Turkish Journal of Vascular Surgery 2021;30(1):66-69

DOI: 10.9739/tjvs.2021.792
www.turkishjournalofvascularsurgery.org

Case Report

# Inferior vena cava aneurysm in advanced age: A rare case report

Ferhat Borulu[1], Beliz Öztok Tekten[2]

[1]*Department of Cardiovascular Surgery, Atatürk University Faculty of Medicine, Erzurum, Turkey*
[2]*Emergency Medicine, Bolu Abant Izzet Baysal University Faculty of Medicine, Bolu, Turkey*

**ABSTRACT**

Among all vascular aneurysms, the venous type is quite rare compared to the arterial type. Although this is the case, venous aneurysms can cause serious complications and even death. Most patients are asymptomatic; however, serious clinical indicators may occur including abdominal pain, gastrointestinal bleeding, venous occlusions, and pulmonary embolism. In this article, we present an 84-year-old male case of an inferior vena cava aneurysm presenting with a complaint of intermittent, non-specific abdominal pain in the right upper quadrant for the last couple of years.

***Keywords:*** Aneurysm, inferior vena cava, advanced age.

Venous aneurysms are extremely rare and, to date, only a few cases have been reported in the literature.[1] Although there is no clear information about its etiology, some authors have advocated that innate defects play a role in the development of venous aneurysms.[2] Although this type of aneurysm is rare, its pathology should be followed, since it has a wide clinical picture including patients who are asymptomatic to those who are facing an increased risk of mortality. The life-threatening aspect is its ability to cause massive thrombosis.[2]

In this article, we present an elderly case of patient who had a large inferior vena cava aneurysm (IVCA) in the light of literature data.

## CASE REPORT

An 84-year-old male patient presented to our emergency department with the complaint of abdominal pain in the right upper quadrant. He did not have any complaints other than intermittent abdominal pain for the last three to four years, which resolved spontaneously without increasing in intensity. His medical history revealed no chronic disease. A written informed consent was obtained from the patient.

The biochemical investigations and his complete blood count results were normal. The abdominal ultrasound (US) revealed that the diameter of the inferior vena cava (IVC) increased in more than one segment (Figure 1). A contrast-enhanced computed tomography angiography (CTA) was performed in the venous imaging phase (Figure 2). The CTA images demonstrated that the size of the hepatic segment of the IVC was 60×75 mm, the middle hepatic vein was 19 mm, the left renal vein was 36 mm at the site where it drained and it was 30 mm to 36 mm at the infrarenal level. The diameter of the right iliac vein was 22 mm and the left iliac vein was 25 mm. The right external iliac vein was 16 mm and the left iliac vein was 17 mm. The femoral veins were also dilated with a diameter of about 20 mm. Echocardiography was performed. The ejection fraction was 40 to 45%. The left atrium was dilated and 45 mm in diameter.

***Received:*** January 01, 2020 ***Accepted:*** August 30, 2020 ***Published online:*** September 24, 2020

***Correspondence:*** Ferhat Borulu, MD. Atatürk Üniversitesi Tıp Fakültesi Kalp ve Damar Cerrahisi Anabilim Dalı, 25240 Yakutiye, Erzurum, Türkiye.
e-mail: fborulu@gmail.com

***Citation:***
Borulu F, Öztok Tekten B. Inferior vena cava aneurysm in advanced age: A rare case report. Turk J Vasc Surg 2021;30(1):66-69


**Figure 1.** An abdominal ultrasound image showing an inferior vena cava aneursym.

A mild-to-moderate mitral insufficiency, an advanced tricuspid valve regurgitation, and an advanced right ventricular failure were observed. The right atrial diameter was about 95 to 100 mm in the largest segment. Other than dyspnea, he had no symptoms or physical examination findings associated with cardiac failure.

No thrombi were observed in the aneurysmal dilatation of the vena cava segments. Based on the hospital records, his medical history was not specific, other than smoking over a period of 65 years. He was admitted to our inpatient clinic. During the diagnostic tests and follow-up examinations, he was discharged upon his own will, as he considered that he had no serious medical complaints for hospitalization. No new complaints or findings were observed at the follow-up visit in the outpatient clinic three months later. Our patient was informed that his current disease was rare. He did not have any serious symptoms and did not attend to the subsequent follow-up visits. About one year later, the patient was admitted to our hospital due to cerebral infarction. Unfortunately, he died in the hospital seven days later.

## DISCUSSION

Although IVCAs are extremely rare, they are important due to their life-threatening potential.[1] Such patients are usually asymptomatic; the IVCA may cause thrombus and rupture formation which increases the risk of embolism.[3] The etiology is not clear; however, congenital anomalies in the vascular walls, any obstructions to impair the venous flow, and long-term states of venous hypertension due to embryological malformations have been blamed.[2] Others have proposed that anastomoses develop among the venous structures accompanying other cardiac problems (i.e., right cardiac failure, lesions in the tricuspid valve, cardiomyopathies, constrictive pericarditis).[4] Long-term inflammatory disease, thrombosis, trauma, and right heart failure are considered as possible risk factors.[5]

The histopathological findings suggest that they are real aneurysms. The increased amount of the

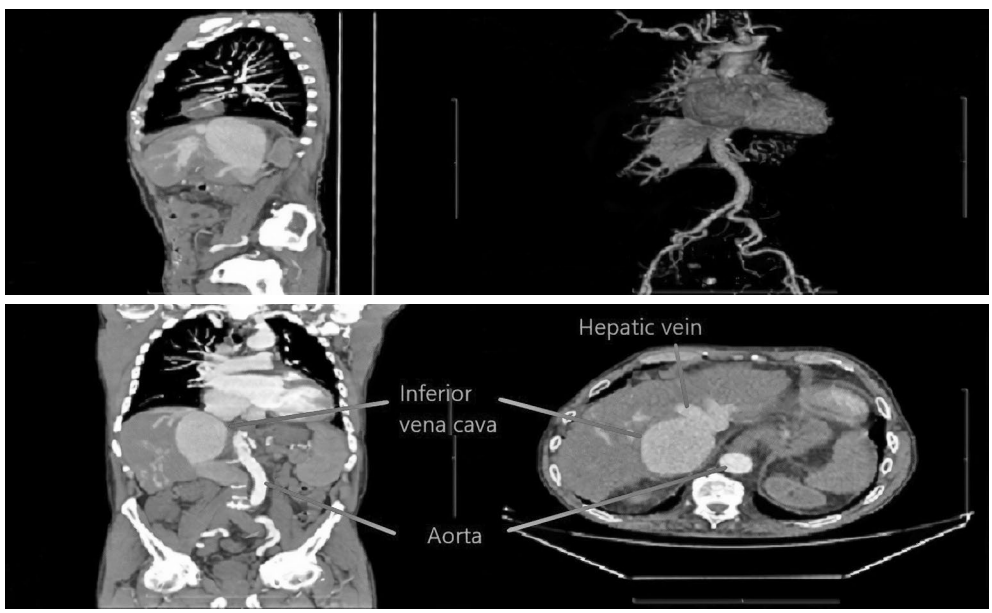


**Figure 2.** A computed tomography angiography showing an inferior vena cava aneurysm.

muscular, elastic, and fibrous tissues is evident in the wall of the vessel.[6] Prolonged duration of the Valsalva maneuvers and significantly higher levels of venous pressure may play a role in the development of the associated histopathological changes.[6] The IVCAs can be saccular, fusiform, or diverticular in structure, while they are most common in the saccular form.[7] The IVCAs can be categorized based on a classification system developed by Gradman and Steinberg.[8] In this classification, the following classifications are used: Type 1, aneurysms involving the suprahepatic IVC with no venous obstruction; Type 2, aneurysms associated with the obstruction of the IVC above or below the hepatic veins; Type 3, infrarenal aneurysms without venous obstruction; and Type 4, aneurysms that may occur in any location. Given this classification, most of the cases in the literature are Type 3 saccular aneurysms. However, a Type 2 fusiform aneurysm was observed in our patient.

The major complications in the venous aneurysms and, particularly, in the IVCAs are thrombosis, rupture of the aneurysm, and pulmonary embolism.[1] Although the patient in this case was of advanced age, there were neither any thrombi formations in the aneurysmal segment nor any other potential complications associated with the IVCA. No other case has been reported in the literature in which the patient has reached this age, while remaining asymptomatic and uncomplicated for many years. The limited number of patients also precludes the collection of sufficient data on the frequency of complications.

Venous aneurysms are most commonly detected coincidentally during other diagnostic tests. An US imaging is of paramount importance in the diagnosis. It provides a great advantage owing to its low cost and the lack of ionizing radiation. Echocardiography, CTA, and magnetic resonance imaging (MRI) can be also employed as diagnostic modalities. In the diagnosis, venous phases of conventional phlebography and arteriograms can be used.[9,10] These methods are important in the diagnosis of comorbid pathologies and in associated complications. Although all of these diagnostic methods are available in our clinic, US, echocardiography, and CTA were sufficient for the diagnosis of our patient.

No consensus on the management of these pathological structures has been reached, yet. The limited number of cases hinders the development of treatment protocols. Treatment options vary from a close follow-up of asymptomatic and non-complicated patients to surgical resection and graft interposition for others. The development of thromboembolism, IVC syndrome, or rupture requires surgical treatment. Saccular aneurysms usually require full or partial resections. The other structural types of aneurysms can be treated with prosthetic graft interpositions, infrarenal caval vein ligations, or partial resections. Type 1 aneurysms can be followed with annual imaging. In the presence of complications, additional interventions (i.e., resection in the presence of hemothorax, anticoagulation in the presence of thrombosis) can be considered.[1,11] As the risk of complications is relatively higher with Type 2 and Type 3 aneurysms, a higher level of care should be exercised in the evaluations for surgical interventions. Small-sized aneurysms (<5 cm), those with stable dimensions during follow-up, and anatomically difficult aneurysms should be followed. Also, close follow-up is appropriate for patients with severe morbidity. The algorithm developed by Montero-Baker et al.[1] summarizes these treatment methods. According to this algorithm, it should be first divided into Type I and other types. In Type I aneurysms, those who are symptomatic should receive an intervention, and those who are asymptomatic should be treated conservatively (anticoagulant therapy/thrombolysis). Patients with other types (Types 2-4) should receive an intervention. Although the patient presented with a Type 2 aneurysm, no surgical intervention was performed, since the patient had no serious symptoms, did not accept further treatment, and was of advanced age. When the decision is to follow the patient, an MRI provides more advantages compared to contrast-enhanced CTA and interventional procedures. The superiority of MRIs is of importance, particularly when the patients are diagnosed at relatively younger ages and when longer durations of follow-up are scheduled over the years.

In conclusion, IVCAs are very rare. The clinical picture may vary among the patients, ranging from those who are asymptomatic to those with complications, leading to mortality. A close follow-up can be scheduled for asymptomatic patients and for the patients in whom surgical interventions would be of a higher risk due to other accompanying risks. Surgical intervention options may be considered for patients, when a dilatation, rupture, or thromboembolic event develops during the follow-up period. Further case reports are required to collect more data on the treatment modes and associated complications in these patients.

**Declaration of conflicting interests**

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

**Funding**

The authors received no financial support for the research and/or authorship of this article.

## REFERENCES

1. Montero-Baker MF, Branco BC, Leon LL Jr, Labropoulos N, Echeverria A, Mills JL Sr. Management of inferior vena cava aneurysm. J Cardiovasc Surg (Torino) 2015;56:769-74.
2. Rodríguez-González M, Castellano-Martinez A. Inferior Vena Cava Aneurysm in Children: A Case Report. Ann Vasc Surg 2017;38:315.e9-315.e13.
3. Davidovic L, Dragas M, Bozic V, Takac D. Aneurysm of the inferior vena cava: case report and review of the literature. Phlebology 2008;23:184-8.
4. Woo K, Cook P, Saeed M, Dilley R. Inferior vena cava aneurysm. Vascular 2009;17:284-9.
5. Luís Duarte M, Abreu BFBB, Silva AQPD, Prado JLMA, Silva MQPD. Idiopathic inferior vena cava aneurysm - tomographic diagnosis. Rev Port Cardiol 2017;36:781-2.
6. Debing E, Vanhulle A, van Tussenbroek F, von Kemp K, Van den Brande P. Idiopathic aneurysm of the inferior vena cava as a cause of massive penile bleeding. Eur J Vasc Endovasc Surg 1998;15:365-8.
7. Weber C, Jones K, Milner R. Resection and primary repair of an inferior vena cava aneurysm in a 13-year-old male. Vascular 2011;19:218-22.
8. Gradman WS, Steinberg F. Aneurysm of the inferior vena cava: case report and review of the literature. Ann Vasc Surg 1993;7:347-53.
9. Moustafa SE, Mookadam M, Khandheria BK, Mookadam F. Inferior vena cava aneurysm. J Am Soc Echocardiogr 2007;20:1418.e5-7.
10. Deshpande A, Sahoo S, Chaudhari P, Abhijit R. Aneurysm of the inferior vena cava: accurate preoperative diagnosis and surgical excision. ANZ J Surg 2010;80:552-3.
11. Davidovic L, Dragas M, Bozic V, Takac D. Aneurysm of the inferior vena cava: accurate preoperative diagnosis and surgical excision. ANZ J Surg 2010;80:552-3.