

Incidentally diagnosed Takayasu arteritis on thyroid ultrasonography showing prominent collateral vessels of thyroidal arteries and common carotid artery occlusion

Se Jin Nam, Eun-Kyung Kim

Department of Radiology, Research Institute of Radiological Science, Yonsei University College of Medicine, Seoul, Korea

We report a case of middle-aged woman incidentally diagnosed with Takayasu arteritis during the ultrasonography of a thyroid gland nodule. Prominent collaterals of the thyroidal arteries and a thin common carotid artery with mural thickening and deficient intraluminal flow signals were initially depicted on the ultrasonography with color Doppler. Subsequent magnetic resonance angiography and computed tomography aortography confirmed the diagnosis with the imaging features of a bilateral long segment common carotid artery occlusion and segmental stenosis of the left subclavian artery in addition to the suggestive physical findings.

Keywords: Takayasu arteritis; Ultrasonography; Carotid artery, common

Introduction

Takayasu arteritis is a chronic vasculitis of unknown cause predominantly affecting large vessels, such as the aorta and its main branches including subclavian artery, common carotid artery (CCA), renal artery, pulmonary arteries, and coronary arteries, preferentially affecting young women in the second and third decades of life in Asian and Middle Eastern countries [1,2]. Its histopathology is known to be granulomatous panarteritis characterized by inflammatory cells infiltrating the arterial wall, typically the media and adventitia causing proliferation of the intima and degeneration of the external elastic lamina resulting in arterial wall thickening and formation of stenosis, occlusion, and aneurysm of the affected arteries [3]. Due to the chronic feature of this disease entity, Takayasu arteritis is often accompanied by collateral formation. Here, we report a case of incidentally diagnosed Takayasu arteritis with prominent collaterals of thyroidal arteries and CCA occlusion primarily depicted on the neck ultrasonography (US) during the evaluation of a thyroid nodule.

Case Report

A 53-year-old female patient was referred for US of a thyroid nodule incidentally detected on chest

ULTRA SONO GRAPHY

CASE REPORT

<http://dx.doi.org/10.14366/usg.14007>
pISSN: 2288-5919 • eISSN: 2288-5943
Ultrasonography 2014;33:222-225

Received: January 22, 2014

Revised: February 16, 2014

Accepted: April 3, 2014

Correspondence to:

Eun-Kyung Kim, MD, Department of Radiology, Research Institute of Radiological Science, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 120-752, Korea
Tel. +82-2-2228-7400
Fax. +82-2-393-3035
E-mail: ekkim@yuhs.ac

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Copyright © 2014 Korean Society of Ultrasound in Medicine (KSUM)



How to cite this article:

Nam SJ, Kim EK. Incidentally diagnosed Takayasu arteritis on thyroid ultrasonography showing prominent collateral vessels of thyroidal arteries and common carotid artery occlusion. *Ultrasonography*. 2014 Jul;33(3): 222-225.

computed tomography (CT) for the evaluation of pneumonia. She had no other prior history such as diabetes mellitus and no smoking history. On physical examination, there was no palpable mass in the anterior neck. At the time of US, the white blood cell count was within the normal range ($3,740/\mu\text{L}$), and the erythrocyte sedimentation rate and C-reactive protein were elevated at 21 mm/hr and 1.840 mg/dL respectively. The thyroid nodule detected on chest CT was revealed on US as a 9-mm, well-defined, mixed-echoic nodule in the lower pole of the thyroid gland left lobe, suggesting a benign lesion. However, several serpentine anechoic structures were detected medial to the right lobe of the thyroid gland, between the trachea and the right lobe of thyroid gland (Fig. 1A). The anechoic

structures showed internal blood flow signals on color Doppler US (Fig. 1B) and were suggested to be enlarged vascular structures. Furthermore, bilateral CCAs were unusually small with diffuse homogeneous mural thickening with barely visible intraluminal flow signals (Fig. 1B–D).

Magnetic resonance (MR) angiography was recommended to evaluate the vascular structure of the neck, and complete long segment occlusion of bilateral CCAs from the orifice was found, while bilateral internal and external carotid arteries were patent. Segmental occlusion of the left subclavian artery just distal to the vertebral artery orifice and stenosis of the left proximal subclavian artery were noted. Extensive collateral vessels were demonstrated

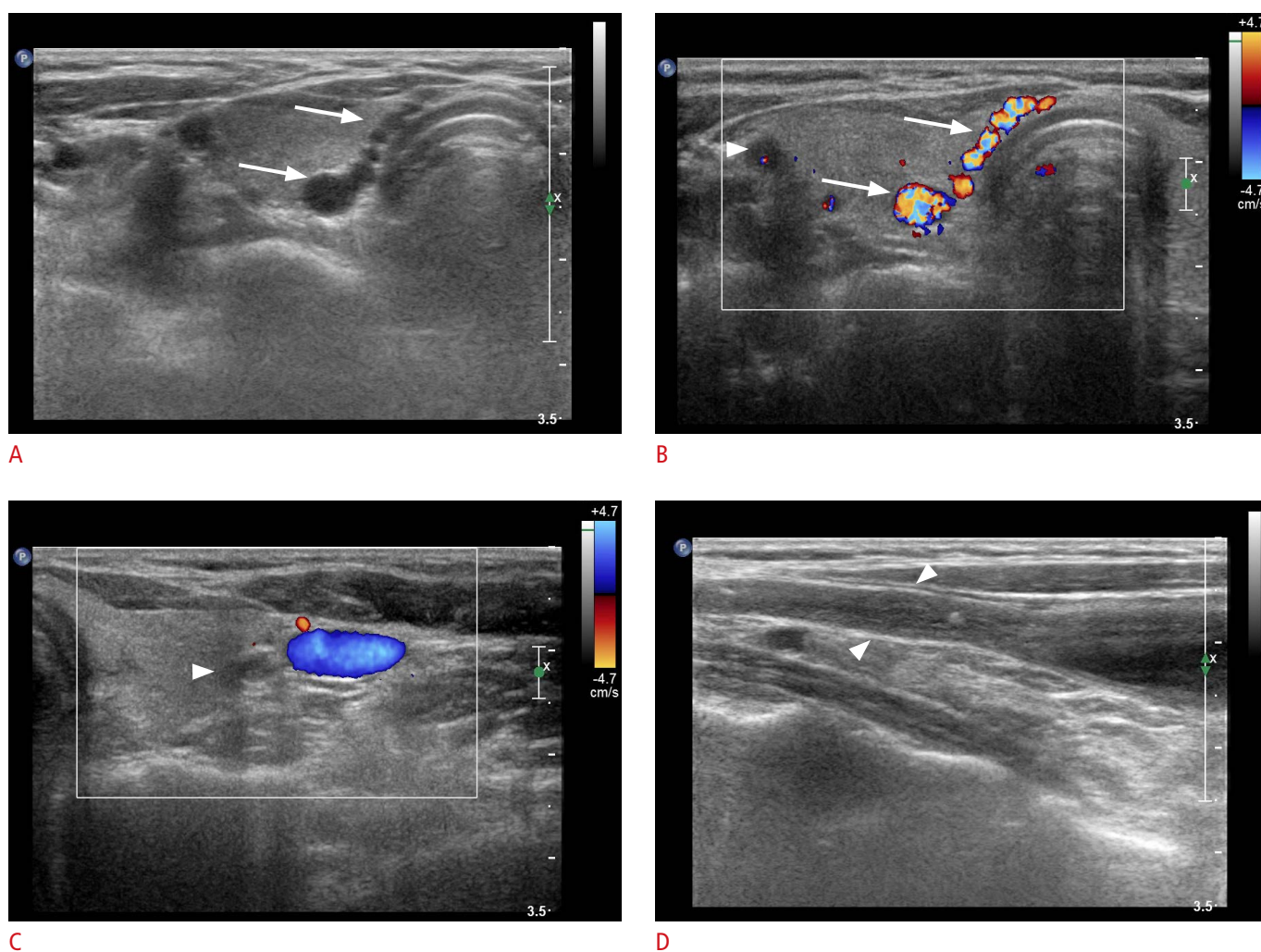


Fig. 1. Neck ultrasonograms of a 53-year-old female performed to evaluate a known thyroid nodule.

A. On the transverse gray-scale image, several serpentine anechoic structures (arrows) are defined medial to the right lobe of the thyroid gland, between the trachea and the right lobe of the thyroid gland. **B.** Color Doppler image shows internal flow signals (arrows), suggesting enlarged vascular structures. Right common carotid artery (CCA) looks unusually small, measuring about 0.5 cm on the transverse scan image (arrowhead) with minimal internal vascularity. **C.** Left CCA is also unusually small, measuring about 0.4 cm without visible vascularity on the transverse color Doppler image (arrowhead). **D.** Longitudinal gray-scale image shows diffuse homogeneous mural thickening (arrowheads) of left CCA. There is no echogenic calcification along the arterial wall of bilateral CCAs.

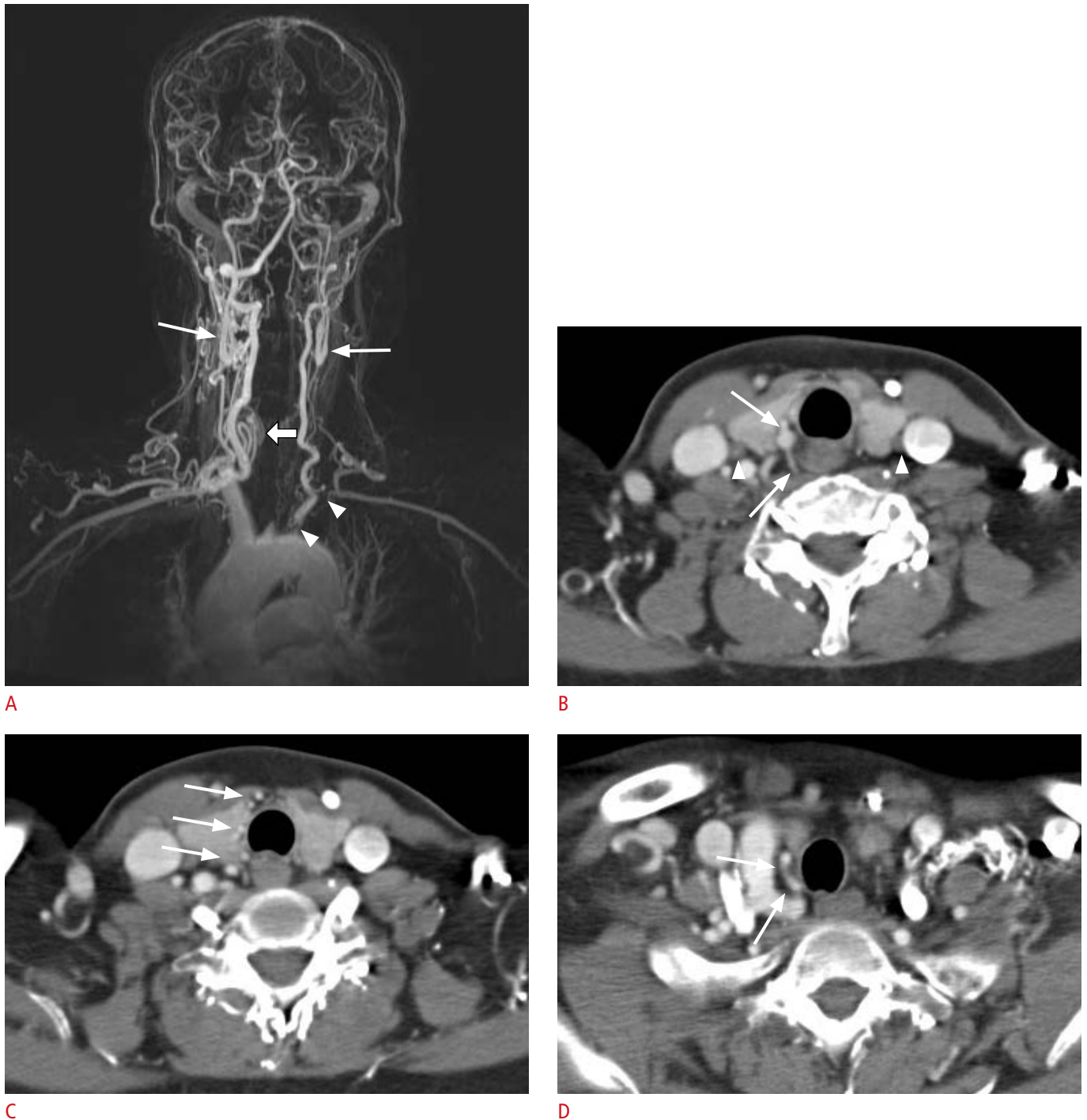


Fig. 2. Magnetic resonance (MR) angiography and contrast-enhanced computed tomography (CT) performed to evaluate neck vessels after ultrasonography.

A. On intravenous contrast-enhanced MR angiography, bilateral common carotid arteries (CCAs) are not visualized due to complete occlusion. Bilateral internal and external carotid arteries are patent (thin arrows) and extensive collateral vessels are demonstrated on the right side which were detected on the ultrasonography (thick arrow). Left subclavian artery shows segmental occlusion and focal stenosis (arrowheads). Takayasu arteritis could be suspected on the basis of these imaging findings. **B–D.** Serial axial images of contrast-enhanced CT show unusually small bilateral CCAs (arrowheads on **B**) without filling of contrast agent and extensive collateral vessels (arrows) corresponding to the ultrasonographic features.

on the right side including inferior and superior thyroidal arteries, which were detected on previous US (Fig. 2). These imaging findings suggested Takayasu arteritis. Other vascular structures were evaluated by CT of the aorta, and there was no grossly depicted other vascular involvement for the aorta, renal arteries, or pulmonary arteries. For the exact diagnosis, blood pressure was measured on both arms, and there was a 27-mmHg difference: right side, 130 mmHg; left side, 103 mmHg. Physical examination was performed again, and the bruit over left subclavian arteries was noted. Based on all these imaging features and physical findings, the patient was diagnosed with Takayasu arteritis according to the criteria laid out by American College of Rheumatology [4].

Discussion

There are several reports about US findings of the CCA in patients with Takayasu arteritis. Maeda et al. [5] described a "macaroni sign" as an indicator of the disease, and characteristic circumferential arterial wall thickening of the common carotid arteries as a macaroni-like, diffusely thickened intima-media complex. If CCA occlusion is detected on US, the differential diagnosis should include atherosclerosis, Takayasu arteritis, postirradiation arteriopathy, and cardioembolism [6]. The echogenicity of the occluded material tends to be homogeneous in patients with Takayasu arteritis, while it looks rather heterogeneous in patients with atherosclerosis and those with postirradiation arteriopathy [6]. To the best of our knowledge, there has been no case of Takayasu arteritis presenting as bilateral CCA occlusion and perithyroidal collateral vessels incidentally detected during thyroid US like our case.

Collateral formation is frequently accompanied in Takayasu arteritis due to the chronic features of the disease. It is contributable to the imaging feature of sparing of the internal carotid artery and external carotid artery with CCA involvement in Takayasu arteritis. In our case, dilatation of the superior thyroidal artery branching from the external carotid artery and inferior thyroidal artery branching from the thyrocervical trunk play the role of a collateral pathway. Detection of these collateral vessels accompanied by CCA occlusion on US was a key clue to the suspicion of Takayasu arteritis in our case.

If Takayasu arteritis is suspected on neck US, the evaluation of other vessels should be followed with conventional, CT, or MR angiography to confirm the disease and evaluate other vessel involvement besides CCA. Angiography, which has been the procedure of choice for the diagnostic evaluation of Takayasu arteritis, often shows long, smooth, tapered stenosis ranging

from mild to severe or frank occlusions, collateral vessels, or the subclavian steal phenomenon [7]. Smoothly tapered luminal narrowing or occlusion accompanied by thickening of the wall of the vessel could be depicted better by CT or MR angiography than by conventional angiography [8–10].

In summary, we would like to report a case of a middle-aged woman with Takayasu arteritis initially suspected during the neck US, presenting as prominent collaterals of thyroidal arteries and CCA occlusion.

ORCID: Se Jin Nam: <http://orcid.org/0000-0002-1161-1128>; Eun-Kyung Kim: <http://orcid.org/0000-0002-3368-5013>

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

References

1. Hata A, Noda M, Moriwaki R, Numano F. Angiographic findings of Takayasu arteritis: new classification. *Int J Cardiol* 1996;54 Suppl:S155-S163.
2. Brunner J, Feldman BM, Tyrrell PN, Kuemmerle-Deschner JB, Zimmerhackl LB, Gassner I, et al. Takayasu arteritis in children and adolescents. *Rheumatology (Oxford)* 2010;49:1806-1814.
3. Weyand CM, Goronzy JJ. Medium- and large-vessel vasculitis. *N Engl J Med* 2003;349:160-169.
4. Arend WP, Michel BA, Bloch DA, Hunder GG, Calabrese LH, Edworthy SM, et al. The American College of Rheumatology 1990 criteria for the classification of Takayasu arteritis. *Arthritis Rheum* 1990;33:1129-1134.
5. Maeda H, Handa N, Matsumoto M, Hougaku H, Ogawa S, Oku N, et al. Carotid lesions detected by B-mode ultrasonography in Takayasu's arteritis: "macaroni sign" as an indicator of the disease. *Ultrasound Med Biol* 1991;17:695-701.
6. Tsai CF, Jeng JS, Lu CJ, Yip PK. Clinical and ultrasonographic manifestations in major causes of common carotid artery occlusion. *J Neuroimaging* 2005;15:50-56.
7. Park JH, Chung JW, Lee KW, Park YB, Han MC. CT angiography of Takayasu arteritis: comparison with conventional angiography. *J Vasc Interv Radiol* 1997;8:393-400.
8. Kissin EY, Merkel PA. Diagnostic imaging in Takayasu arteritis. *Curr Opin Rheumatol* 2004;16:31-37.
9. Yamada I, Nakagawa T, Himeno Y, Numano F, Shibuya H. Takayasu arteritis: evaluation of the thoracic aorta with CT angiography. *Radiology* 1998;209:103-109.
10. Yamada I, Numano F, Suzuki S. Takayasu arteritis: evaluation with MR imaging. *Radiology* 1993;188:89-94.