

Provocation of clinically significant left ventricular outflow tract obstruction by postural change in patients with sigmoid septum

Yukina Hirata¹ · Hirotsugu Yamada^{1,2} · Kenya Kusunose^{1,2} · Susumu Nishio¹ · Yuta

Torii¹ · Yuki Horike³ · Masataka Sata^{1,2}.

¹ Ultrasound Examination Center and ² Department of Cardiovascular Medicine, Tokushima
University Hospital, Tokushima, Japan, ³ Department of Clinical Laboratory, Osaka Saiseikai
Nakatsu Hospital, Osaka, Japan

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Address for Correspondence:

Hirotsugu Yamada, MD, PhD

Department of Cardiovascular Medicine, Tokushima University Hospital, Tokushima, Japan

2-50-1 Kuramoto, Tokushima, Japan

TEL: 81-88-633-9311, FAX: 81-88-633-7798

E-mail: yamadah@tokushima-u.ac.jp

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Case 1

A 89-year-old man had occasional palpitations with dizziness at rest for past few years. Two-dimensional echocardiography showed hypertrophy of basal left interventricular septum with a thickness of 16 mm, which we diagnosed as sigmoid septum (Figure 1A). Although his left ventricular outflow tract (LVOT) seemed narrow, there was no systolic anterior motion of the mitral valve leaflets (SAM). During a Valsalva maneuver, the peak continuous wave Doppler flow velocity of the LVOT increased from 1.5 m/s to 2.0 m/s (Fig. 1B, C). When we tried the same procedure in the supine position, prominent SAM occurred and the LVOT velocity dramatically increased to > 5.0 m/s during a Valsalva maneuver (Fig. 1D, E).

Case 2

A 66-year-old woman is admitted to the hospital with syncope when she was doing gardening. She had history of progressive shortness of breath for the past few years. Two-dimensional echocardiography showed a small LV cavity and a marked bulging of the basal intraventricular septum with thickness of 16 mm (Fig. 1F). Her left ventricular ejection function was 65%. The peak LVOT flow velocity in the left lateral decubitus position was 2.7m/s and the velocity did not change during a Valsalva maneuver (Figure 1G, H). As her syncope occurred in bending position, we tried to record her hemodynamics in the sitting position. Interestingly, SAM became prominent

and the velocity dramatically increased to 4.0 m/s (Fig. 1I, J). Her syncopal episodes have not recurred after administration of low dose of bisoprolol.

Discussion

Sigmoid septum is observed frequently in elderly which is thought to be associated with elongation of the aorta due to aging and atherosclerotic changes [1]. This condition rarely becomes clinically problematic unless accompanied by LVOT obstruction [2]. It has been reported that the LVOT obstruction sometimes is not overt but provoked by exercise, a Valsalva maneuver, dehydration, anemia or drug administration [3]. In addition, Yamaguchi et al. [4] reported that head-up tilt induced LVOT obstruction in 2 patients with recurrent syncope, which is similar with our case 2. The mechanism of LVOT obstruction are diverse. Kobayashi et al.[5] recently assessed the cause of an increased LVOT pressure gradient in patients, sigmoid septum was only 4% of the total. However, provocation test did not perform in the routine examination, the number of patients with latent LVOT obstruction diagnosed under various stress may substantially increase. When we conduct echocardiographic examination, we need to listen to patients' complaints at when and how their symptoms appear, and to use the appropriate loading method including Valsalva's maneuver and posture change.

Compliance with ethical standards

Conflict of interest All authors declare that they have no conflicts of interest.

Human rights statements All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later revisions.

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Figure legend

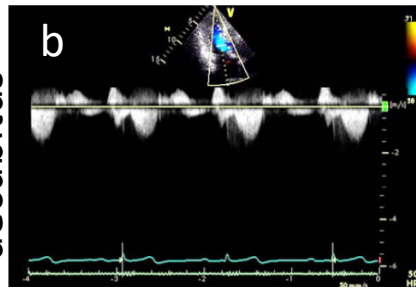
Fig. 1 Two-dimensional and continuous-wave Doppler echocardiographic studies in case 1 (A-E) and case 2 (F-J). Apical long-axis views of at rest in case 1 (A) and case 2 (F). In case 1, left ventricular outflow tract flow velocity was increased by Valsalva maneuver in left lateral decubitus position (B -> C), and the phenomenon exaggerated in supine position (D -> E). In case 2, left ventricular outflow tract flow velocity did not change by Valsalva maneuver in left lateral decubitus position (G -> H), but significant increase was observed in sitting position (I -> J).

Case 1

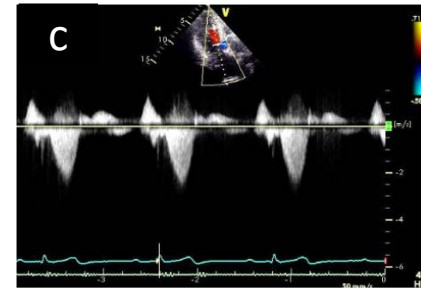


Left lateral
decubitus

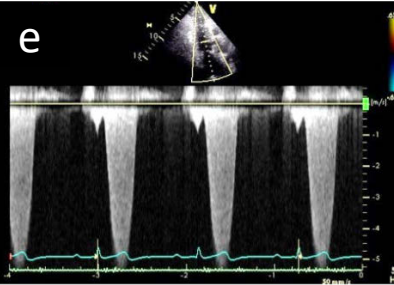
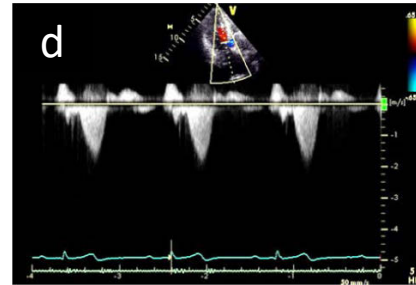
Rest



Valsalva



Supine

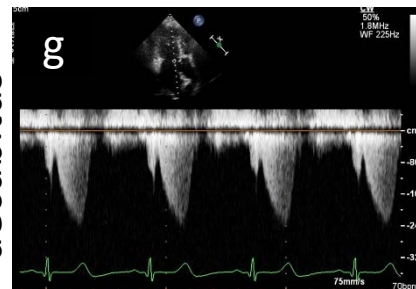


Case 2

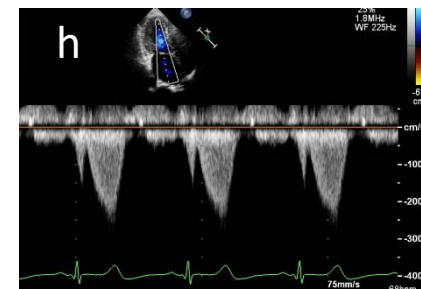


Left lateral
decubitus

Rest



Valsalva



Sitting

