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Primary epiploic appendagitis: evaluation of computed tomography findings in the differential diagnosis of patients that presented with acute abdominal pain

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Abstract. – OBJECTIVE: Primary epiploic appendagitis (PEA) is a rare cause of abdominal pain revealed by torsion of colonic structures called epiploic appendices. In this paper, we present our clinical data and experience regarding this rare condition that may be confused with many diseases, such as acute appendicitis, diverticulitis, salphingitis, renal colic that may require emergency surgery.

MATERIALS AND METHODS: A total of 39 consecutive patients diagnosed as PEA confirmed by abdominal computed tomography with a clinical course. Basic demographic data, abdominal pain characteristics, physical examination findings, laboratory results, treatment methods, and clinical course of the patients were retrospectively evaluated. Statistical analysis was performed using SPSS (18.0; Chicago, IL, USA), using the χ2-test and Fisher's exact test.

RESULTS: Of the 39 patients diagnosed with PEA, 35 were male and 4 were female; the mean age of the patients was 36.0 ± 10.3. The main complaints were 69.2% abdominal pain, 12.8% groin pain, 5.1% flank pain with nausea and vomiting (2.6%), and abdominal swelling and dysuria. The average time of symptom was 5.3 days (1-15 days). In the computed tomography scan images, PEA was located in the sigmoid colon (21, 53.8%), descending colon (10, 25.6%), ascending colon (5, 12.8%), cecum (2, 5.1%), and hepatic flexure (1, 2.6%). No patient underwent surgical treatment. However, 9 of 39 patients were hospitalized for medical treatments, such as antibiotics and analgesic drugs intravenously. All patients were followed-up for a period of 1-year and there were no recurrence symptoms.

CONCLUSIONS: When patients with localized lower abdominal pain and tenderness do not have associated symptoms or laboratory abnormalities, a high index of suspicion for PEA and early radiologic examinations are required.

Key Words:
Primary epiploic appendagitis, Diverticulitis, Appendicitis, Renal colic.

Introduction

Primary epiploic appendagitis (PEA) is a rare and unusual entity that commonly occurs due to torsion of structures called epiploic appendices (EA)[1,2]. The epiploic appendices, known by different names, such as appendices epiploicae, epiploic appendages, appendix epiploica, or omental appendices, are structures of small pouches comprising fat and delicate vascular texture on the serosal surface of the entire colon[3,4]. PEA is a confusing clinical condition that not only manifests itself with acute abdominal pain, which commonly does not require surgical treatment but can also be confused with primarily inflammatory bowel diseases due to inflammation of the small and large walls of the colon and other similar diseases, such as diverticulitis, cholecystitis, and salphingitis[2,5-7].

PEA is an interesting situation that has been the subject of many studies in recent years[8]. The diagnosis of PEA is sometimes very challenging because this disease is rare, consequently, many clinicians are unaware of this clinical condition[9]. The exact prevalence of PEA is unknown, but it is assumed that may occur more often than anticipated[10]. Many clinicians can presume that this clinical condition is not encountered in daily clinical practice[11-14]. However, many patients leave the emergency room without being diagnosed as they recover without surgical intervention[3]. An appropriate abdominal tomography examined in detail

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is one of the best basic diagnostic methods[9,15]. In this article, we aimed to present our own experience of PEA that is commonly unnoticed by emergency physicians many times due to lack of awareness and research on the importance of detailed abdominal tomography used in the diagnosis of this rare disease[15].

Materials and Methods

This retrospective analysis included data from the medical records of our emergency department of Internal Medicine (Hisar Intercontinental Hospital, Umraniye, Istanbul, Turkey). This case series study consisted of 39 consecutive patients diagnosed with PEA using abdominal computed tomography from January 2015 to August 2020.

All patients were admitted to our emergency department to evaluate the suspicion of acute abdomen. The medical history, drug use, operations, and records of physical examination findings were obtained from patients' files. The study was conducted in accordance with the Declaration of Helsinki. Written consent was obtained from all patients. A certificate of compliance with ethical rules was obtained from the Hisar Intercontinental Hospital Local Ethics Committee (IRB 21-18).

Statistical Analysis

Statistical analysis was performed with SPSS (Windows version 18.0, SPSS Inc., Chicago, IL, USA), using the χ^2 test and Fisher's exact test. The averages were compared using *t*-tests. Statistical significance was set at $p < 0.05$.

Results

Of the 39 patients diagnosed with PEA, 35 were male and 4 were female, and the mean age of the patients was 36.0 ± 10.3. The mean body mass index was 28.2±3.2 kg/m^2. Patients with PEA presented with lower abdominal pain of recent onset that was localized to the left (seven cases) and right (one case) lower quadrants. In some patients, well-localized tenderness without peritoneal irritation is usually the only sign of physical findings. Computed tomography findings, such as a pedunculated oval fatty mass with streaky densities connected to the serosal surface of the adjacent colon, often led to the diagnosis of PEA.

On admission, the patient's main complaints were as follows: abdominal pain (69.2 %), groin pain (12.8%), flank pain (5.1%) with nausea and vomiting, 2.6% abdominal swelling, and dysuria. On physical examination, tenderness in the left lower quadrant was 51.3%, tenderness in the right lower quadrant was 23.1%, on the right side was 5.1%, sensitivity on both sides was 2.6%, and normal physical examination findings were 2.6%. Abdominal pain was more commonly observed throughout the lower abdomen (Table I).

In laboratory tests, hemogram values showed a nearly normal leukocyte count (9.45 ± 2.80) with a neutrophil 5.86 ± 2.13, a lymphocyte 2.59 ± 0.93, and a platelet 260.0 ± 59.2 (Table II). On computed tomography (CT) scans, PEA was located in the sigmoid colon (21, 53%), descending colon (10, 25.6%), ascending colon (5, 12.8%), cecum (2, 5%), and hepatic flexure (1, 2.5%) (Figures 1 and 2). No surgical treatment was applied to any patient (Table III).

Treatment and Results of Primary Epiploic Appendagitis

No surgical treatment was applied to all patients, but 3 of 39 patients with hematuria had ureteral stones, and the URS procedure was performed in these patients. 6 patients of 39 had evident signs of acute diverticulitis (clinical, radiological, and laboratory), and intravenous antibiotics (ceftriaxone or ciprofloxacin) and analgesic drugs (paracetamol or ibuprofen) were administered. Since the pediatric patient had more abdominal pain than adults, these patients were hospitalized for medical treatment with the same antibiotics and analgesic drugs. Other pa-

Table I. Physical examination findings.

Physical examination findings	Frequency (%)
Left lower quadrant tenderness	51.3
Right lower quadrant tenderness	23.1
Right side tenderness	5.1
Tenderness on both sides	2.6
Detected on CT taken without abdominal complaints	2.6

Table II. Laboratory and demographic findings between the two sexes.

	Male (n=34)	Female (n=5)	Total (n=39)	p
Age	36.1±11.0	33.8±5.2	36.0±10.3	0.657
BMI	28.5±3.1	26.8±4.2	28.2±3.2	0.440
WBC	9.4±2.6	9.6±4.0	9.45±2.80	0.836
Neutrophil	5.7±1.7	6.6±3.6	5.86±2.13	0.356
Lymphocyte	2.7±1.0	2.1±0.4	2.59±0.93	0.222
PLT	262.8±59.4	247.8±63.7	260.0±59	0.630
CRP	0.50 (0.02-1.97)	3.16 (0.06-4.55)	0.5(0.02 4.55)	0.344

tients (30 of 39 patients) were discharged with oral analgesic therapy without hospitalization. The average time of symptom was 5.3 days (1-15 days). Symptoms of PEA were resolved within 1 week (mean, 4.7 days) without surgery. The patients' symptoms were followed by phone dialog or by calling for examination, if necessary. At the same time, all patients were followed up for a period of 1-year and there were no recurrence symptoms.

Discussion

The epiploic extensions, which were first described by Vesalius in 1543, are arranged in two rows along with the taenia coli at the antimesenteric edge of the colon, measuring between 0.5-5 cm in length and 1-2 cm in thickness, oval-shaped, lobulated, containing adipose tissue and vascular structures at the peritoneal extensions[8,16]. Primary epiploic appendicitis is thought to be an inflammatory condition that is primarily caused by ischemia and appendiceal torsion, causing infarction with aseptic fat necrosis and spontaneous venous thrombosis[5]. The main clinical symptom of this disease is persistent localized abdominal pain whether acute or subacute[9]. Other uncommon complaints include abdominal symptoms, such as local tenderness, postprandial fullness, early satiety, epigastric discomfort, vomiting, bloating, diarrhea, intermittent febrile temperature, and moderate weight loss[1,17].

PEA can occur in any part of the colon, but the most common sites of PEA are the sigmoid colon and descending colon, followed by the cecum, where they have longer epiploic extensions[7,13]. In our series, we found that the PEA location of the patients was 53.8% in the sigmoid colon location, which is consistent with the literature[18,19]. Since epiploic extensions are not well developed in children, PEA is usually seen in adults and rarely encountered in children[20]. There was only one child in our case series, and he was 10 years old. When the literature is investigated in terms of basic epidemiological features; the age range is reported as 5-80 years with a mean age of 40 years; the highest incidence ranges are fourth and fifth decades with men being slightly more affected than women[12,19]. In our case series, unlike other studies, the average age was found to be slightly lower (36.0 ± 10.3) and there was a prominent male predominance [(35/39) 89.7% males and (4/39) 10.3% females]. The main symptom in our patients was acute abdominal pain. In addition, symptoms, such as flank pain, groin pain, nausea, bloating, and dysuria were observed in our patients. No fever was observed in any of the patients. Most patients complained of pain as dull, constant, non-migratory, and localized tenderness on physical examination. On physical examination of our patients, half of the patients had tenderness in the left lower quadrant, and one-fourth had sensitivity in the right lower quadrant. These findings are compatible with those reported in the litera-

Table III. Physical examination findings.

Localization	Formation of tubular fat density and edema around it
Sigmoid Colon	53.8%
Descending Colon	25.6%
Ascending Colon	12.8%
Cecum	5.1%
Hepatic flexure	2.6%

ture[2,7]. There were no pathognomonic diagnostic laboratory findings for PEA. The white blood cell count and erythrocyte sedimentation rate may be normal or slightly high. Abnormal laboratory parameters may include slightly elevated serum C-reactive protein and neutrophil leukocyte levels. However, all routine laboratory parameters, such as erythrocyte sedimentation rate and liver and pancreatic enzymes, were generally within normal limits.

PEA is a self-limiting disease that starts and stops within less than 10 days without antibiotic therapy or surgery. In this study, no patient was treated surgically, and only one child was hospitalized for medical treatment because of severe abdominal pain, and antibiotic and analgesic treatments were administered. In six patients with acute diverticulitis, inpatient antibiotic analgesic treatment (ceftriaxone and ibuprofen) was administered. The other patients were discharged with outpatient analgesic therapy.

PEA is a very important differential diagnostic issue that should be considered by clinicians and radiologists in patients admitted to the acute abdomen clinic. Also, its clinical features in radiological findings should be well known and kept in mind.

The most important limitation of this study is its retrospective design and relatively low number of patients. The number of patients is limited due to the rarity of this disease; however, we believe that we can do new studies with a larger number of patients in an ongoing period due to increased awareness.

Conclusions

When a patient with localized lower abdominal pain and tenderness does not have associated symptoms or laboratory abnormalities, a high index of suspicion for PEA and early radiological examinations are required.

Conflict of Interest

TThe authors declare that they have no conflict of interests.

Authorship

AND, AHA, and SHA: Collected data, written manuscript, literature research, edited and critically reviewed the manuscript. TA, BC: Collected data and involved in written, critical revision, and final editing of the paper.

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