

The first case of a COVID-19 positive child with acute appendicitis in our hospital of a tertiary of 180,000 people.

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Abstract

Background: The most common abdominal surgery in the pediatric population is acute appendicitis.

Case presentation: Herein, we report a 15-year-old female who appeared in the emergency department with a two-day history of abdominal pain localized in the right iliac fossa. The pain was associated with fever (37.8 °C), nausea, and anorexia. Physical examination disclosed deep tenderness at McBurney point, positive Rovsing's sign, and rebound tenderness. Laboratory tests revealed leukocytosis, increased neutrophils, and increased C-reactive protein. The result of a COVID19 nasal viral test performed in the hospital was positive. As a result, no other imaging modalities were obtained (abdominal ultrasound or computed tomography), and the patient was taken to the operation room. Due to the limited data concerning the safety of laparoscopic appendectomy in COVID-19 positive patients, an open appendectomy was carried out. During surgery, gangrenous perforated appendicitis and purulent peritonitis were discovered.

Conclusion: In the era of the COVID-19 pandemic, early diagnosis of acute appendicitis and avoidance of unnecessary examinations, especially in children, leads to the most effective treatment and shortest time of recovery. The medical and nursing staff's safety motivates them to assess and treat the patient accurately.

Keywords: Coronavirus; COVID-19; appendicitis; pediatric.

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I. Introduction

Appendicitis is a common surgical emergency, with a lifetime risk of 8-9% in western countries. Perforation is more frequent in youths or individuals older than 50 years, and it is linked with higher mortality and morbidity (1). Early diagnosis of acute appendicitis in children is necessary to prevent rupture, abscess formation and other postoperative complications (2). In a pandemic, people are afraid of visiting a hospital for their health problems (3).

Herein, we present the first case of a child who underwent surgery at our hospital while being positive for COVID-19, with an acute appendicitis diagnosis. The purpose of this case report is to analyze the late arrival of patients in the hospital, the advanced stage of acute appendicitis in children, and the steps required to operate on a patient who tests positive for COVID19. Early diagnosis and avoidance of unnecessary examinations, especially in children, lead to the most effective treatment and shortest recovery time. The medical and nursing staff's safety motivates them to assess and treat the patient accurately.

II. Case Presentation

A 15-year-old female visited the emergency department with a two-day history of abdominal pain that started in the epigastrium and, after several hours, shifted to the right iliac fossa. The pain was associated with fever (37.8 oC), nausea, and anorexia. The girl was taken to the COVID19 examination room after a recent molecular nasal test revealed COVID19. Parents were skeptical whether taken the girl to the hospital was safe.

Physical examination disclosed deep tenderness at McBurney point, positive Rovsing's sign, and rebound tenderness. Laboratory tests revealed leukocytosis, increased neutrophils, and increased C-reactive protein. The initial diagnosis was acute appendicitis. The result of a COVID19 nasal viral test performed in the

hospital was positive. As a result, no other imaging modalities were obtained (abdominal ultrasound or computed tomography), and the patient was taken to the operation room.

Due to the limited data concerning the safety of laparoscopic appendectomy in COVID-19 positive patients, an open appendectomy was carried out. All precautions were taken to protect the staff from a positive COVID-19 patient. During surgery, gangrenous perforated appendicitis and purulent peritonitis were discovered. The patient was discharged from the hospital on the 4th postoperative day after receiving dual antimicrobial treatment. Postoperatively, she developed suppuration of the surgical wound, which was treated with regular wound care.

III. Discussion

Appendicitis is a common cause of abdominal pain and a leading cause of surgical emergencies. Its incidence varies from 5.7 to 50 patients per 100,000 individuals per year, with a peak incidence between the second and third decade of life. The USA and Europe display the highest lifetime risk for acute appendicitis (9% and 8%, respectively), whereas, in Africa, the risk is lower (2%). The perforation rate ranges between 16% and 40%. Youths and individuals older than 50 years exhibit a higher risk for perforation (40-57% and 55-70%, respectively). Perforation is correlated with higher mortality and morbidity compared to non-perforated appendicitis. Acute appendicitis's mortality risk is 0.1%, while the risk increases to 0.6% in gangrenous and 5% in perforated appendicitis (1). The diagnosis should be made as soon as possible as the risk of rupture and complications increases with time (2)

The global pandemic has wholly altered how patients, family members and doctors evaluate and make medical decisions. One of the issues created by this pandemic is the delayed onset of hospital emergencies (3). To deal with the pandemic, healthcare systems all over the world had to adapt. Under the guidance of health authorities, a step-by-step approach to surgeries has been adopted, with scheduled surgeries being postponed and emergency surgeries being prioritized during periods of increased community-based transmission to use health care resources related to COVID-19.

Parents are initially concerned about exposing themselves and their children to public places where the risk of contracting COVID-19 is high. Secondly is the preliminary clinical evaluation (3, 4). In COVID-19, many medical activities were carried out using a telemedicine platform, which allowed patient evaluation while limiting physician exposure (5, 6).

The physician, fearing exposure to COVID-19, conducts a limited examination of the patient. Another issue is the lack of instructions and protective equipment for healthcare workers (3, 4). In the current situation, we believe that both parents and medical staff must receive instructions on child monitoring, warning signs, and emergency medical schedules to avoid unnecessary complications from routine pediatric emergencies.

Acute abdominal surgery situations, such as acute appendicitis, are treated differently by treating physicians in these circumstances. The conservative approach is preferred for uncomplicated cases of acute appendicitis in patients with COVID-19 (3, 7). The most critical factors that regulate the management and prognosis of acute appendicitis in children appear to be delayed access and extended stays in the emergency department. The average time between the onset of symptoms and surgery for acute appendicitis increased during the pandemic (8-10). Misdiagnosis or delayed hospitalization increases the risk of the process rupturing the appendix, with younger patients being affected at higher rates due to their inability to describe their pain adequately and a higher incidence of clinical symptoms that mimic non-diagnostic symptoms (11-14). The parents' knowledge of the illness, the availability of a means of transport, the insurance status and the financial situation play a significant role in the late arrival of pediatric patients as they search for medical care.

Lazzerini et al. showed that visits to the pediatric emergency department in Italy decreased by 88% during the peak of the pandemic compared to visits in 2018 and 2019. They had poorer outcomes, and parents mentioned that they avoid hospital treatment because they were afraid of contracting COVID-19 (3). Snapiri et al. reported that pediatric patients in Israel experienced delayed diagnosis of acute appendicitis during the pandemic, with a double complication rate (22% vs 11%) compared to the same period in 2019 (13). Gerall et al. found that patients had more advanced disease during the pandemic and spent more time in the hospital (14).

The doctor should be aware that the COVID-19 infection mimics a surgical condition, in this case, acute appendicitis. Although COVID-19 can cause gastrointestinal symptoms, there is no evidence that COVID-19 directly impacts the pathogenesis of appendicitis (15-17).

During the pandemic, the burden on health workers is enormous, and the risk of virus exposure. Therefore, surgeons and operating room staff should follow established protocols for limiting and controlling the exposure and reduce staff infection risk (18). Wong et al. publication state precisely how a surgical case should be managed. The operating room is a complex environment with many people who work in it, including anesthesiologists, surgeons, nurses, operating room assistants, and technicians. It is not easy to coordinate everything so that everyone is safe (19). Finally, following a safety protocol during a pandemic increases the

amount of time spent at the emergency room, owing to the time spent waiting for the results of a COVID19 screening (18).

IV. Conclusion

The pediatric patient has a different psyche and an inability to express symptoms accurately. The pandemic period is an additional challenge in the effective treatment of pediatric surgical patients. Early diagnosis and avoidance of unnecessary examinations lead to effective treatment and shortens recovery. The medical and nursing staff's safety motivates them to assess and treat the patient accurately.

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3. Stefanou SK: Literature search and acquisition of data.
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5. Doumkou E: Analysis and interpretation of data.
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