

CLINICAL CASE

AN UNEXPECTED COMPLICATION OF APPENDICITIS

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Abstract

Appendicitis is quite a common pathology and is usually followed by a simple surgical procedure. This was not the case for a 24-year-old patient that initially presented with abdominal pain and diarrhea. The diagnosis of appendicitis was not apparent at first and after a few days of bed rest with malaise and fever, he starts having shortness of breath. The next examination deems his symptoms as a case of pneumonia. He is treated with antibiotics; he shows no signs of improvement and also develops hypoxia and tachycardia. He is referred to our cardiology clinic where the diagnosis of bilateral massive thromboembolism is established, along with the discovery of a large retroperitoneal abscess. Because the patient was septic, the surgery cannot be postponed. A ruptured retrocecal appendix is confirmed as the cause of the abscess. Later, the Doppler examination shows left popliteal vein thrombosis and also the laboratory results confirm that the patient has thrombophilia. This case illustrates an unfortunate association between an unknown thrombophilia, a long standing infection and massive thromboembolism. This combined pathology transformed a simple intervention for appendicitis into a high risk one.

Keywords: *thrombophilia, pulmonary thromboembolism, acute appendicitis***Introduction**

Appendicitis is the most common abdominal emergency, with a life-time risk of around 7%, slightly higher in males[1]. The typical presentation occurs in only 60% of the presentations, which usually leads to enhanced awareness to abdominal symptoms and even a high rate of negative appendectomies, in order to avoid the delay of the diagnosis and the peril of perforated appendicitis[2].

Thromboembolic disease as an entity comprises both deep vein thrombosis (DVT) and its main complication, pulmonary thromboembolism. In order for DVT to occur, one or more elements of Virchow's triad must be present. These factors favouring DVT are:

hypercoagulability, endothelial damage and venous stasis. In younger individuals, hypercoagulability is the favoured diagnosis. This pathology is better studied in females than in males due to the peripartum discovery of thrombophilia.

The case that we choose to report displays an unusual, albeit in retrospect predictable, course of events following acute appendicitis with an atypical presentation and an unfortunate association between the two entities discussed above.

Case report

06 april 2014 - A 24-year-old overweight, but otherwise previously healthy male was first examined in an emergency department for an upper right quadrant pain and diarrhea. After a brief clinical examination that reveals no signs of peritoneal irritation, an abdominal echo that did not show fluid in the abdominal cavity or gallbladder stones, he was given antispastic medication and sent home. The blood panel showed slight leukocytosis ($12 \times 10^3/\mu\text{L}$). The chest X-ray does not hold any significant changes.

11 april 2014 - After a few days of bed rest, he continues to have malaise and starts developing a fever and shortness of breath, which prompts him to refer to another hospital. After a brief clinical exam, chest X-ray and blood works (leukocytosis - $18 \times 10^3/\mu\text{L}$), he is directed to an infectious diseases hospital with the diagnosis of pneumonia.

13 april 2014 - He is admitted with malaise, fever, shivers, non-productive cough, tachypnea, tachycardia and hypoxia in the infectious diseases department. The blood panel shows leukocytosis. The chest X-ray shows ascension of the right hemidiaphragm and dilation of the pulmonary artery trunk (Figure 1). He is treated with antibiotics for the diagnosis of pneumonia. After a week of treatment and bed rest, the symptoms get worse, the patient being even more tachycardic, tachypneic and hypoxemic. He is referred to our Cardiology Department.

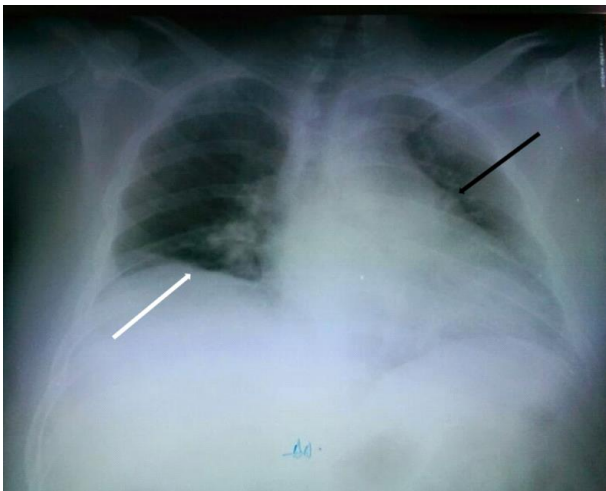


Figure 1 - Chest X-ray. White arrow indicates ascended right hemidiaphragm; black arrow indicates dilation of the pulmonary artery trunk.

20 april 2014 - At admission in the Cardiology Department, the patient is continuously tachycardic, tachypneic and hypoxemic ($\text{O}_2 \text{ sat}=89\%$), with low grade fever, no pulmonary rales, has turgescient jugular vessels, an enlarged liver, slight tenderness in the right flank and left calf. The blood pressure is 120/70 mmHg, HR=140 bpm, regular. The initial blood works shows significant leukocytosis ($26 \times 10^3/\mu\text{L}$) and elevated ESR and fibrinogen.

The echocardiogram shows an enlarged right atrium and ventricle, with moderate tricuspid regurgitation and moderate pulmonary hypertension. A contrast chest and abdominal CT shows bilateral pulmonary thromboembolism, multiple pulmonary infarcts and an abdominal mass of unknown origin (Figure 2). In retrospect, during the previous hospital stay, the patient remembers developing tenderness and slight swelling in the left calf.

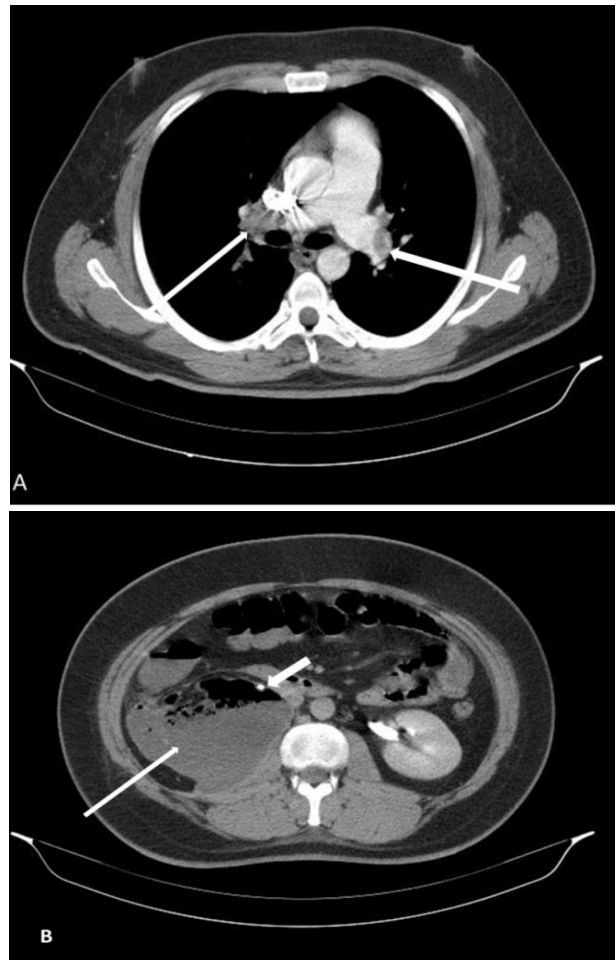


Figure 2 - Initial CT examination. Panel A: White arrows indicate bilateral thromboembolism. Panel B: Thin arrow shows the retroperitoneal abscess. Thick arrow indicates displaced ureter.

A heparin infusion is started immediately for the previously established diagnosis of pulmonary embolism and also antibiotic treatment is administered and clinical and imagistic follow up is performed regarding the abdominal mass. The initial antibiotic regimen contained vancomycin, to which the patient developed a cutaneous allergic reaction and so it was replaced.

Two days after admission a repeated CT exam shows enlargement of the mass (Figure 3) and a multidisciplinary consult opts for surgical intervention.



Figure 3 - Second contrast CT Panel A: White arrow designates only right artery thromboembolism. Panel B: Thin arrow indicates inflamed appendix. Curved arrow points toward the retroperitoneal abscess. Black arrow indicates displaced kidney.

The recent episode of pulmonary embolism was a contraindication to the laparoscopic treatment. An extraperitoneal approach using an incision in the lower right quadrant was performed. The retroperitoneal exploration revealed a right perinephric abscess and a large

volume of foul smelling pus was drained from the retroperitoneum. We mention that the abscess was located only in the extraperitoneal space, the peritoneal cavity being clear from any contamination. A ruptured retrocecal appendix was confirmed as the cause of the abscess and an appendectomy was performed. The lavage and extraperitoneal drainage of the retroperitoneum concluded the intervention. The microorganisms identified from culture were *E. Coli* and *Enterococcus* spp, as expected.

Following surgery, heparin treatment was continued and replaced with oral anticoagulants by discharge. Also a venous Doppler examination confirmed the suspected popliteal deep vein thrombosis. A blood panel for thrombophilia was performed showing a heterozygous G20210A factor II mutation and a heterozygous PAI-1 4G/5G mutation. It was decided that the oral anticoagulation treatment should be continued over a long term.

Follow-up examinations at 6, 12 and 18 months revealed a symptom-free patient with no pulmonary hypertension, assessed through repeated echocardiograms.

Discussions

Acute appendicitis is the cause for the most common emergency surgical intervention in the world [3]. There is also a considerable economic burden due to the high percentage of negative appendectomies [3]. Due to the atypical presentation, this was not the case for our patient.

Whether the correct diagnosis of appendicitis and the subsequent surgical treatment, followed by thromboprophylaxis would have prevented or not the deep vein thrombosis and acute pulmonary thromboembolism, is debatable.

Moreover, the thrombophilia would have remained undiagnosed and revealed itself at a later age, when the recovery could have been more difficult. Also, the male sex has a greater risk of recurrence of DVT [4]. The fact that the patient had a fever and leukocytosis, because of the ongoing appendicitis, masked and delayed the diagnosis of pulmonary thromboembolism. Looking only for the cause of the current complaint and missing parts of the patient's

history resulted in an intermediate, false diagnosis of pneumonia.

It is also true that this diagnosis is highly unlikely in a young male, as most of the studies regarding thrombophilia concern mostly women or the association with malignancy. The prevalence in the young male population is not well defined as the need for testing is lower than in women, but in most studies it is slightly lower than in females[4]. Most recent diagnosed cases are similar to our case, when a thrombotic episode occurs.

The pathophysiology is easy to follow in retrospect, as our patient was exposed to multiple factors predisposing to deep vein thrombosis: obesity, bed rest, inflammation, fever/dehydration and thrombophilia. To summarize the case, our patient initially presented with atypical symptoms of appendicitis, which, left untreated, led to prolonged bed rest and due to the thrombophilia, to deep vein thrombosis and acute pulmonary thromboembolism. On the other hand, the acute appendicitis progressed to perforation and retroperitoneal abscess.

Conclusions

The association between the two conditions transformed an otherwise simple surgical procedure into a high risk, albeit a successful one. There are two lessons learned from the unravelling of this case. The first one is that we can never be too cautious when ruling out appendicitis as a cause for abdominal pain, hence the relatively high tolerance for negative appendectomies. Secondly, pulmonary thromboembolism is easily missed if it is not included in the diagnostic protocol of dyspneic,

hypoxemic patients, even if this diagnosis is not highly probable according to age, sex and associated pathology. As a final and self-explanatory remark, the Geneva score for this patient was 12 points, which enlists him in the high risk group, with a probability of having pulmonary embolism of more than 60%.

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