

## Pneumopericardium, pneumomediastinum, pneumoretroperitoneum, pneumoscrotum after diverticular perforation developed during colonoscopy

Kolonoskopi sırasında gelişen divertiküler perforasyon sonrası pnömoperikardiyum, pnömomediastinum, pnömoretroperitoneum ve pnömoskrotum

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### Summary

The incidence of colon perforation is 0.1 percent for flexible sigmoidoscopy, 0.16 percent for diagnostic colonoscopy, and 0.44 percent for colonoscopy plus therapeutic intervention. Colonic perforation can lead to air accumulation in the retroperitoneal space and in a variety of places. This is a very rare entity. We report a case of a 73-year-old man investigated for enlargement of the neck, mild abdominal pain and distention after a diagnostic colonoscopic procedure. A chest and abdominal X-ray with CT scan showed subcutaneous emphysema, retroperitoneal air, pneumopericardium, pneumomediastinum, and pneumoscrotum. This report pointed out the pathway of the air from the retroperitoneal space to the intrapericardial space and into the scrotum in a patient with a colon perforation.

**Key Words:** Pneumopericardium, pneumomediastinum, pneumoretroperitoneum, pneumoscrotum, diverticulum perforation, colonoscopy.

### Özet

*Fleksibl sigmoidoskopi işlemi esnasında kolon perforasyonu gelişme insidansı %0.1, tanısal amaçlı yapılan kolonoskopide %0,16 ve tedavi amaçlı yapılan kolonoskopide %0.44'dür. Kolonik perforasyon retroperitoneal alanda hava birikimine neden olur. Bu çok ender görülen bir durumdur. Burada sunulan olgu 73 yaşında erkek hasta, diagnostik kolonoskopi sonrasında boynunda şişme, orta düzeyli karın ağrısı ve batin distansiyonu ile görüldü. Akciğer ve ayakta direkt batin grafisi ile birlikte batin tomografisinde subkutan anfizem, retroperitoneal hava, pnömoperikardiyum, pnömomediastinum ve pnömoskrotum izlendi. Burada kolon perforasyonlu bir hastada, havanın retroperitoneal alandan intraperikardial alana ve skrotuma yayılma yolu vurgulandı.*

**Anahtar Sözcükler:** Pnömoperikardiyum, pnömomediastinum, pnömoretroperitoneum, pnömoskrotum, divertiküler perforasyon, kolonoskopi.

### Introduction

We describe a case of an older male with a perforated diverticulum on the descending colon during a diagnostic colonoscopic procedure, which developed pneumopericardium, pneumomediastinum, pneumoretroperitoneum and pneumoscrotum. We in turn report the pathway of the air from the retroperitoneal space to the intrapericardial space and into the scrotum in a patient with a colonic diverticulum perforation as a complication of colonoscopy.

### Case Report

A 73-year-old man admitted to our Emergency Service with enlargement of the neck, mild abdominal pain and distention after a diagnostic colonoscopic procedure. He had a partial colonic ileus history and recovered without surgical intervention approximately 20 days before he was referred for diagnostic colonoscopy. At another center, the patient was prepared for this procedure. During the procedure, the endoscopist noticed a diverticulum in the descending colon close the level of the splenic flexure which had been perforated and extracolonic space came in to view. At this point, the procedure was terminated and the patient was transferred to the Emergency Service. Biopsy, polypectomy and any other treatment procedures were aborted during the colonoscopy.

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On physical examination, the patient has mild abdominal tenderness and abdominal distention without signs of peritoneal irritation. He had marked emphysema over the neck extending to the chest. Heart sounds were muffled; breath sounds were normal and symmetrical. Chest pain or respiratory distress did not develop.

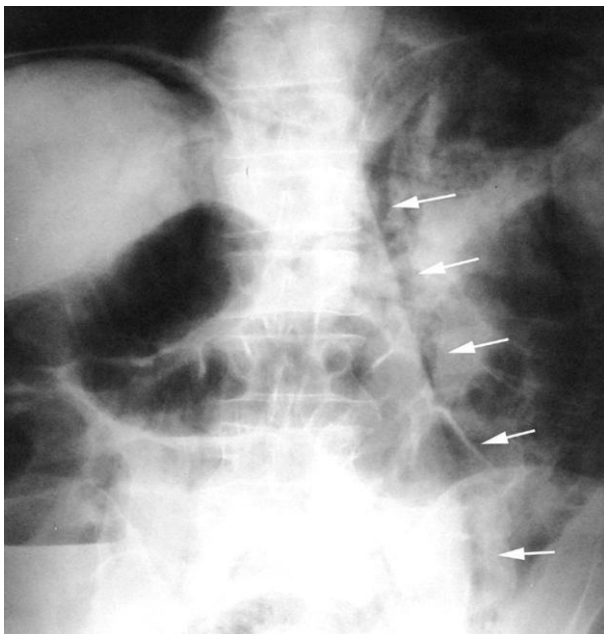
A chest X-ray revealed obvious pneumopericardium with subcutaneous emphysema (Figure-1a,b) while abdominal films showed retroperitoneal free air which manifested on the lateral border of the psoas muscle on the left (Figure-2). On admission, the patient was febrile and normotensive, his white blood cell count was 8,100/mm<sup>3</sup>, and electrocardiogram was normal.

On the CT scan, we observed intrapericardial and scrotal free air (Figure-3a-b, 4).

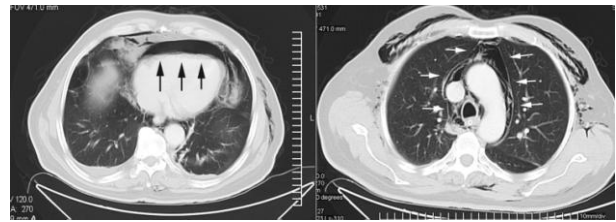
Because his physical findings were minimal, the patient was discharged on the fourth day without surgical intervention.



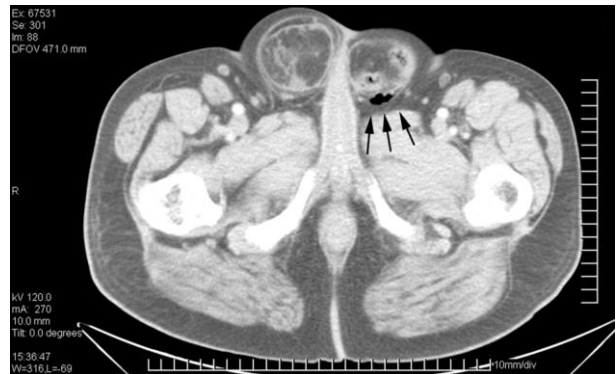
**Figure-1a,b.** Pneumopericardium on chest X-ray, a) First day and b) Seventh day of perforation.



**Figure-2.** Pneumoretroperitoneum on abdominal X-ray, retroperitoneal free air which manifested lateral border of the psoas muscle.



**Figure-3 a,b.** a) Pneumopericardium  
b) Pneumomediastinum on computerized tomography.



**Figure-4.** Pneumoscrotum on computerized tomography.

## Discussion

In the presence of intestinal pathology, such as diverticulitis, inflammatory bowel disease, colonic stricture, or previous abdominal surgery, the colon may be perforated during endoscopic intervention. The incidence of perforation is 0.1 percent for flexible sigmoidoscopy, 0.16 percent for diagnostic colonoscopy, and 0.44 percent for colonoscopy plus therapeutic intervention. Colonic perforation can lead to air accumulation in the retroperitoneal space and in a variety of places including subcutaneous emphysema, pneumatosis coli, pneumoscrotum, pneumopericardium, and pneumothorax. This is a very rare entity (1-4).

The visceral space is a connecting and continuous fascial compartment between the retroperitoneum and the mediastinum. Air travels along these fascial planes and arrives at the pericardium and neck superiorly, and scrotum inferiorly. Posterior intestinal perforation adjacent to the retroperitoneal space allowed air to dissect along the visceral fascial plane, resulting in a pneumoretroperitoneum, pneumomediastinum, pneumopericardium and pneumoscrotum (5-8).

The best treatment for colonoscopy-induced perforation is controversial and depends on the patient's clinical presentation. Laparotomy and thoracotomy may be necessary (9,10). In our case we preferred a non-operative approach, because symptoms were limited.

In conclusion, during endoscopic procedures some complications may be unavoidable. The physician should be aware of the clinical manifestations of air leakage to the retroperitoneal space during endoscopic

procedures. Because of very limited references reported in the literature, there is no standard treatment. Thus it is important to make a decision after close observation of the patient.

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