CASE REPORT

Encountering a lateral pouch acute appendicitis in pediatric age group: case series study

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ABSTRACT

Background: Facing lateral pouch appendicitis (LPA) is unusually encountered by pediatric surgeons, and usually, these cases carry intraoperative challenges due to their unpredictable location and are difficult to locate. Pediatric surgeons should be aware of this and anticipate encountering such cases. Diagnosis of acute appendicitis is based on clinical, laboratory, and imaging modalities. Moreover, the same diagnostic strategy is applied for LPA, but with more challenges since its location sometimes gives atypical presentations, with difficulty in finding the appendix during the ultrasonographic radiological imaging.

Case Presentation: A total of three cases of acute appendicitis were presented, which were managed surgically. Intra-operatively, an appendix was found retroperitoneally with its base in the posterior wall of the cecum, while the terminal ileum was set in a retroperitoneal fashion alongside the lateral abdominal wall. This is an unusual location, which carries challenges during dealing with such cases.

Conclusion: It was assumed that this is a considerable health concern that needs to be investigated. Clarifying the outcome in these cases, and describing the intraoperative findings, would help us understand the condition. Increase the awareness around the health care community, in order to manage these cases properly in terms of understanding the diagnostic challenges, and surgical interventions, and to prevent or decrease the intra-operative complications.

Keywords: Acute appendicitis, lateral pouch appendicitis, abnormal position, appendectomy, case report.

Introduction

Appendicitis is an inflammation of the vermiform appendix, and it is a common medical problem, with a lifetime occurrence of 7% [1]. In the United States, pediatric cases of appendicitis occur at a rate of 70,000 per year [2]. The incidence between birth and age 4 years is 1-2 cases per 10,000 children per year. The rate of occurrence increases to 25 cases per 10,000 children per year between the ages of 10 and 17 years of age [3].

The posteromedial wall of the cecum normally gives rise to the tube-like vermiform appendix. It consists of a base, a body, and a tip. Approximately 2 cm below the level of the ileocecal junction, it connects to the cecum through an aperture [4].

Lateral pouch appendicitis (LPA) is a rare form of acute appendicitis that occurs in children and only accounts for 0.08% of all cases [5], characterized by a switch in the position of the appendix, and at the point at which the ileum connects to the cecum, due to abnormality in cecal rotation [6].

While this condition is not as common as other locations of acute appendicitis, it could be more difficult to diagnose and lead to more serious complications [1].

The most common risk factors associated with LPA are lymphoid tissue hyperplasia, appendiceal fecolith, fecal stasis, and ingestion of foreign objects [7]. Early...
detection and treatment of LPA is crucial, as it can lead to serious complications if not addressed properly [8].

This study aimed to discuss important aspects of embryology, pathophysiology, and anatomy of an unusually located lateral pouch appendix. Hence, the clinical approach of lateral pouch acute appendicitis was discussed. Moreover, this study would enrich the media by sharing photos, and videos that were taken during the procedure of laparoscopic appendectomy (LA).

Case Presentation

It was a descriptive case series review of electronic files. Patient information was taken from the electronic medical record at King Khalid University Hospital and Al Mamlakah Hospital-Riyadh, who were admitted to the pediatric surgery department. Patients who had lateral pouch acute appendicitis seen intraoperatively are included in the study.

Case 1

An 11-year-old medically free female, presented with abdominal pain for 1 day, the pain was localized at the lateral abdominal wall, associated with nausea and vomiting. On abdominal examination, there was a tenderness that was more lateral than expected for appendicitis, and positive rebound tenderness, with no signs of urinary tract infections, constipation, or diarrhea.

The ultrasound confirmed appendicitis with the appendix sitting laterally, a computed tomography (CT) scan revealed an enhancing wall appendix with multiple fecaliths, and no abnormal rotation was described in the report. Diagnostic LA was done. Intra-operatively an appendix was seen medial and the terminal ileum was seen lateral and sub-peritoneal, no release or mobilization of the terminal ileum was done, and the patient discharged 2 days later was doing well.

Case 2

An 11-year-old medically free female, presented to the Emergency Department with intermittent right lower quadrant abdominal pain that started 2 days ago, aggravated by movement and relieved by rest, associated with nausea and vomiting, the patient reported a history of not passing stool for the past 3 days. On the physical exam, the patient was vitally stable but had a temperature of 38.1°C, there was right lower quadrant tenderness with guarding and negative rebound tender.

The white blood cell (WBC) count was 25.5 per µl, mainly neutrophilia. The ultrasound showed evidence of appendicitis. LA was made, and findings of the high sub-hepatic cecum with retro-cecal entire length gangrenous appendix measure 6.5 × 1.2 cm (Figure 1). The appendectomy was done successfully. The patient was discharged 6 days later in stable condition.

Case 3

A 12-year-old medically free male, presented with right lower quadrant pain and vomiting for 1 day, the pain started as para-umbilical and then shifted to the right lower quadrant. On the physical exam, he was vitally stable and afebrile, abdominal palpation revealed McBurney’s point tenderness and positive rebound tenderness.

WBCs were mildly elevated at 11.4 per µl, mainly neutrophilia. Ultrasound was negative for appendicitis. CT was done, revealing a thick appendiceal wall with a possibility of wall defect in the tip of the appendix that was seen in the sub-hepatic area. LA was done; findings of cecal rotational anomaly, retroperitoneal small bowel along the lateral abdominal wall, retroperitoneal cecum in right hepatic flexure, adhesions, pus, and abscess were found surrounding the perforated appendix. The patient was discharged home after 5 days of doing well.

Figure 1. An intraoperative image of the right iliac fossa showing a retro-cecal sitting appendix.
Following up, the patient has chronic abdominal pain and constipation (Figure 2).

Discussion

The midgut of the fetus undergoes multiple stages of elongation and rotations to reach the normal adult-shaped intestine. Physiological herniation of the intestinal loop takes place during the sixth weeks of gestation because of the limited space abdominal cavity, when the intestinal loop regresses during the 10th week of gestation, the cecum would be in the sub-hepatic region before it descends into the retroperitoneal cavity to complete the adult shape intestine and define the hepatic flexure [9].

Derangements could happen in any stage of intestinal development, either mal-rotations or fixations. Intestinal rotational disorders are considered very common, and the incidence reaches 1% of the total population [10]. A variety of cecal rotational disorders as the sub-hepatic cecum, pelvic cecum, and lumbar cecum have been described in the literature.

The presentation of lateral pouch acute appendicitis is usually similar to that of other forms of acute appendicitis, with the most common symptom being pain in the right lower quadrant [11]. However, patients with an LPA often have disrupted McBurney point with pain in the upper abdomen or suprapubic tenderness [6].

Two of the presented cases had atypical presentations of appendicitis which took us a longer time to confirm the diagnosis of appendicitis before operating on them. Unfortunately, one of them had a perforated appendix upon the operation. If the appendix is located in an abnormal sub-hepatic location, it can be a challenge to diagnose and manage. CT scans could also be used to diagnose appendicitis in children, but ultrasonography is the preferred modality due to its non-invasive nature and low radiation exposure [12].

Searching the literature, lateral pouch appendix is a very rare form of developmental anomaly. Only one case could be identified of a cadaver that was used for medical students’ education at Melaka Manipal Medical College in India [13], where the caecum was situated in the lower part of the right ileum was the bar region, and the terminal ileum was found to be retroperitoneal and opened into the posterolateral wall of the caecum. Likewise in the presented cases, it was noticed that the opening of the appendix base situated in the posterolateral was as well. Moreover, the ileum was noticed intraoperatively to be located in the retroperitoneal and opened in the posterolateral wall of the cecum (Figure 3).

An increase in surgical community awareness is needed to decrease the occurrence of complications (terminal ileum injury), emphasize the importance of this unusual location of lateral pouch type of appendix, and retroperitoneal vertical ileum, and further strategize the surgical options intraoperatively.

Tricks during surgical procedure included; 1) Adequately mobilize the cecal attachment, mainly lateral peritoneal reflections, if there is confusion about the position of the appendix. 2) Find the tips in the appendix that would guide through the process of appendectomy, and further decrease the risk of complications. 3) High level of suspicion of finding an anatomically abnormal position of the appendix could be resolved with abnormal cecal positioning (should be kept in the surgeon’s mind during any appendectomy procedure). 4) Once a laterally attached tubular structure is encountered, which is not clear to be an appendix (think about the ileum, and it should be made sure that it’s not the ileum), then

Figure 2. An intraoperative image of the right iliac fossa, the perforated appendix sitting in a posterior position of the cecal wall.
adequately mobilize the caecum to clarify this point, and confirm that it’s the appendix.

LA is currently the most effective method of treating appendicitis [14] and should be considered a viable option for patients with LPA as well [5].

Conclusion

Whenever encountering an abnormally positioned appendix, think about rotational abnormalities of the bowel. Always search for the tip of the appendix. Moreover, if the appendix is not clear, adequate mobilization of the caecum would help to delineate the structure a physician is dealing with (ileum or appendix). Importantly, being aware of such variants, and anomalies, could prevent converting to the open technique, and decrease the occurrence of injuring adjacent structures versus complications.

List of Abbreviations

CT Computed tomography
LA Laparoscopic appendectomy
LPA Lateral pouch appendicitis
WBCs White blood cells

Conflict of interest

The author declared that there is no conflict of interest regarding the publication of this case series.

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Lateral pouch acute appendicitis


