

Case Report

Interesting case report on Chiari network

Dheeraj Kumar¹, Gajram Singh², Mahendra Singh^{3*}, Jyotsana Singh¹

¹Department of Cardiology Technology, Faculty of Paramedical Sciences, UPUMS, Saifai, Etawah, Uttar Pradesh, India

²Department of Dialysis Technology, Faculty of Paramedical Sciences, UPUMS, Saifai, Etawah, Uttar Pradesh, India

³Department of Operation Theatre Technology, Faculty of Paramedical Sciences, UPUMS, Saifai, Etawah, Uttar Pradesh, India

Received: 19 December 2023

Revised: 30 January 2024

Accepted: 01 February 2024

***Correspondence:**

Mahendra Singh,

E-mail: mannu2021upums@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

The Chiari network is a congenital remnant that is typically found in the right atrium and is generally not associated with significant pathophysiological implications. Usually, this is detected on general routine health checkup screening or casual examination. But, occasionally in certain cases, it is possible for this condition to result in diagnostic ambiguity when assessing right atrial disorders. Additionally, it has potential to contribute to the development of thromboembolism by inducing flow blockage. The Chiari network can be accurately diagnosed by echocardiography. This network appears as a highly mobile, highly reflectant echo target at many regions in the right atrium during transthoracic and transesophageal echocardiography. In this study, we provide a case involving an 18-year-old male student studying cardiac technology who was diagnosed incidentally during echocardiography practical classes with Chiari network, mild TR and mild PR. The value and precision of echocardiography are becoming more widely recognized and being used more frequently. The potential for finding normal anatomical variations and their potential incorrect interpretation as pathological states coincides with the wider implementation of this imaging method.

Keywords: Congenital, Chiari network, 2D echocardiography, Tricuspid regurgitation, Pulmonary regurgitation

INTRODUCTION

The Chiari network is an intricate and mobile structure that is occasionally observed in the right atrium, in close proximity to the posterior vena cava and coronary sinus. There are normally no clinical symptoms and are frequently identified incidentally. But, occasionally in certain cases, it is possible for this condition to result in diagnostic ambiguity when assessing right atrial disorders. Additionally, it has potential to contribute to the development of thromboembolism by inducing flow blockage.¹ It has been found in 1.3% to 4% of autopsies and is accepted to be minimal clinical outcomes.² In the majority of instances, echocardiography is employed for

the diagnosis and visualization of the Chiari network.³ The echocardiographic presentation of the Chiari network is an atypical anatomical finding that cannot be classified as a "normal variant".⁴

CASE REPORT

Here, in our case, the patient was seen to have a long, thin, highly mobile echo target that was travelling across the right atrium in a lateral to medial orientation, as well as quick, whip-like motion that was going towards and away from the tricuspid valve ring in 2D echocardiography. M-mode at the tricuspid valve level also shows a peculiar sinusoidal echo target in the right atrium was detected as a

curvilinear oscillating echo that was positioned relatively posteriorly towards the right atrium and occasionally travelled towards the tricuspid valve leaflets during diastole but did not really pass through it. Color Doppler showed mild tricuspid regurgitation with a velocity of 1.6 m/sec and PAP=11 mmHg, the patient was also noted with mild pulmonary regurgitation. There was no history of preexisting cardiac disease. He has a history of dermatology disorder with the symptom of itching only. On examination, the vital signs were found to be normal.



Figure 1: Chiari network can be seen in right atrium.



Figure 2: Pulmonary regurgitation.

DISCUSSION

While the heart is growing during fetal life the right venous junction is characterized by the presence of two valve, namely euastachi and thebesi. The septum spurium serves as the point of attachment for both valves within the right atrium. The septum spurium typically undergoes regression during the final stages of valve development.

Anyhow, in few cases, the regression is incomplete leading to cor-triatrrium. In instance of partial regression, the presence of fenestrated layer persists, resulting in the development of the Chiari network.⁵ It was Karls von, who described this anatomical remnant, it was named after Hans Chiari who reviewed this anatomical remnant in 11 different cases.⁶ Initially, the Chiari network was seen as being devoid of clinical symptoms. However, subsequent papers have indicated a potential association with cardiac conditions such as embolism, infective endocarditis or supraventricular tachyarrhythmias.⁷⁻⁹ This anomaly is often misinterpreted in cases of fever, congestive heart failure, pulmonary infiltrate and history of IV drug abuse as infection or disruption of normal right-sided structure which require an urgent surgical attention.¹⁰ On certain occasions, it function as a tangible obstruction during invasive medical interventions. The Chiari network has been observed to provide protection against pulmonary embolism by functioning as a filter in the inferior vena cava, due to its sieve-like properties near the cavo-arterial junction.¹ The Chiari network can be accurately diagnosed by echocardiography. This network appears as a highly mobile, highly reflectant echo target at many regions in the right atrium during transthoracic and transesophageal echocardiography.¹¹ Recent research has shown that real time 3D transthoracic echo is effective in establishing a Chiari network diagnosis and distinguishing it other right atrial structure like the eustachian valve and thebesian valve.¹² The Chiari network is largely an accidental discovery that has a little clinical importance on its own. However it can occasionally cause complications with diagnosis during echocardiography, where it might be mistaken for right atrial thrombi, tumours or vegetation.¹¹ Significant tricuspid regurgitation could result from the Chiari network extending into the right ventricle.¹³ Sometime a diagnosis of cor-triatrrium or even an ebstein anomaly of the tricuspid valve may be confused with the presence of Chiari network. The right sinus venosus valve partial resorption similarly cause cor-triatrrium dexter, although the condition separating septum is significantly thicker and has little to no fenestration. Unlike the Chiari network, it has the potential to restrict blood flow and is frequently accompanied by other congenital anomalies such as tricuspid atresia and atrial septal defect.^{14,15}

CONCLUSION

Chiari network is an uncommon congenital anomaly which is found accidentally. This structure may appear as a very mobile, very reflective echo target that is visible from a number of angles in the right atrium. Given the occurrence of this “normal variant” is not rare, such data should be interpreted with caution. The value and precision of echocardiography are becoming more widely recognized and being used more frequently. The potential for finding normal anatomical variations and their potential incorrect interpretation as pathological states coincides with the wider implementation of this imaging method.

ACKNOWLEDGEMENTS

Authors would like to express their heartfelt appreciation to everyone engaged in the study, both directly and indirectly.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Monwarul I, Lima AS, Shanah Z. Chiari Network: A case report and brief overview. J Saudi Heart Assoc. 2013;25(3):225-9.
2. Schneider B, Hofmann T, Justen MH, Meinertz T. Chiari network: normal anatomical variant or risk factor for arterial embolic event?. J Am College Cardiol. 1995;6:23-9.
3. Schwimmer-Okike N, Niebuhr J, Schramek GGR, Frantz S, Kielstein H. Case Report: The presence of large chiari network in a patient with atrial fibrillation and stroke. Hindwai J. 2016;3:483.
4. Chiari H. Ueber Netzbildungen im rechten Vorhofe des Herzens. Beitr Path Anat 1897;22:1.
5. Franck D. Über atypische Diaphragmen und Sehnenfäden des menschlichen Herzens. Virchows Arch. 1970;349(2):152-62.
6. Chiari H. Über netzbildungen im rechten vorhofe des herzens. Virch Arch. 1897;22:1-10.
7. Edwards P, Wozniak M, Corretti M, Price TR. Cardiac Chiari network as an etiology for embolic stroke. J Stroke Cerebrovasc Dis. 1994;4(4):238-41.
8. Mousavi N, Bhagirath K, Ariyarajah V, Fang T, Ahmadi R, Lytwyn M, Jassal DS, Seifer C. Chiari network endocarditis: not just an innocent bystander. Echocardiography. 2008;25(6):642-5.
9. Dregoes D, Rejent M, Zhang A, Abousy R. Incidental discovery of Chiari network in a patient with new onset of atrial fibrillation. J Clin Case Rep. 2013;4(2):1-2.
10. Warner JA, Cheitlin MD, Gross BW, Speck SM, Ivey TD. Echocardiographic appearance of the Chiari Network: Differentiation from the right heart pathology. Am Heart J. 2018;23:32-9.
11. Werner JA, Cheitlin MD, Gross BW. Echocardiographic appearance of Chiari network: differentiation from right heart pathology. Circulation. 1981;5:1104-9.
12. Pothineni KP, Nanda NC, Burri MV, Singh A, Panwar SR, Gandhari S. Live/real time three-dimensional transthoracic echocardiography visualization of chiari network. Echocardiography. 2007;24(9):995-7.
13. Jen-Ping CJP. Tricuspid regurgitation as a result of chairi network attachment. J Thorac Cardiovasc Surg. 2012;143:235.
14. Hansing CE, Young WP, Rowe GG, Cor triatriatum dexter. AM J Cardiol. 1992;30:559-64.
15. Salama S, Gallachera D, Uzna O. Cor Traitratum dexter. Pediatr Cardiol. 2002;23:103-5.

Cite this article as: Kumar D, Singh G, Singh M, Singh J. Interesting case report on Chiari network. Int J Community Med Public Health 2024;11:1342-4.