

Gated myocardial perfusion imaging of double-chambered left ventricle

To the Editor: The heart generates sufficient pressure to circulate the blood from the cardiac chambers to the whole body in order to sustain an arterial blood pressure necessary to provide adequate perfusion, facilitating the excretion of waste products. Cardiac dysfunction can thus be non compatible with life. The incidence of congenital cardiovascular defects is approximately 1% and is the most common type of heart diseases among children [1]. This incidence is higher in premature infants and in stillborns. Although double-chambered right ventricle is a rare disorder [2], double-chambered left ventricle is an extremely rare congenital anomaly [3-5].

A 56 years old male patient with risk factors for coronary artery disease, but clinically asymptomatic, was referred to our department for gated myocardial perfusion imaging (gMPI) performed according to a two-day (stress-rest) protocol. Following symptom-limited treadmill exercise using the standard Bruce Protocol, 740MBq technetium-99m 2methoxy-isobutyl-isonitrile (^{99m}Tc MIBI) was injected intravenously at peak stress and the following day he was examined for rest single-photon emission tomography imaging. Acquisitions were initiated 30 ± 15 min after the injection of ^{99m}Tc MIBI while the patient was in the supine position. Stress gMPI scan showed the presence of a contractile muscular septum parallel to the interventricular septum which divided the left ventricle into two chambers (Fig.1).

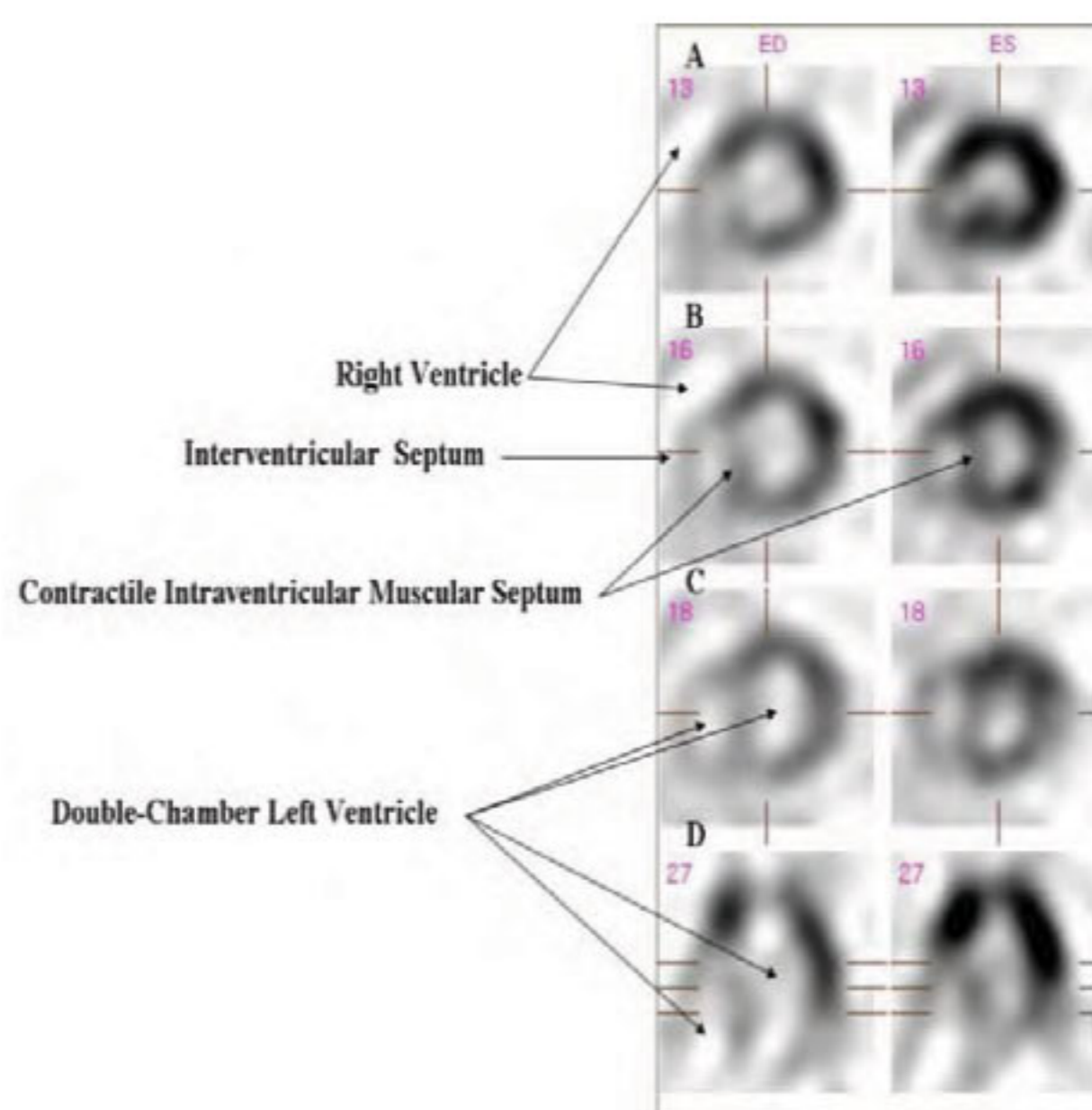


Figure 1. Slices of short axis at different levels (A, B, C) and a slice of vertical long axis (D) of gMPI demonstrate a double-chambered left ventricle divided by an intraventricular septum. End-diastolic and end-systolic images are on the left and on the right columns, respectively.

Physical examination was normal and there was no audible cardiac murmur. Regular sinus rhythm with normal QRS axis and duration were noticed on the 12-lead electrocardiogram. The presence of intraventricular septum that is iso-intense to myocardium in all pulse sequences, within the left ventricle was delineated clearly

on magnetic resonance imaging (MRI) scan (Fig. 2), originating from the apex and parallel to the interventricular septum. Transthoracic echocardiography demonstrated two different contracting left ventricle chambers separated by a muscular septal wall. No flow was detected in the right ventricle on color and continuous-wave Doppler ultrasound examination.

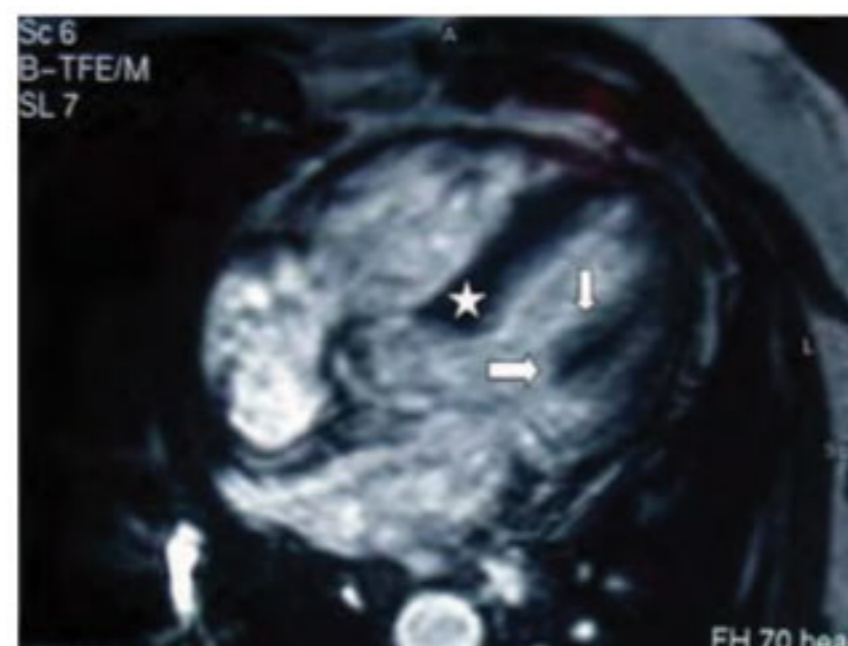


Figure 2. A long axis breath hold balanced turbo field echo-MRI scan shows an intraventricular septum (arrows) that was parallel to the interventricular septum (star).

Major cardiovascular structures are formed and begin to function in the 3rd-8th gestational weeks. Environmental factors (such as chemicals, drugs or infections), some maternal diseases (diabetes mellitus, phenylketonuria), chromosome abnormalities (such as Down syndrome, Turner syndrome), genetic diseases (such as Noonan syndrome, Apert syndrome), and idiopathic factors (such as Alagille syndrome, asplenia syndrome) contribute to the development of congenital heart defects [6-11]. "Double chambered left ventricle" does not seem to affect survival and seems to be clinically silent. *In conclusion*, the intraventricular septum causing the appearance of double chambered left ventricle showed prominent ^{99m}Tc MIBI uptake like other walls of the left ventricle and was contractile, because it showed thickening and shortening in end-systolic images. Not only, wall motion abnormalities of the left ventricle are detected by gMPI, but also this test provides additional information regarding the function of structural malformations as in our case.

Bibliography

- Hoffman JIE, Kaplan S. The incidence of congenital heart disease. *J Am Coll Cardiol* 2002; 39: 1890.
- Oliver JM, Garrido A, Gonzalez A et al. Rapid progression of midventricular obstruction in adults with double-chambered right ventricle. *J Thorac Cardiovasc Surg* 2003; 126: 711-7.
- Hemmers T, Schwaiger M, Stern H. Double chambered left ventricle in cardiac magnetic resonance imaging. *Heart* 2006; 92: 1401.
- Sanz J, Rius T, Kuschnir P et al. Images in cardiovascular medicine. Double-chambered left ventricle: complete characterization by cardiac magnetic resonance and multidetector-row computed tomography. *Circulation* 2004; 110: 502-3.
- Dogan OF, Alehan D, Duman U. Successful surgical management of a double-chambered left ventricle in a 13-year-

old girl: a report of a rare case. *Heart Surg Forum* 2004; 7: 198-200.

6. O'Toole TE, Conklin DJ, Bhatnagar A. Environmental risk factors for heart disease. *Rev Environ Health* 2008; 23: 167-202.

7. Lisowski LA, Verheijen PM, Copel JA et al. Congenital heart disease in pregnancies complicated by maternal diabetes mellitus. An international clinical collaboration, literature review, and meta-analysis. *Herz* 2010; 35:19-26.

8. Kuciene R, Dulskiene V. Selected environmental risk factors and congenital heart defects. *Medicina (Kaunas)* 2008; 44: 827-32.

9. Fasnacht MS, Jaeggi ET. Fetal and genetic aspects of congenital heart disease. *Ther Umsch* 2001; 58: 70-5.

10. Cohen MM Jr, Kreiborg S. Visceral anomalies in the Apert syndrome. *Am J Med Genet* 1993; 45: 758-60.

11. Rohrer T. Noonan syndrome: introduction and basic clinical features. *Horm Res* 2009; 72 Suppl 2: 3-7.

Alper O. Karacalioglu MD, Asli Ayan MD¹, Turgay Celik M.D.², Murat Kocaoglu MD³,

Mehmet Ozguven MD⁴

1. Departments of Nuclear Medicine, 2. Cardiology and 3. Diagnostic Radiology, 4. Gulhane Military Medical Academy and School of Medicine, Ankara, Turkey

Alper O. Karacalioglu M.D.

Gülhane Military Medical Academy and School of Medicine, Department of Nuclear Medicine, 06018, Etlik-Ankara, Turkey

Phone: (90) 312 3044805, Fax: (90) 312 3044800

e-mail: aokaracali@yahoo.com

Tel: +98 9122107037

Hell J Nucl Med 2010; 13(3): 293-294

Published on line:25-11-10