A CASE OF DILATED CARDIOMYOPATHY MANIFESTED BY EXERCISE-INDUCED LEFT BUNDLE BRANCH BLOCK

TOSHIKAZU AOKI, M.D., MUNENOBU MOTOYASU, M.D.
YUZO SIMIZU, M.D., NAOMI ONO, M.D.
MASAZUMI UNNO, M.D., HIDEO NISHIKAWA, M.D.
YUTAKA KAKUTA, M.D., TOKUI KONISHI, M.D.*
AND TAKESHI NAKANO, M.D.*

We report an extremely rare case of dilated cardiomyopathy manifested by exercise-induced left bundle branch block. A 63-year-old female came to our hospital because supraventricular arrhythmia had been detected at a check-up. A treatmill exercise test induced left bundle branch block. However, chest X-ray and echocardiography revealed no abnormal finding. Two years later, the patient experienced exertional dyspnea. A chest X-ray examination showed cardiomegaly, and echocardiography showed a moderate impairment of left ventricular function with left ventricular dilatation. The diagnosis of dilated cardiomyopathy was made by left ventricular myocardial biopsy. No previous cases have initially shown exercise-induced left bundle branch block which was followed by left ventricular dysfunction due to dilated cardiomyopathy. Careful long-term observation of the clinical course is necessary in patients with exercise-induced left bundle branch block which shows no significant underlying disease.

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Transient left bundle branch block induced by treadmill exercise is uncommon. Its clinical findings and prognosis have not yet been adequately clarified. Coronary arteriosclerosis is believed to be present as an underlying disease in about 50% of the patient with exercise-induced left bundle branch block.1—3 However, only a few cases have been reported which have dilated cardiomyopathy as the underlying disease. We report an extremely rare case of dilated cardiomyopathy manifested by exercise-induced left bundle branch block.

A 63-year-old female came to our hospital on March 11, 1989, because supraventricular arrhythmia had been detected at a check-up examination. A chest X-ray (Fig. 1, left) showed a cardiothoracic ratio (CTR) of 49%. Echocardiography (Fig. 2, A) revealed a left ventricular end-diastolic dimension of 49 mm and a left ventricular ejection fraction of 66%. However, bundle branch block was induced during treadmill exercise testing (Fig. 3). At rest, the electrocardiogram showed negative T wave in V1—V4 leads. Left bundle branch block developed at a heart rate of 92 beats/min, and converted to normal sinus rhythm at a heart rate of 75 beats/min. A Holter electrocardiogram showed rate-dependent left bundle branch block, which developed at a heart rate of

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The Division of Cardiology Yamada Red Cross Hospital Mie, Japan
*The First Department of Internal Medicine Mie University School of Medicine Mie, Japan
Mailing address: Toshikazu Aoki, M.D., Yamada Red Cross Hospital 174 Misonomura Takabuku Watarai-gun,
Mie 516, Japan

Japanese Circulation Journal Vol. 57, June 1993 573
Fig. 1. Chest X-ray films. The film on the left was observed on March 11, 1989, with a CTR 49%, and the film on the right was obtained on March 13, 1991, with a CTR 58%.

Fig. 2. Echocardiograms (A) were observed on March 11, 1989, with a left ventricular end-diastolic dimension of 49 mm and a left ventricular ejection fraction of 66%. (B) was obtained on March 13, 1991, with a left ventricular end-diastolic dimension of 66 mm and a left ventricular ejection fraction 21%.

about 90 beats/min. While further examinations were recommended, the patient refused them. No symptoms were noted thereafter until early in March, 1991, when she began to notice exertional dyspnea. She was admitted to the hospital on June 11, 1991.

The patient was 142 cm tall and weighed 42 kg. Her blood pressure was 104/70 mmHg, and her pulse rate was 70 beats/min and regular. No anemia or jaundice was observed in the conjunctiva. Auscultation of the chest, and abdominal and neurological examinations produced normal findings. Hematological examinations revealed no abnormalities. An electrocardiogram on admission showed normal conduction with normal sinus rhythm, left axis deviation and left ventricular hypertrophy (Fig. 4). During treadmill exercise testing, left bundle branch block developed at a heart rate of 80

*Japanese Circulation Journal Vol. 57, June 1993*
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Fig. 3. Treadmill exercise testing was observed on March 11, 1989. Electrocardiogram at rest showed negative T wave in V1–V4 leads. Left bundle branch block developed at a heart rate of 92 beat/min, and converted to normal sinus rhythm at a heart rate of 75 beats/min.

beats/min. However, a chest X-ray (Fig. 1, right), showed a CTR of 58% and echocardiography (Fig. 2, B) disclosed a left ventricular end-diastolic dimension of 69 mm. Left ventricular wall motion was diffusely hypokinetic with an ejection fraction of 21%. Other finding include: mean pulmonary arterial wedge pressure, 14 mmHg; pulmonary arterial pressure, 18/8 (11) mmHg; right ventricular pressure, 18/5 mmHg; mean right atrial pressure, 5 mmHg; and cardiac index, 2.82 L/min/m². Coronary angiography showed normal right and left coronary arteries, but left ventriculography showed diffuse hypokinesis with an ejection fraction of 38%. Left ventricular endomyocardial biopsy (Fig. 5) revealed hypertrophic degeneration of myocytes and marked interstitial fibrosis with only negligible inflammatory cell infiltrations. These findings were compatible with dilated cardiomyopathy.

The incidence of transient left bundle branch block induced by treadmill exercise testing has been reported to be 0.39–1.1%1,2,4. Coronary arteriosclerosis, coronary spasm, cardiomyopathy, and myocarditis are thought to be the underlying diseases2,3,5. Of these underlying diseases, coronary arteriosclerosis is the most frequently observed (32–64%)1–3. On the other hand, there have been only two previous reports of patients with dilated cardiomyopathy as the underlying disease3,5. In the present case, there was no history of atrial fibrillation, hypertension, diabetes mellitus or drinking, and no inflammatory signs, such as myocarditis, were noted in left ventricular endomyocardial biopsy. No other cases have initially shown exercise-induced left bundle branch block which was then followed by left ventricular dysfunction due to dilated cardiomyopathy. Data from the Framingham study indicated that in as many as one-third of the patients who showed permanent left bundle branch block, clinically congestive heart failure developed.
a mean of 3.3 years after the onset of left bundle branch block. In many cases, the left bundle branch block was the first clinical sign of developing cardiomyopathy. Therefore, exercise-induced left bundle branch block may also be an early manifestation of a developing cardiomyopathy. Careful long-term observation of the clinical course is necessary in patients with exercise-induced left bundle branch block which shows no significant underlying disease.

REFERENCES


Fig. 5. Left ventricular myocardial biopsy (hematoxylin eosin staining, ×200). Hypertrophic degeneration of myocardial cells and marked interstitial fibrosis were observed.