

# Utility of contrast-enhanced echocardiography in the diagnosis and follow-up of a pseudoaneurysm of the aortic arch

Yu Wu<sup>1</sup>, Yuman Li<sup>2</sup>, Jia Xu<sup>3</sup>, Wang Menghe<sup>4</sup>, and Qing Lv<sup>5</sup>

<sup>1</sup>Department of Ultrasound, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, 430022, China

<sup>2</sup>Union Hospital, Tongji Medical College, Huazhong University of Science and Technology,

<sup>3</sup>Huazhong University of Science and Technology Tongji Medical College

<sup>4</sup>Affiliation not available

<sup>5</sup>Union Hospital, Tongji Medical College, Huazhong University of Science and Technology

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## Abstract

Spontaneous pseudoaneurysm of the aortic arch is an exceptionally rare and potentially life-threatening condition. Diagnosis of pseudoaneurysms of the aortic arch mainly depends on imaging examinations. Contrast-enhanced echocardiography, as a non-invasive, bed-side and radiation-free tool, plays an important role in the rapid diagnosis and postoperative follow-up of pseudoaneurysms of the aortic arch.

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Yu Wu<sup>1,\*</sup>, MD, PhD, Yuman Li<sup>1,\*</sup>, MD, PhD, Jia Xu<sup>1,\*</sup>, Menghe Wang<sup>2</sup>, MM, and Qing Lv<sup>1</sup>, MD, PhD

<sup>1</sup> Department of Ultrasound, Union Hospital, Tongji Medical College, Huazhong

University of Science and Technology, Wuhan, 430022, China.

<sup>2</sup> The First Affiliated Hospital of Zhengzhou University, Zhengzhou, 450000, China

\*Contributed equally

Corresponding author:

Qing Lv, MD, PhD.

Tel: 86-27-85726430; Fax: 86-27-85726386.

E-mail address: lvqing1987@hust.edu.cn

Department of Ultrasound, Union Hospital, Tongji Medical College, Huazhong

University of Science and Technology, 1277 jiefang avenue, Wuhan, 430022, China

A 47-year-old female presented to our hospital with hoarseness for two years. She had no history of surgery, trauma, hypertension, collagen disease or other potential infectious diseases. Transthoracic echocardiography revealed a mass adjacent to the lesser curvature of aortic arch (Figure 1A). Color flow Doppler imaging did not clearly show if the mass communicated with the aortic arch. Subsequently, two-dimensional and three-dimensional contrast-enhanced echocardiography clearly demonstrated that a large pseudoaneurysm

(5.5×6.5 cm) communicated with the aortic arch via an 8-mm wide defect located on the opposite side of the left subclavian artery (Figures 1B and 1C, Videos 1 and 2). A thrombus within the pseudoaneurysm cavity was also observed. Computed tomography (CT) confirmed the diagnosis of pseudoaneurysm of the aortic arch (Figure 1D). The patient underwent a successful pseudoaneurysm resection and the aorta replacement. Postoperative two-dimensional and three-dimensional contrast-enhanced echocardiography showed no leakage around the vascular graft (Figures 1E and 1F, videos 3 and 4). 23 months later, follow-up two-dimensional echocardiography and contrast-enhanced echocardiography showed a recurrent pseudoaneurysm (3.0×1.7 cm) arising from the proximal part of descending aorta (Figures 2A and B, video 5). CT angiography revealed the recurrent pseudoaneurysm originating from the proximal end of descending aorta (Figure 2C). Unfortunately, the patient declined any form of treatment. At the half-month follow-up, the patient died of a ruptured pseudoaneurysm.

Spontaneous pseudoaneurysm of the aortic arch is an exceptionally rare and potentially life-threatening condition. Diagnosis of pseudoaneurysms of the aortic arch mainly depends on imaging examinations. Contrast-enhanced echocardiography, as a non-invasive, bed-side and radiation-free tool, can greatly improve visualization of the pseudoaneurysm [1]. In this case, the extension, neck and mural thrombus of the pseudoaneurysm are well visualized after contrast administration. Our case highlights the value of contrast-enhanced echocardiography in the rapid diagnosis and postoperative follow-up of pseudoaneurysms of the aortic arch.

Informed consent: Written informed consent was given by the patient's relatives.

## References

1. Sehmi JS, West C, Khattar R, Senior R, Chahal NS. Mass confusion: defining aortic pathology with ultrasound contrast. *Circulation* 2015; 132: 1433-1434.

## Figure legend:

Figure 1. Preoperative and postoperative imaging. (a) Echocardiography showing a mass (asterisk) adjacent to the lesser curvature of aortic arch. (b-c) Two-dimensional and three-dimensional contrast-enhanced echocardiography displaying a pseudoaneurysm communicating with the aortic arch (arrow). (d) CT angiography confirming the presence of pseudoaneurysm of the aortic arch. (e-f) Postoperative two-dimensional and three-dimensional contrast-enhanced demonstrating no leakage around the vascular graft. AAO: Ascending aorta; DAO: Descending aorta.

Figure 2. Follow-up imaging (23 months after surgery). (a) Echocardiography revealing a recurrent pseudoaneurysm (asterisk) arising from the proximal part of the descending aorta. (b) Contrast-enhanced echocardiography demonstrating a recurrent pseudoaneurysm of the descending aorta. (c) CT angiography reconstruction indicating the recurrent pseudoaneurysm originating from the proximal descending aorta.

## Video legend:

Video 1: Preoperative two-dimensional contrast-enhanced echocardiography displaying a pseudoaneurysm communicating with the aortic arch.

Video 2: Preoperative three-dimensional contrast-enhanced echocardiography revealing a pseudoaneurysm communicating with the aortic arch.

Video 3: Postoperative two-dimensional contrast-enhanced demonstrating no leakage around the vascular graft.

Video 4: Postoperative three-dimensional contrast-enhanced showing no leakage around the vascular graft.

Video 5: Follow-up contrast-enhanced echocardiography demonstrating a recurrent pseudoaneurysm of the descending aorta.

