicits, attached to the single cecum.

Key words: Vermiform appendix , appendiceal duplication

Acute appendicitis has been recognized as one of the most common cause of severe acute abdominal pain worldwide. Numerous advances in the diagnosis and treatment of appendicitis have emerged in the past 125 years. Anomalies of the appendix are rare and are usually found in the adult population as an incidental finding during the course of surgery. Inflammation of the two appendices separately can cause diagnostic difficulty at an initial operation or subsequent exploration. The anomaly can mimic other conditions such as diverticulitis in adults. Awareness of this anomaly can prevent errors in clinical management.

The Case

J.M., a 23 year old male, single, Filipino, Roman Catholic, residing at Tandang Sora, Quezon City, was admitted for the first time at the Quezon City General Hospital on January 16, 2010, due to right lower quadrant abdominal pain. Two days prior to admission, patient suddenly experienced a generalized colicky abdominal pain associated with anorexia and nausea, followed by 3 episodes of non-billous vomiting. He consulted in a nearby clinic where he was given unrecalled medication which afforded slight relief. The pain became dull and steady at the mid-abdominal region which was aggravated by coughing. Few hours prior to admission, pain migrated to the right lower quadrant of the abdomen same in character, now accompanied by low grade fever. Persistence of the above condition prompted patient to seek consult at our institution hence admission.

Patient had no history of previous hospitalization nor undergone any surgical procedure. He has no family history of hypertension, diabetes mellitus, asthma and bleeding disorder. He denies allergies to any food or drugs.

The patient had no headache, dizziness, blurring of vision, hearing loss, difficulty of breathing, chest pain, palpitation, dysuria, flank pain, bloatedness, diarrhea, constipation, melena nor hematochezia.

The patient on presentation was conscious, coherent, ambulatory, not in cardio-respiratory distress, fairly developed and well nourished. Vital signs were within normal limits and the measured axillary temperature was 37.4ºC. Examination findings of the head, neck, and chest were all normal. The patient's abdomen was flat, non-distended and with normo-active bowel sounds. The right lower quadrant had direct and rebound tenderness. Rovsing's and psoas signs were both positive. Digital rectal rectal examination revealed normal findings. Blood leukocyte count was 15, 000 and urinalysis showed 0-1 RBC's and a pus cell count of 2-4. (Tables 1 & 2) The admitting impression was acute appendicitis.

Routine pre-operative care with pre-operative hydration and antibiotics were instituted.

Table 1A.

Hemoglobin	150
Hematocrit	0.44
WBC	15
Segmeters	0.85
Lymphocytes	0.25
Monocytes	

Table 1B.

Specific Gravity	1.012
Sugar	Negative
Protein	Negative
WBC	2-4/hpf
RBC	0-1/hpf

Regional spinal anesthesia was started after proper NPO preparation. The patient was placed in the supine position and appropriate pre-operative antiseptic procedures were done. A Rockey-Davis incision was made and carried down to the peritoneum.

An inflamed retro-cecal appendix was identified, measuring 8cm x 1cm x 1cm in length.

On inspection of the ileum, an elongated mass was noted approximating 1.5cm from the base of the appendix along the taenia coli, in close relation to the ileocecal valve. Measuring 4cm x 1cm x 1cm, the second appendix was likewise inflamed and was mistaken for an appendiceal epiplocae. On isolation, the mass was noted to have its own blood supply. The tip was incised revealing its lumen. Both mesoappendix and appendiceal artery of the first isolated appendix were ligated. The base of the appendix was crushed with a clamp and the proximal edge of the crushed segment was doubly ligated. The appendix was amputated and the exposed mucosa of the appendiceal stump was cauterized. After the first appendectomy, same procedure was done on the said isolated elongated mass (Figure 1). Both specimens were sent to laboratory for histopathological analysis. It was labeled appendices A and B with separate request. The peritoneum, transversalis fascia, internal oblique, aponeurosis of the external oblique, subcutaneous tissue and skin were closed in layers.

The postoperative course was unremarkable. The patient was put on regular diet on the second post-operative day. No problems were identified during the first week post-discharge out-patient follow-up consultation.

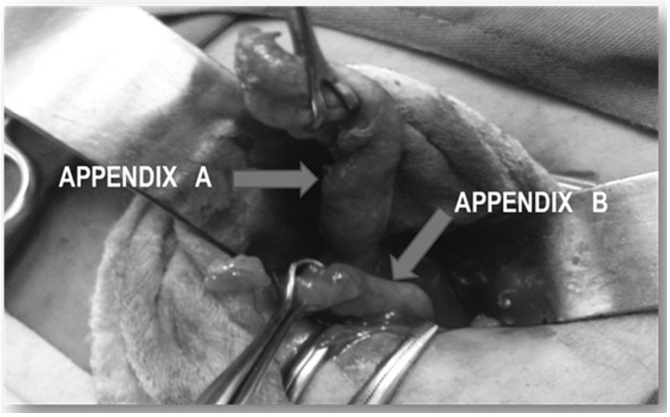

Figure 1

Discussion

Although normal embryogenesis of appendix is well known, the pathogenesis of its duplication remains unclear. Several theories have been formulated in an attempt to explain the gastrointestinal duplication. In a case report by Jimenez SG, et al., the following were enumerated: the split notochord theory, failure of the normal regression of embryonic diverticula, the median septum formation, and partially twinning procedure. In another citation that was presented by Waugh in 1941, he described the three types of appendiceal duplication. A double barreled appendix, the bird type paired appendix, has two appendices symmetrically placed on either side of the ileocaecal valve. The last type was Taenia coli type having a normal appendix at the usual site with another appendix though smaller, on a taenia coli. In 1962, Wallbridge classified duplication of the appendix into three types[2]: Type 'A': partial duplication of the appendix of various degrees on a single caecum. Type 'B': a single caecum with two completely separate appendices. This is further subdivided into type 'B1', which is also called

'bird like appendix' due to resemblance of the normal arrangement in birds (where there are two appendices symmetrically placed on either side of the ileocaecal valve); Type 'B2' also called a 'taenia coli' type where one appendix arises from the usual site on caecum with another rudimentary appendix from the caecum almost always along the line of taenia coli at a varying distance from the first. Type 'C': double caecum, each bearing an appendix. In relation to this classifications our case is of Type 'B2' variety where one appendix is on retrocaecal in position that arose from the normal site while the other appendix, smaller in size though not rudimentary was placed on the anterior taenia coli about 1.5cm away from the base of normally placed appendix.

Variation in the size and position of the appendix is a common finding but duplication is rare like the case presented earlier. The first description of duplication of the vermiform appendix was made by Picoli in 1892.[3] Collins found four cases of appendix duplex in a study of 50,000 human appendices [4], an incidence of 1 in 12,500. However, fewer than 100 cases have been reported in the world literature.[5] One case of triple appendix has been recorded.[6] With regards to local data, the Philippine Journal of Surgical Specialties has not published any case of appendiceal duplication at present. In our institution, the first recorded data of double appendix was this particular case.

Anomalies of the appendix are rare and are usually found in the adult population as an incidental finding during the course of surgery. Inflammation of the two appendices separately can cause diagnostic difficulty at an initial operation or subsequent exploration.[5] In correlation to this patient it was not observed. Awareness of this anomaly can prevent errors in clinical management and possible litigation.

The Cave-Wallbridge classication of duplication of the appendix, based on reported cases, was devised and divided these duplications into three types [7]: Our patient belongs to the type B2 anomaly since he was observed to have normally located appendix arising from the caecum at the usual site and a second separate rudimentary appendix located along the line of one of the taenia. (Figure 2)

Cave put forward two theories for the pathogenesis of duplex appendix: a) supernumerary appendix due to persistence of a transient embryological structure; b) appendiceal duplicity incidental to a more general affection of the primitive midgut.[8] Cave's theories may explain this duplication, but they are not enough to explain all types.

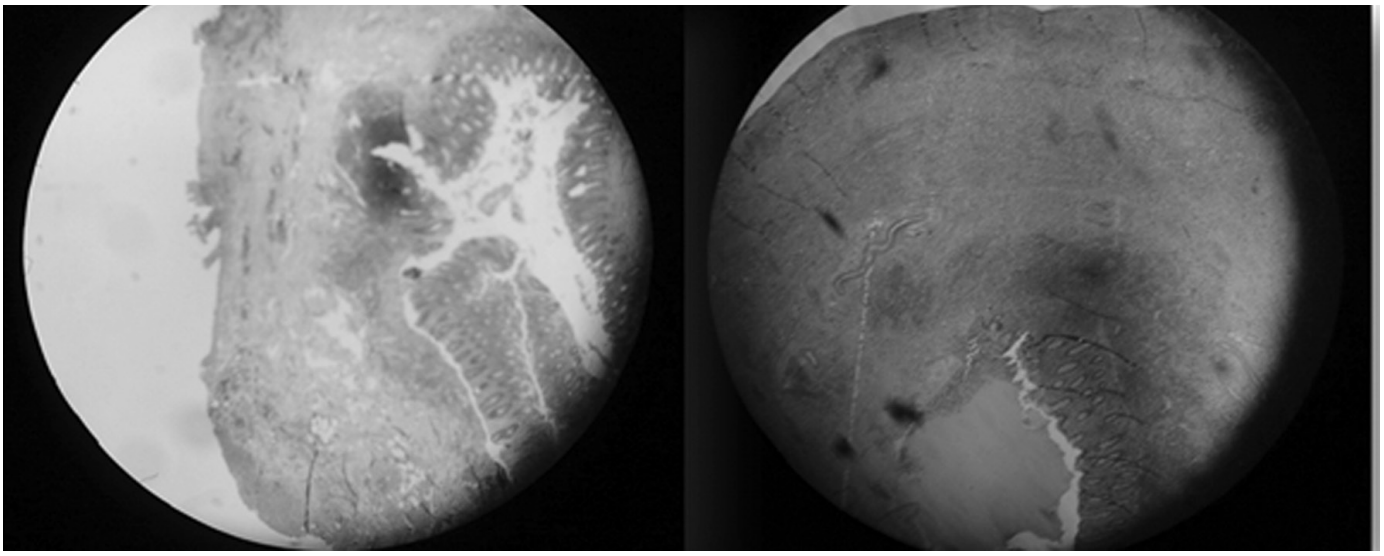

Figure 2. Histological analysis confirms the typical appearance of appendiceal wall with lymphoid follicles and smooth muscle.

Duplication of appendix must be distinguished from solitary diverticulum of the caecum, a difficult differentiation best made by histological examination. A diverticulum of the caecum is normally sited on the inner aspect of ileocaecal angle, and the wall of the diverticulum does not demonstrate lymphoid tissue microscopically.[7] A further abnormality that should be considered in the differential diagnosis is diverticulosis of the appendix, seen in 0.004% – 2.1% of specimens.[9]

Considering the fact that duplication anomalies of the appendix are uncommon, they have significant medico- legal impact. As one of the physician's duty to his patient, he is bound to possess knowledge and skill of his profession and it is also his duty to utilize this knowledge and skill with care and diligence (Pedro Solis, Medical Jurisprudence – Civil Liabilities of Physicians). Maizels[7] reported a case in which a child had appendectomies performed twice in a 5 month period and Bluett[11] described a case of duplication of appendix mimicking adenocarcinoma of the colon; greater awareness of the condition amongst surgeons is important.[12]

Duplication of the appendix is very uncommon anomaly. Each patient must be assessed clinically regarding the need for surgical intervention; an appendectomy scar does not always exclude acute appendicitis. Failure to recognize this condition may have serious clinical and medico-legal consequences.

References

1. Jimenez SG, et al. Colonic duplication: a rare cause of obstruction. Gastroenterol Hepatol 1999; 14: 889.
2. Wallbridge PH. Double appendix. Br J Surg 1963; 50: 346.
3. Tinckler LF. Triple appendix vermiformis - a unique case. Br J Surg 1968; 55: 79-814.
4. Collins DC. A study of 50,000 specimens of the human vermiform appendix. Surg Gynaecol Obstet 1995; 101: 437-4462.
5. Cave AJ. Appendix vermiformis duplex. J Anat 1936; 70: 283–292.
6. Payan HM. Diverticular disease of the appendix. Dis Col Rect 1977; 20: 473–476.
7. Maizels G. Duplication of the vermiformis appendix. S Afr Med J 1966; 40: 1123.
8. Bluett MK, Halter SA, Salhany KE, O'Leary JP. Duplication of the appendix mimicking adenocarcinoma of the colon. Arch Surg 1987; 122:817-8209.
9. Mitchell IC, Nicholls JC. Duplication of the vermiform appendix. Report of a case: review of the classification and medicolegal aspects. Med Sci Law 1990; 30: 124–126.