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Case report

Unusual position of appendix in a complicated group of children with acute appendicitis causing midline with additional right lower quadrant incision: A report of 2 cases

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We reported two cases of acute appendicitis in a complicated group of pediatric patients in which the appendix also located at extraordinary sites. A child aged 5 years old experienced abdominal tenderness with the greatest point at lower abdomen. Another child aged 13 years old suffered from symptoms of abdominal pain. Due to the very young age and presence of full bladder in the former and the underlying cerebral palsy with spasticity in nature in the latter case, finally the diagnosis of appendicitis was established with a great concern. Open appendectomies through Lanz incision were performed in both cases. Since one's appendix positioned at left-upper quadrant secondary to midgut malrotation and another one's found at mid-abdomen because of malposition of the gut following a previous transumbilical surgery for gastroschisis at birth, extra midline incisions were indispensable for both patients. Communication barriers presented in a very young aged patient and a patient with cerebral palsy precluded an accuracy of initial history taking and physical examination to establish definite diagnosis. As a result, in some cases, the anatomical location of the appendix may not be at the McBurney point and an additional surgical approach is necessary.

Keywords: Appendicitis, malrotation, gastroschisis.

Acute appendicitis constitutes a common abdominal condition requiring emergency appendectomy. Evaluation of such conditions is often challenging in certain groups of patients, e.g., in very young age group or patients with cerebral problems since there is a barrier in communication making the definite diagnosis not easy.[1] In addition, the unusual position of the appendix makes it more difficult to diagnose acute appendicitis.[2 – 9] We reported difficulties in diagnosis of appendicitis, not only the diagnoses were made in the complicated group, i.e., very young age in one case and underlying cerebral palsy in another case, but the appendix also positioned at unusual sites.

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Case report

Case 1

A 5-year-old male patient presented with a low-grade fever, nausea and vomiting, and acute abdominal pain for one day. The physical examination revealed generalized abdominal pain with marked tenderness at lower abdominal quadrant. We could palpate a large soft mass at suprapubic region suspected of full bladder. Following a help with urinary catheterization, we obtained approximately 300 mL yellowish clear urine. However, a repeated abdominal examination still disclosed greatest tenderness at lower abdominal region. Laboratory findings revealed a total white blood cell count of 18,400 per microliter of blood and a neutrophil count of 79.4%. There was no white nor red blood cells found in the urinalysis. Such clinical findings with left shift in neutrophils made it possible to make the diagnosis of acute appendicitis. Subsequently, he had an emergency operation. Preoperatively, intravenous gentamicin (5 mg/kg/day) and metronidazole (10 mg/kg/ dose) were given.

At surgery, as a routine, a right transverse incision at McBurney point was performed. With the passage of time, approximately 60 minutes, both cecum and appendix eluded our attempt prompting us to re-evaluate the situation. We ultimately performed an extra midline incision following the completion of closure of the previous incision. It is fortune that although the appendix was at unusual site, the culprit which was acutely inflamed was finally found at left upper quadrant (Figure 1). The plausible explanation for this appendiceal malposition was incomplete rotation of the midgut. Appendectomy was performed by double ligation with 1- 0 silk and sharp cut with scalpel blade No.15. The stump was burn and made clean with phenolic acid solution and 70% alcohol, respectively, without purse string sutures.

Peritonization and linea alba sheath approximation were performed with 3 - 0 polyglactin suture and skin was closed by subcuticular suture with 5 - 0 polyglactin suture. A total operative time of 140 minutes from incision to the last stitch was taken for this surgery. Postoperatively, the boy had uneventfully recovered without antibiotics and was discharged on day 4. Interestingly, at 2-week follow up, although there was no surgical site infection (Figure 2A), the pathologic report revealed that not only the section showed vascular congestion within periappendiceal wall, but also the presence of a number of *enterobius vermiscularis* eggs in the lumen (Figure 2B). The patient was transferred to a pediatrician for the proper management of this infestation.

Figure 1. Following a midline incision, appendicocecal segment (serosal vascular congestion on appendiceal surface, small arrow; cecum, large arrow) including entire colon was found at the left side. The serosal lesions seen in the picture were secondary to an attempt to find out the cecum through a right lower quadrant incision.

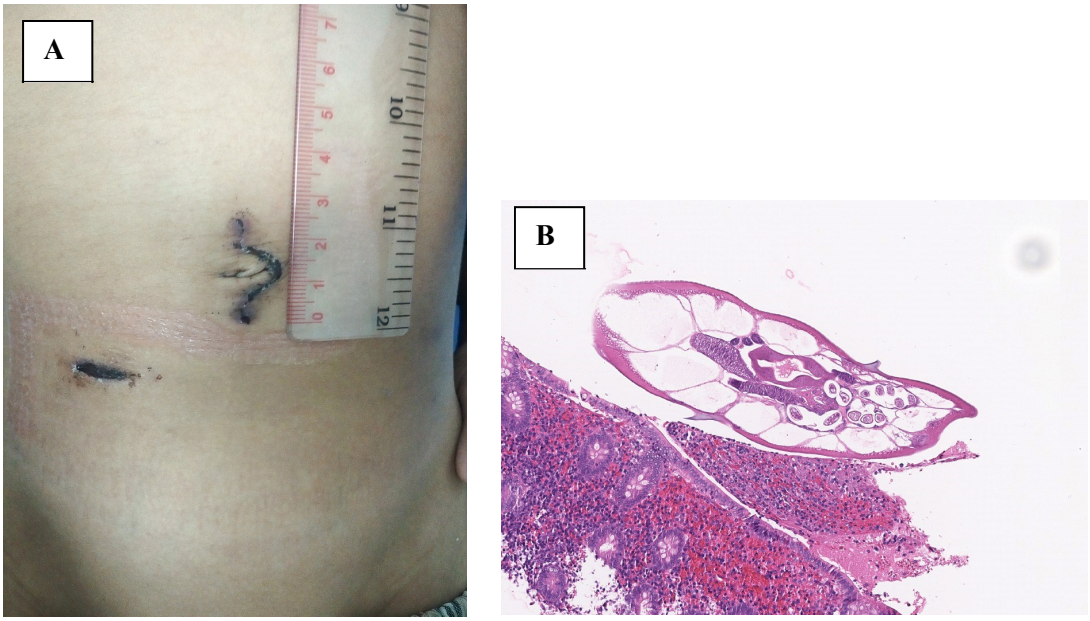

Figure 2. (A) A 2-week follow-up picture revealed right lower quadrant incision and midline incision without evidence of wound infection, **(B)** Pathologic finding showed a number of *enterobius vermiscularis* eggs (D-shaped appearance) in the appendiceal lumen.

Case 2

A 13-year-old male patient with underlying spastic cerebral palsy came to the hospital with symptoms of his abdominal pain. His caregiver noticed those abnormal expression for one day. There was neither nausea nor vomiting. The examination demonstrated low grade fever, 37.5°C with abdominal cramps. The markedly tender area seemed to be around the umbilicus. Complete blood count revealed left shift in neutrophils with white blood cell count of 11,200 per microliter of blood and neutrophil count of 84.0%. Plain abdominal radiography showed unremarkable findings. As with such findings, diagnosis was acute appendicitis. Intravenous gentamicin (5 mg/kg/day) and metronidazole (10 mg/kg/ dose) were given as our routine.

Right transverse incision was made at McBurney point. Again, we could not find the appendix or even the colonic segment. An extra midline incision was inevitably made to explore the real causes. The inflamed appendix was finally found at mid-abdomen with the entire colon at the left side. Some adhesion between bowel loops was found suggesting previous operation at birth. Appendectomy was performed as the same as the former case. The real cause was unfolded postoperatively by another caregiver, a person who adopted the patient as her son, that the patient was ever given an operation for gastroschisis at birth. However, at 2-week follow up, there was no wound infection and pathologic report revealed inflammatory appendicitis.

Discussion

Acute appendicitis constitutes a serious and occasionally life-threatening condition in children. Making diagnosis is more challenging in certain groups of patients, particularly in young children or patients with cerebral palsy since there are atypical presentations and a barrier in communication between them and others.[1] The high index of suspicious should be exercised in this population. However, the unusual position of the appendix will make it more difficult to diagnose acute appendicitis. We reported difficulties in diagnosis of appendicitis, not only the diagnoses were made in a very young child and a child with cerebral palsy, but the appendix also positioned at unusual sites.

The diagnosis of left-sided acute appendicitis in children is not uncommon in the literature. Of the 8 reported cases in English language, aged between 10 - 15 years old, [2-9] There were 2 ruptured appendicitis occurring in patients aged 10 years old equally.[5-6] This might be implied that it is more difficult in diagnosis in younger age. In the former case, in actual fact secondary to the position of the appendix, the marked tenderness should be examined

specifically around mid-abdomen in lieu of lower abdomen. Since there was a presence of full bladder, despite a release by urinary catheterization, the repeated examination that still revealed a remarkable point of tenderness at lower part resulted in making diagnosis of acute appendicitis and a decision to the point of incision at McBurney. In addition, the patient's age of 5 years old was another important factor that caused the situation more difficult by decreasing the accuracy of history taking and physical examination.

In the latter case, the spasticity of the abdomen caused by natural history of the disease and the failure of communication were the crucial factors that made us decide making the point of incision in the same way. Although the presence of crampy abdomen would arouse us to keep a differential diagnosis of perforated appendicitis in mind, with respect to the author's experience, all cases of appendicitis with perforation could be successfully managed through the right lower quadrant incision.[10] As a result, the Lanz incision was also initially performed in the patient. However, had the past history of definite surgery for gastroschisis been retrieved at the presentation or the surgeon been triggered by some degree of suspicion at the patient's umbilicus, the initial incision would have been at midline instead of McBurney incision.

In fact, preoperative diagnostic imagings such as ultrasonography, computed tomography scan or even magnetic resonance imaging would play an important role in increasing precision in diagnosis particularly in difficult situations like this. However, such investigations might not be possible in these two cases because of nonparticipation from the patients unless sedation was initiated. Importantly, these imagings require experienced radiologists. Unfortunately, there was no radiologist available at night at our institution. However, although there was no point to be aware of the unusual position of the appendix in the former case but in the latter case the abnormal appearance of his navel would trigger some doubts as to whether there was something behind this situation. As a result, as the situation was not emergency at that time in that delayed surgery could do no harm, the patient should be postponed to the next morning retrieving additional history and more accurate imaging data. In addition, clinical scoring systems such as "Pediatric Appendicitis Score" and "Alvorado's score" were developed to help diagnosis of appendicitis in any patients. However, the utilization of these tools might not be useful in every situation, some important parameters, e.g., anorexia, migratory pain, right lower quadrant (RLQ) tenderness, cough/ percussion/heel tapping tenderness at RLQ and rebound pain, seemed to be impossible to be evaluated in our patients.

Laparoscopy has several benefits of being diagnostic and therapeutic, as well as having a minimal surgical approach. This method can be safely used even in complicated appendicitis. Although laparoscopic appendectomy currently is an accepted treatment procedure for patients with appendicitis especially in uncommon situations[11], the laparoscopy requires well trained team who is familiar with sophisticated instruments. However, with this approach in the hospital with this facility, performing both RLQ incision and additional large midline incision in these two cases may be avoided. Unfortunately, like other general hospitals, at present, all laparoscopic procedures at our institution were performed only in adult patients and still not performed at night.

Conclusion

An accuracy of initial history taking and physical examination to establish definite diagnosis could be influenced by the communication barriers presented in a very young aged patient and a patient with cerebral palsy. Such incidences as bladder fullness and an abnormal navel should be carefully taken into account while evaluating the patients. Although midline incision was an appropriate initial approach in the both cases, incision at the McBurney point is still a standard in patients initially suspected of having appendicitis. However, in some cases, like this reported cases, the anatomical location of the appendix may not be at the McBurney point and an additional surgical approach is necessary.

Conflicts of interest

We declare, hereby, that we have no conflict of interest.

References

1. Hamid KA, Mohamed MA, Salih A. Acute appendicitis in young children: A persistent diagnostic challenge for clinicians. Cureus 2018;10:e2347.
2. Tsumura H, Ichikawa T, Kagawa T, Nishihara M. Successful laparoscopic Ladd's procedure and appendectomy for intestinal malrotation with appendicitis. Surg Endosc 2003;17:657-8.

3. Kamiyama T, Fujiyoshi F, Hamada H, Nakajo M, Harada O, Haraguchi Y. Left-sided acute appendicitis with intestinal malrotation. Radiat Med 2005; 23:125-7.
4. Vechvitvarakul S, Harris BH. Appendicitis and malrotation. J Pediatr Surg 2007; 42:905-6.
5. Galván-Montaño A, Flores-Nava G, Suárez-Roa Mde L, Salazar-Herrera MC, Lavalle-Villalobos A. Subhepatic appendicitis with subdiaphragmatic abscess in a pediatric patient without intestinal malrotation: case report. Cir Cir 2010; 78:79-81.
6. Shekhar A, Hendahewa R, Premaratne G. A diagnostic dilemma: Left-sided appendicitis in a 10 year old boy with previously undiagnosed intestinal malrotation. A case report. Int J Surg Case Rep 2015;14:10-2.
7. Biçer Ş, Çelik A. Duodenal obstruction caused by acute appendicitis with intestinal malrotation in a child. Am J Case Rep 2015; 16: 574-6.
8. Ahmed W, Ibrahim T, Abbasi MH, Bajwa MA. Left-sided appendicitis in a 14-year girl with midgut malrotation. J Coll Physicians Surg Pak 2018;28:317-9.
9. Lupiañez-Merly C, Torres-Ayala SC, Morales L, Gonzalez A, Lara-Del Rio JA, Ojeda-Boscana I. Left upper-quadrant appendicitis in a patient with congenital intestinal malrotation and polysplenia. Am J Case Rep 2018;19:447-52.
10. Sookpotarom P, Khampiwmar W, Termwattanaphakdee T. Vigorous wound irrigation followed by subcuticular skin closure in children with perforated appendicitis. J Med Assoc Thai 2010;93:318-23.
11. Palanivelu C, Rangarajan M, John SJ, Senthilkumar R, Madhankumar MV. Laparoscopic appendectomy for appendicitis in uncommon situations: the advantages of a tailored approach. Singapore Med J 2007;48: 737-40.