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Distribution of causes of acute abdominal pain in children that presented to a state hospital radiology unit according to age, gender and pathology origin

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ABSTRACT

Objectives: The term "acute abdomen" refers to any sudden non-traumatic disorder whose chief manifestations are located within the abdominal area. In this condition, urgent operation may be necessary. The aim of this study was to investigate the distribution of causes of acute abdominal pain in children according to their age, gender and origin of pathology, who presented to a state hospital radiology unit in Turkey that had undergone standardised abdominal sonography and computed tomography imaging if necessary.

Methods: This study was designed as a retrospective investigation. A sample of 1000 patients (568 males and 432 females) were selected from a pool of 3452 paediatric patients between 2014 and 2016.

Results: Acute abdomen in the paediatric age group occurred more frequently in males than females. The most common age of presentation with acute abdominal pain was between 7 and 15 years. The most common medical cause was mesenteric lymphadenitis (11%). In females, mesenteric lymphadenitis, acute appendicitis and ovarian cyst rupture were the predominant causes, whereas mesenteric lymphadenitis, acute appendicitis and urinary system pathologies were predominant in males.

Conclusions: When evaluating a child with acute abdominal pain, the most important components include taking a thorough patient history and performing repeated physical examinations. Selective use of appropriate laboratory and radiological investigations may be necessary in order to establish a specific diagnosis.

Keywords: Paediatric, acute abdomen, distribution of cause

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Abdominal pain is a common complaint in the emergency department. Trauma, appendicitis and intussusception are the most common reasons for emergency abdominal imaging in paediatric patients. The term "acute abdomen" refers to any sudden non-traumatic disorder whose chief manifestations are located within the abdominal area. For patients in this condition, urgent operation may be necessary. Delay in diagnosis and treatment affects the outcome [1]. The aim of this study was to determine the distribution of causes of acute abdominal pain in children that presented to a state hospital radiology unit according to age, gender and origin of pathology that had undergone standardised abdominal sonography and compued tomography imaging if necessary.

METHODS

The study was designed as a retrospective

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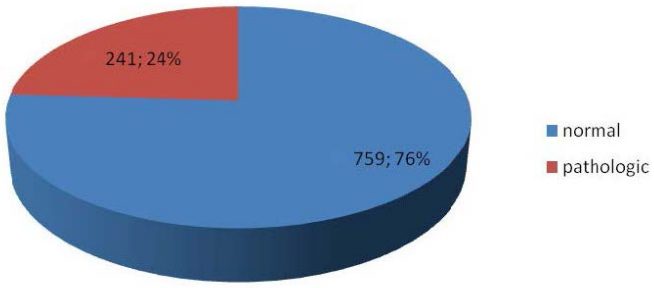

Figure 1. Distribution of patients according to normal or pathologic radiologic findings.

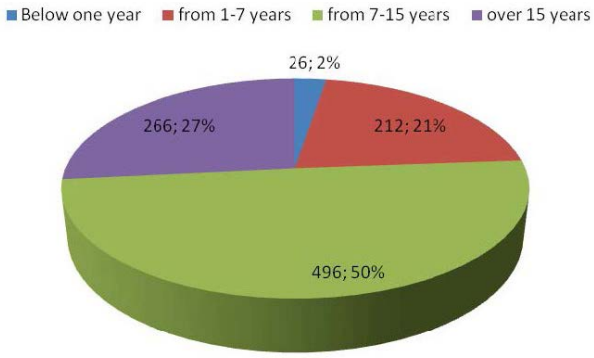

Figure 2. Distribution of patients according to age.

investigation. The sample included 1000 patients (568 males and 432 females) that were randomly selected from a pool of 3452 paediatric patients that had undergone standardised abdominal sonography between 2014 and 2016. The inclusion criteria were patients aged between 0 and 18 years and the presence of acute abdominal pain before or during consultation with the physician. The exclusion criteria were patients aged over 18 years or the absence of acute abdominal pain as a symptom before or during the examination.

Statistical Analysis

In the data analyses, frequency analysis was performed and percentages were calculated. Analyses were performed with SPSS 22.0 software. The images were created with Microsoft Excel 2017 software.

RESULTS

There was no pathology identified in 76% (n = 759) of the patients, with normal results obtained in both the sonography and CT exams. Figure 1 shows the distribution of patients according to normal or pathologic radiologic findings.

In the study group, the minimum age was 0 years and maximum was 17 years. According to age, children were divided into the following (four) groups: (1) patients aged younger than 1 year old (26/1000, 2.6%; 20 (2.0%) males and 6 (0.6%) females); (2) patients aged from 1-7 years old (212/1000, 21.2%; 176 (17.6%) males and 36 (3.6%) females); (3) patients aged from 7-15 years (496/1000, 49.6%; 310 (31%) males and 186 (18.6%) females); and (4) patients aged over 15 years (266/1000, 26.6%; 150

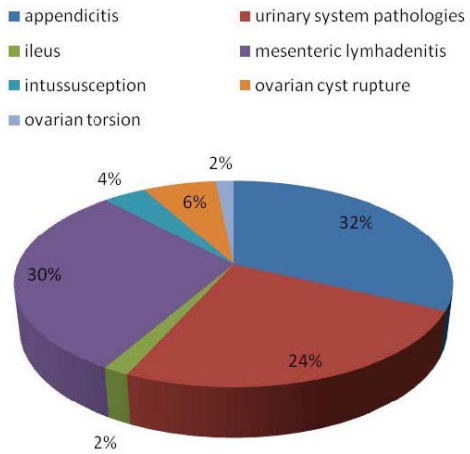

Figure 3. Distribution of patients according to pathology.

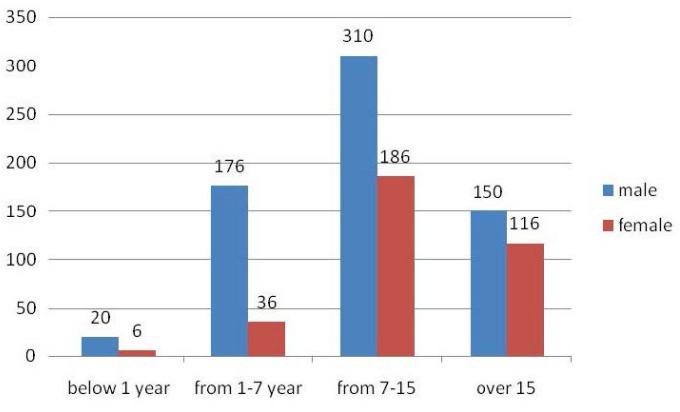

Figure 4. Distribution of patients according to gender.

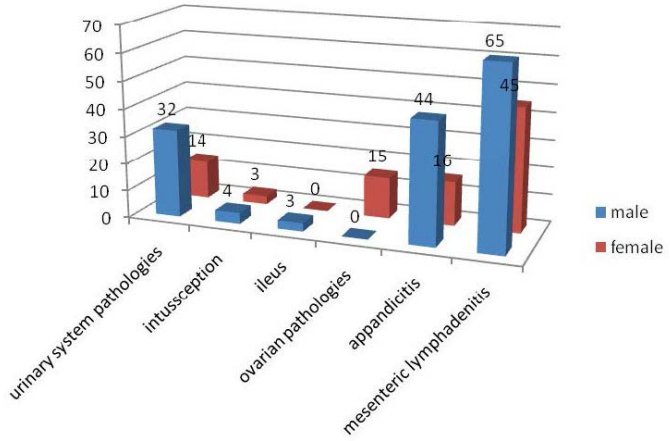

Figure 5. Distribution of patients according to gender and pathology origin.

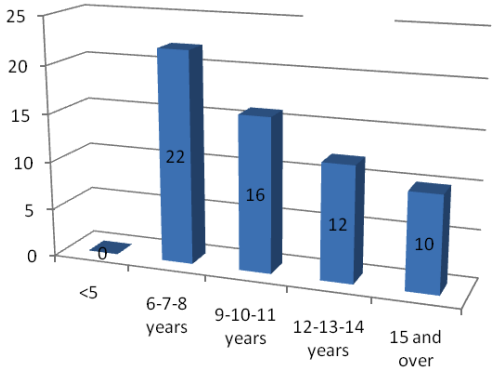

Figure 6. Distribution of appendicitis detected patients according to age.

(15%) males and 116 (11.6%) females). Figure 2 shows the distribution of patients according to age. Acute abdomen in the paediatric age group was more prevalent in males than in females. Figure 3 shows the distribution of patients according to gender.

Abdominal pain and vomiting were the most common clinical symptoms. Of the 1000 patients, 45 had appendicitis, 30 had urinary system pathologies, 3 had ileus, 110 had mesenteric lymhadenitis, 7 had intussusception, 12 had an ovarian cyst rupture and 3 patients showed ovarian torsion, as detected by ultrasound. Figure 4 shows the distribution of patients according to pathology, and Figure 5 shows the distribution of patients according to gender and origin of pathology.

The highest frequency of cases was represented by mesenteric lymphadenitis (110 patients, 11%). Figure 6 shows the distribution of mesenteric lymphadenitis among patients according to age. Figure 7 shows the distribution of ovarian pathologies according to patient age.

Ultrasonography should still be the first imaging modality for detecting the underlying pathology of the paediatric abdominal emergency. In 45 patients, CT was performed. Ureteral calculi was detected by CT scans in 16 patients and appendicitis in 15 patients, which were considered together with secondary findings from a previous ultrasound. Figure 8 shows the distribution of appendicitis in patients according to age, and Figure 9 shows the distribution of urinary pathologies in patients according to age. In three patients, ileus was verified by CT.

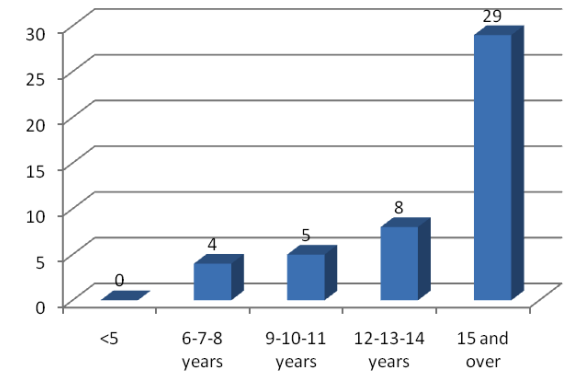

Figure 7. Distribution of urinary pathology detected patients according to age

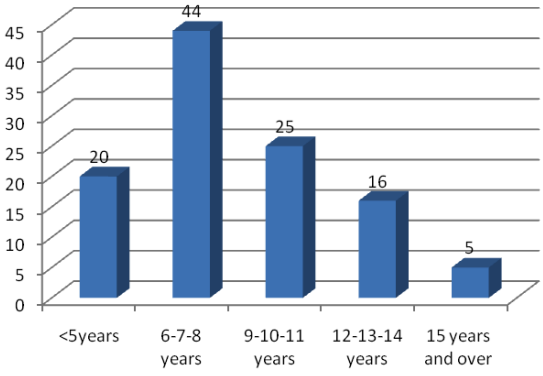

Figure 8. Distribution of mesenteric lymphadenitis detected patients according to age

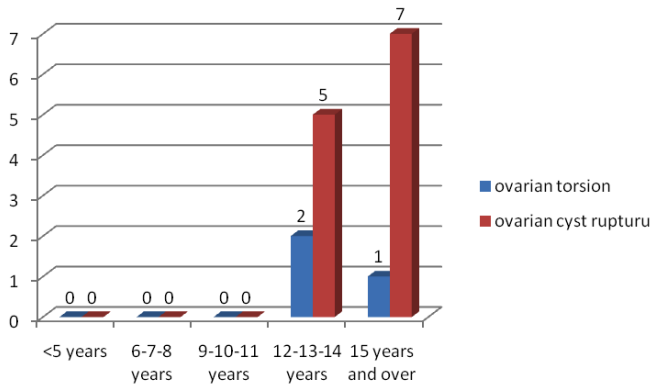

Figure 9. Distribution of ovarian pathologies detected patients according to age

DISCUSSION

Acute abdominal pain is one of the most common complaints in childhood, and one that frequently requires rapid diagnosis and treatment in the emergency department. The term acute abdominal pain refers to non-traumatic abdominal pain of rapid onset with duration of less than five days [2]. Acute abdominal pain can be divided in urgent and non-urgent conditions. Urgent causes require treatment within 24 hours to prevent serious complications whereas for non-urgent conditions treatment is not necessitated within a fixed period [3]. Although acute abdominal pain is typically self-limiting and benign, there are potentially life-threatening conditions that require urgent management, such as appendicitis, intussusception or bowel obstruction. The most difficult challenge is making a timely diagnosis so that treatment can be initiated to prevent morbidity [4].
Viruses or bacteria can be a reason of abdominal pain. Viral infections tend to be off quickly, while bacterial infections may want an antibiotic. Food poisoning, food allergies, eating excessive food, or gas production can cause pain. Surgical problems include appendicitis or blockage of the bowels. Medical causes for example diabetes can be a reason of abdominal pain.

Most simple causes of abdominal pain do not last long and usually gone within 24 hours. Any abdominal pain that continues longer than 24 hours should be evaluated by a physician. Most simple pains are located in the center of the abdomen. Pain felt in other areas especially located low and down on the right side of the abdomen. is more concerning. Until proven otherwise this should be considered as appendicitis.
Children vomit quite frequently with abdominal pain. Vomiting does not always indicate a important problem. Vomiting for longer than 24 hours is a rightful reason to call the physician. Diarrhea is also common with abdominal pain . This generally points out that a virus is the cause. This can continue for several days but usually only lasts less than 72 hours.

The presence of fever does not always shows a serious problem. Indeed, a normal temperature can be seen with the more serious causes of abdominal pain. One critical point is that an abdominal pain actually can come from somewhere else. Testicular torsion can be given as an example for this situation [5]. Abdominal pain associated with any trouble urinating, could show an infection.
Age is a key factor when evaluating the cause, as the incidence and symptoms of different conditions vary greatly over paediatric age groups. Differential diagnosis of the acute abdominal pain is influenced by many factors, especially patient age.

In the emergency department, ultrasound and computed tomography are widely used to identify the cause of abdominal pain [6, 7]. Although computed tomography is more accurate than ultrasound, ultrasound is the preferred imaging modality for the initial evaluation of potential causes of paediatric abdominal pain because it is non-invasive, radiation-free and less expensive [8].

In the current study, acute abdomen in the paediatric age group was found to occur more frequently in males than females. The most common age of presentation with acute abdominal pain was between 7-15 years of age. The most common medical cause was mesenteric lymphadenitis (11%). In the 7-15 and over 15 age groups, acute appendicitis, mesenteric lymphadenitis, ovarian follicular cysts and urinary system pathologies were the predominant causes. In the 0-4 age group, intussusception was predominant. Intestinal obstruction was more frequent in patients aged under 5 years. In females, mesenteric lymphadenitis, acute appendicitis and ovarian cyst rupture were the main causes of acute abdomen, whereas in males mesenteric lymphadenitis, acute appendicitis and urinary system pathologies were predominant.

CONCLUSION

When evaluating a child with acute abdominal pain age, gender, the onset of the pain, pain duration, pain location and associated clinical findings are key factors as the incidence and symptoms of different conditions vary greatly over paediatric age groups. In this state the most important components are taking a comprehensive patient history and repeated physical examinations. Selective use of appropriate laboratory and radiological investigations may be necessary in order to establish a specific diagnosis.

Conflict of interest

The author disclosed no conflict of interest during the preparation or publication of this manuscript.

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