

# Chilaiditi Syndrome: A Rare Occurrence After Open Heart Surgery: Case Report

## Chilaiditi Sendromu: Açık Kalp Cerrahisi Sonrası Nadir Bir Durum

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**ABSTRACT** Chilaiditi syndrome is a rare clinical state, which increases mortality and morbidity if it occurs after a heart operation. A 67 year old male patient was hospitalized due to coronary artery disease. Coronary artery bypass surgery was performed. Initially the patient did not have any abdominal complaints, however 2 days after the operation the patient developed abdominal pains. Free air was identified in the subdiaphragmatic area in the anteroposterior chest X-Ray. This radiological image is known as the Chilaiditi sign. After post-operative complications were identified the patient was provided with supportive medical therapy. He was discharged from the hospital on the 8th day post-operation. We want to stress and remind everyone of the importance of early and precise diagnosis of the Chilaiditi syndrome in the prevention of life threatening post operative complications.

**Key Words:** Chilaiditi syndrome; coronary artery disease; cardiac surgical procedures

**ÖZET** Chilaiditi sendromu nadir, klinik bir durumdur. Kalp operasyonu sonrası geliştiğinde mortalite ve morbiditeyi artırır. 67 yaşında erkek hasta koroner arter hastalığı nedeni ile yatırıldı. Koroner arter baypas cerrahisi uygulandı. Hastanın herhangi bir abdominal şikâyeti yoktu. Operasyondan iki gün sonra karın ağrısı gelişti. Ön arka göğüs filminde diyafram altı serbest hava tespit edildi. Bu radyolojik görüntü Chilaiditi bulgusu olarak adlandırılır. Hastaya destekleyici medikal tedavi uygulandı. Post operatif 8. günde hastaneden taburcu edildi. Ölümcül komplikasyonların önlenmesi için Chilaiditi sendromuna erken ve kesin tanı verilmesinin çok önemli olduğunu hatırlatmak istedik.

**Anahtar Kelimeler:** Chilaiditi sendromu; koroner arter hastalığı; kardiyak cerrahi işlemler

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Chilaiditi syndrome was first identified by Chilaiditi in 1910.<sup>1</sup> This syndrome is a very rare clinical occurrence. The interposition of transverse colon to subdiaphragmatic area between the liver and the diaphragm temporarily or permanently is usually the most common anatomical variation seen in such cases.<sup>2</sup> The prevalence of this anatomical variation is between %0.025-%0.28 among the general population.<sup>3</sup>

This syndrome can interfere with the disease that need surgical intervention. Especially after heart surgery, re-operation increases mortality and morbidity. We want to remember this syndrome that can improve with the medical treatment.

## CASE REPORT

A 67 year old male patient presented himself to emergency services with complaints of chest pain which he described as a pressure sensation. Dyspnea and sweating was associated with the pain.

The patient's personal and family medical history was insignificant. His physical examination was unremarkable and vital signs were considered normal. Laboratory analysis revealed elevated troponin T and creatine kinase MB values and normal electrolytes, lactic acid, lactate dehydrogenase (LDH), lipase, and amylases.

On the electrocardiography (ECG) common ST segment elevation was diagnosed on pericordial and limb derivates. The patient's echocardiography was normal in his examination in emergency services. The patient was hospitalized with the diagnosis of coronary artery disease and a coronary angiography was performed. Following the coronary angiography, the patient was diagnosed with severe coronary artery disease (multi vessel) and coronary bypass surgery was recommended to him for his treatment. Pre-operative antero-posterior chest X ray and other routine tests were normal.

Coronary artery bypass surgery (the left internal mamarian artery to the left anterior descending coronary artery, saphenous vein graft from the aorta to the right coronary artery, to the second obtuse marginal branch of circumflex coronary artery and to the intermediate coronary artery) was performed using cardiopulmonary bypass on the patient. Complication didn't take place in the course of operation.

His follow up after the operation in the Cardiac Surgery Intensive Care Unit was stable as expected. On the second day post-operation the patient started to suffer from vomiting, dyspnea, severe abdominal and chest pain while displaying no ECG changes. On his physical examination the abdomen was soft there was right upper quadrant tenderness. Bowel sounds were hypoactive. The rest of the physical examination and the vital signs were normal.

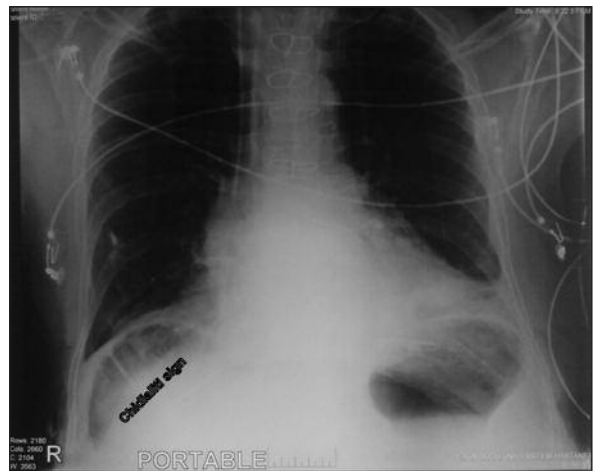
Laboratory analysis revealed mild increase of liver function tests. Electrolytes, lactic acid, lactate

dehydrogenase, lipase and amylases were normal. The Chilaiditi Sign (Pneumoperitoneum in the right subdiaphragmatic zone) was identified on the anteroposterior chest X-Ray (Figure 1). Abdominal ultrasound was obtained and reported as normal.

In his follow up the patient was treated conservatively with supportive medical therapy: which consisted of intravenous fluids, pain control, nasogastric decompression and nil per mouth. As a result of consultations with the gastroenterologists and general surgeons, the decision of no need to any additional test and treatment was made. The patient without having further problems recovered quickly and was discharged from the hospital on the 8th day post-operation.

## DISCUSSION

The colon is stabilized by the colonic suspensory ligaments, mesocolon, liver and its falciform ligament, and the normal anatomical arrangement of the surrounding organs.<sup>4</sup> A shift usually takes place towards to the space under the anterior of the diaphragm and superior to the right lobe of the liver. A shift towards to the posterior subphrenic space is uncommon. This interposition may be temporary or permanent. Any kind of abnormality in the bodies mentioned above such as laxity or elongation of some of these ligaments would certainly lead to the interposition of the bowels causing this clinical occurrence.



**FIGURE 1:** Radiolucency on right subdiaphragmatic zone mimics pneumoperitoneum (Chilaiditi Sign).

The Chilaiditi Sign is an incidental radiographic finding of subdiaphragmatic radiolucency due to the interposition of a bowel segment between the liver and the diaphragm which was described for the first time by Cantini in 1865.<sup>5</sup> It is also known by other names such as *interpositio hepato-diaphragmatica*, subphrenic displacement of the colon, and subphrenic interposition syndrome. The identification of the classical haustra of the bowels and the fixed location of the air that does not change by the position of the patient on roentgenographs backs up the diagnosis of the Chilaiditi sign.

When the Chilaiditi Sign is associated with other clinical symptoms like abdominal pain, vomiting, constipation distension, anorexia and dyspnea it is considered as Chilaiditi syndrome. The Chilaiditi Sign refers to asymptomatic patients where as the Chilaiditi syndrome refers to symptomatic patients.<sup>6</sup>

Post necrotic cirrhosis, chronic lung diseases, sexually transmitted diseases, pregnancy, ascites, previous abdominal surgery, significant weight loss and iatrogenic interventions are also considered among the etiology of the Chilaiditi syndrome.<sup>7</sup>

There are no specific clinical identifiers for this syndrome. It may present itself in a variety of different clinical symptoms like vomiting, dyspnea, constipation, and severe abdominal and chest pain. Most of the time it mimics various clinical situations like bowel perforation, renal colic, coronary artery disease, or intestinal obstruction.

A Chilaiditi sign seen on a chest or abdominal roentgenogram together with the clinical symptoms is sufficient to confirm a diagnosis of Chilaiditi syndrome.

There is also no specific laboratory test which may be helpful in the diagnosis of this occurrence.

Abdominal ultrasound and especially the coronal and the sagittal sections of the abdominal computed tomography are other helpful radiological tools for the differentiating diagnosis of Chilaiditi syndrome.

Chilaiditi syndrome, due to the overlapping features could easily be misdiagnosed. Differential diagnosis include: subdiaphragmatic abscesses, posterior lesions of the liver, morgagni hernias, pneumoperitoneum and retroperitoneal masses. Chiladiti Syndrome in patients having non-specific symptoms together with the appearance of radiolucency (pneumoperitoneum) on the right subdiaphragmatic zone on their chest or abdominal X-Rays following cardiac surgery shall be remembered in the differential diagnosis of such cases.

The treatment is usually nonsurgical and includes bed rest, fluid supplementation, nasogastric decompression, enemas, cathartics, a high-fiber diet, and stool softeners.<sup>8</sup>

Although most cases have a benign outcome some cases may cause devastating gastrointestinal system complications such as cecal perforation most likely due to the underlying etiology of the syndrome. More complicated cases like colonic volvulus, bowel ischemia, perforation and bowel obstruction may require surgery. Choice of appropriate treatment mainly depends on the nature and severity of the symptoms, underlying etiological reasons and associated factors.

Gastrointestinal system complications that are faced, following cardiac surgery may cause deterioration of a patients clinical stability causing an increase in the risk of mortality. Although early and precise differential diagnosis among such complications is vital this is not always very easy to do. Although Chiladiti syndrome is frequently asymptomatic, it is very important because it can interfere with the diseases that necessitate severe surgical procedures.<sup>9</sup>

This syndrome occurs after major operations such as the case with our patient. Because differential diagnosis can't be done well, a second operation may be necessary. This also increases mortality and morbidity. We wanted to remind everyone of the importance of differential diagnosis in cases involving the Chiladiti syndrome and raise awareness concerning this disease, so that patients can be treated with medical therapy.

## REFERENCES

1. Chilaiditi D. [On the question of Hepatoptosis and ptosis generally following three cases of temporary, partieller liver relocation]. *Fortschr Geb Rontegenstr Nuklearmed Ergänzungsband* 1910-11;16:173-208.
2. Vessal K, Borhanmanesh F. Hepatodiaphragmatic interposition of the intestine (Chilaiditi's syndrome). *Clin Radiol* 1976;27(1):113-6.
3. Risaliti A, De Anna D, Terrosu G, Uzzau A, Carcoforo P, Bresadola F. Chilaiditi's syndrome as a surgical and nonsurgical problem. *Surg Gynecol Obstet* 1993;176(1):55-8.
4. Agur AMR. The abdomen. In: Agur AMR, Lee MJ, eds. *Grant's Atlas of Anatomy*. 9<sup>th</sup> ed. Baltimore, MD: Williams & Wilkins; 1991. p.77-146.
5. Aldoss IT, Abuzetun JY, Nusair M, Suker M, Porter J. Chilaiditi syndrome complicated by cecal perforation. *South Med J* 2009;102(8):841-3.
6. Murphy JM, Maibaum A, Alexander G, Dixon AK. Chilaiditi's syndrome and obesity. *Clin Anat* 2000;13(3):181-4.
7. Nakagawa H, Toda N, Taniguchi M, Ibukuro K, Tagawa K. Prevalence and sonographic detection of Chilaiditi's sign in cirrhotic patients without ascites. *AJR Am J Roentgenol* 2006;187(6):W589-93.
8. Kamiyoshihara M, Ibe T, Takeyoshi I. Chilaiditi's sign mimicking a traumatic diaphragmatic hernia. *Ann Thorac Surg* 2009;87(3):959-61.
9. Çetinkaya E, Razi HC, Gündüz M. [Chilaiditi syndrome: case report]. *Türkiye Klinikleri J Pediatr* 2004;13(1):33-6.