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症　　例

# Report of a Successful Case Treated by Aorto-Coronary Bypass with Saphenous Vein Graft for *Bland-White-Garland* Syndrome

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## Summary

We reported a successful reconstruction of aorto-coronary bypass with an autogenous saphenous vein for the anomalous origin of left coronary artery from the pulmonary artery under the extracorporeal circulation. Excision of a flange of pulmonary artery wall attached to the origin of the left coronary artery facilitated the anastomosis to the saphenous vein graft. Operation and postoperative course were uneventful.

## Intoduction

The anomaly of the origin of the left coronary artery from the pulmonary artery is a rare congenital heart disease and has been called B-W-G syndrome since Bland, White and Garland[1] reported clinically and pathologically about this anomaly in 1933. Cooley and his associates[3] described aorto-coronary bypass using an autosaphenous vein in one case and a Dacron graft in the other in 1966. The establishment of a two coronary arterial system is preferable whenever medical treatment is ineffective in these days.

The object of this paper is to report a case of B-W-G syndrome which was treated with establishment of aorto-coronary bypass and further to describe the symptom, the progress, and the surgical method of this disease.

## Case report

A 29-year-old man presented with a history of lifelong heart murmur without any subjective symptom. In August, 1978, he had a sudden episode of palpitation and chest compression, which

Key words: Origin of the left coronary artery from the pulmonary artery, Aorto-coronary bypass, Flange, Ligation, Two coronary arterial system.
索引語：左冠動脈肺動脈起始，大動脈冠動脈バイパス・結紮術，つば，2冠動脈形式.
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tended to exaggerate gradually afterwards. He was admitted to our department for detailed examinations such as cardiac catheterization, angiography and echocardiography, and consequently diagnosed as the anomalous origin of the left coronary artery from the pulmonary artery.

He was a slender man of middle stature. His blood pressure was 100/48 mmHg and pulse rate was 80 per minute in sinus regular rhythm. There were no cyanosis, clubbed-finger and distention of neck veins. The lungs were clear and liver and spleen were not palpable. Auscultation revealed a grade 4/6 continuous murmur loudest in the left second intercostal space with a slight thrill (Fig. 1). The chest roentgenograms showed the slight left ventricular enlargement and the increase of pulmonary markings with CTR of 50%. Electrocardiogram demonstrated normal axis, $q_aV_L$ and left ventricular hypertrophy (Fig. 2). Echocardiogram of the aortic root displayed an abnormal echo-shadow in front of the anterior wall of the aorta, which implicated the dilation of the right coronary artery (Fig. 3).

Operation was done under the cardiopulmonary bypass combined with the hypothermic cardioplegia in April, 1978. A segment of saphenous vein was isolated, resected and prepared for the use of a bypass graft. Exposure of the heart by means of median sternotomy revealed that the left coronary artery of 11 mm in diameter arose from the left posterior portion of pulmonary artery and the right coronary artery was 13 mm in diameter. First of all, the left coronary artery was proximately detached from the pulmonary artery and excised with a flange of the pulmonary arterial wall attached to it. The wall of the pulmonary arterial defect was sewed with 3–0 nylon continuous sutures. An anastomosis between the aorta and the left coronary artery was done with the saphenous vein graft (Fig. 4). The postoperative instantaneous flow through the bypass graft was 150 cc/m by the electromagnetic flowmeter. The operation ended without any trouble and then the postoperative course was uneventful. He was discharged 30 days after surgical treatment in health.

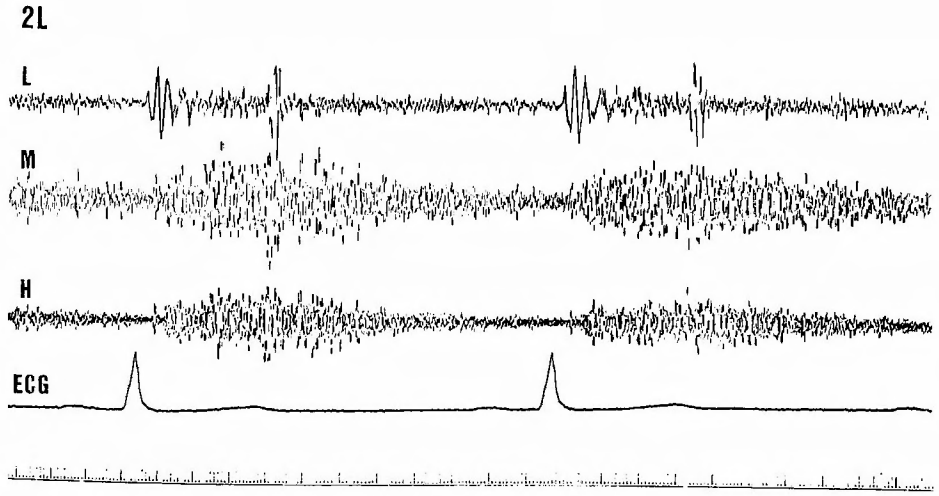


**Fig. 1.**

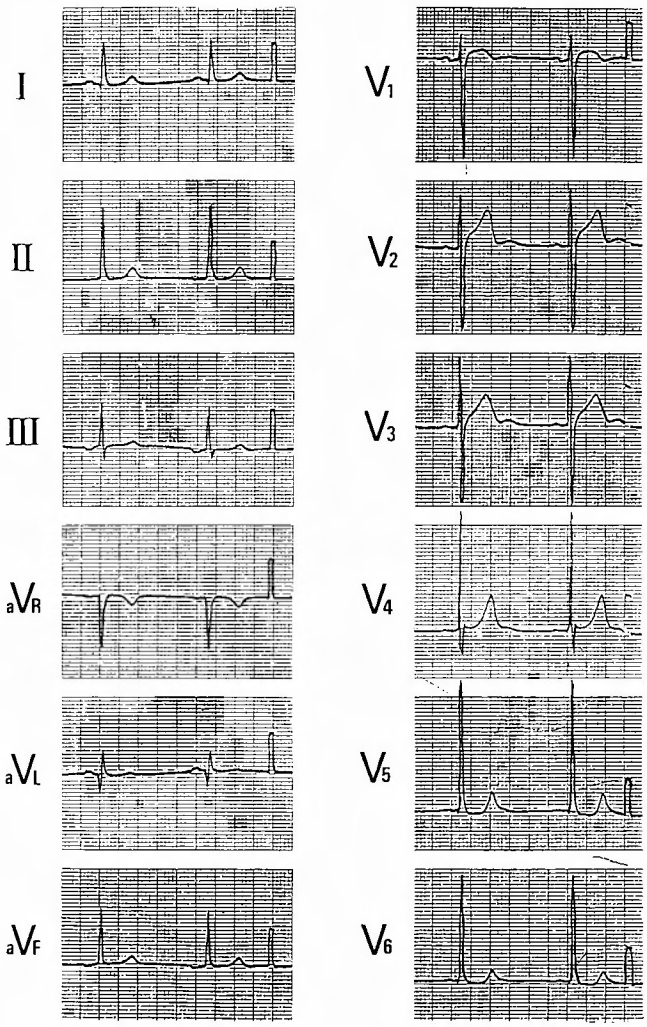


**Fig. 2.**

## Discussion

The anomalous origin of the left coronary artery from the pulmonary artery is a rare anomaly accounting for 0.2 to 0.6%[9,11], out of congenital heart disease. Reports of this anomaly in the adult age group are few since only 10 to 20%[2,5,10,12] of the patients survive beyond infancy. The mean life expectancy in the adult age group is about 35 years[5,6,9,14]. Following the advance of surgical treatment for ischemic heart disease recently, many successful operative cases for this anomaly have been reported.

EDWARDS[4] classified the syndrome into four hemodynamic phases of "newborn", "child", "adult", and "coronary steal". In the first phase (newborn), the newborn infants are asymptomatic at birth and for a short afterward since the anomalous left corornary artery is supplied by the

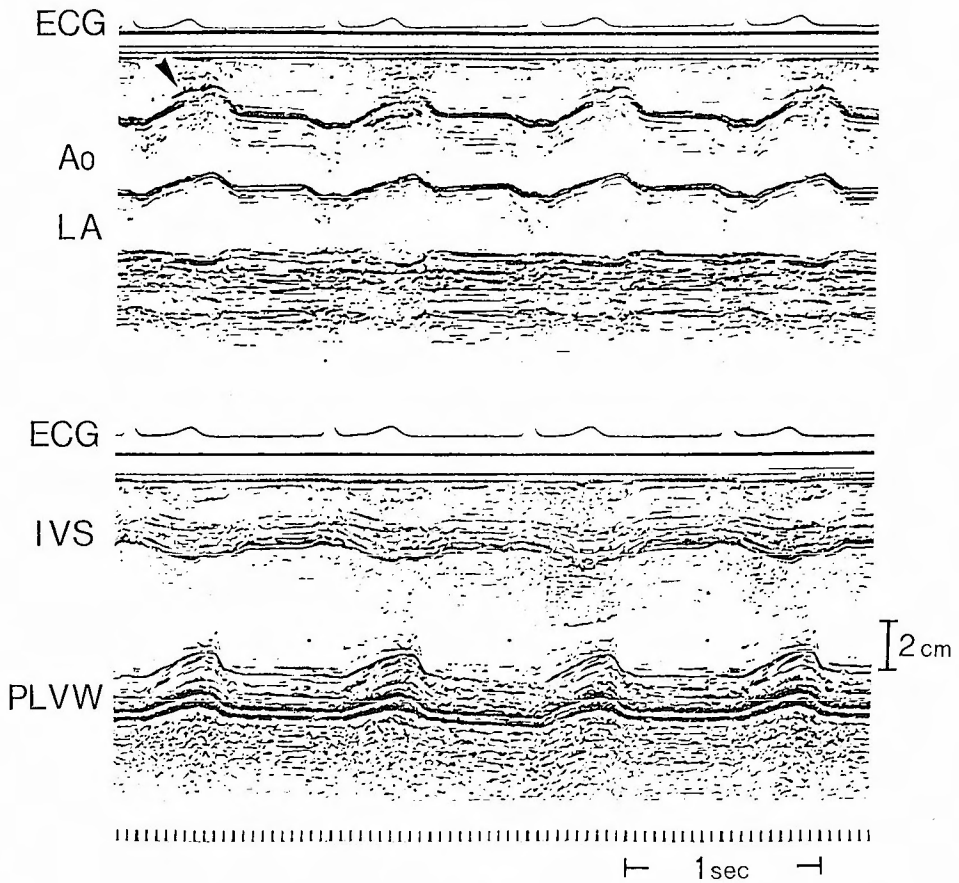


**Fig. 3.**

high pulmonary arterial pressure. The second phase (child) is called an ischemic or a critical transition period. During this phase, various symptoms such as myocardial ischemia or respiratory distress may present and patients may often have regurgitant systolic murmur at the apex, which implicates mitral regurgitation. In the third phase (adult), the adults are almost asymptomatic because of rich collateral channels and present with a murmur of continuous or to and fro type.

In the fourth phase (coronary steal), blood flow from the left coronary artery to the myocardium is decreased and a coronary steal syndrome developes. In the present case, he had the first episode of palpitation and chest compression as a steal phenomenon at 29 years of age because the collateral vessels between both the coronary arteries were very rich.

The electrocardiograms usually show a leftward axis, a q wave in lead I, ${}_{a}V_{L}$, ST-T change in $V_{4,5,6}$, and the voltage criteria for left ventricular hypertrophy.

The chest roentgenograms show often left ventricular hypertrophy and the prominence of the pulmonary arterial arc. Cardiac catheterization almost displays no left to right shunt at pulmonary artery in infants, while in adults, the shunt-ratio sometimes over 30%.

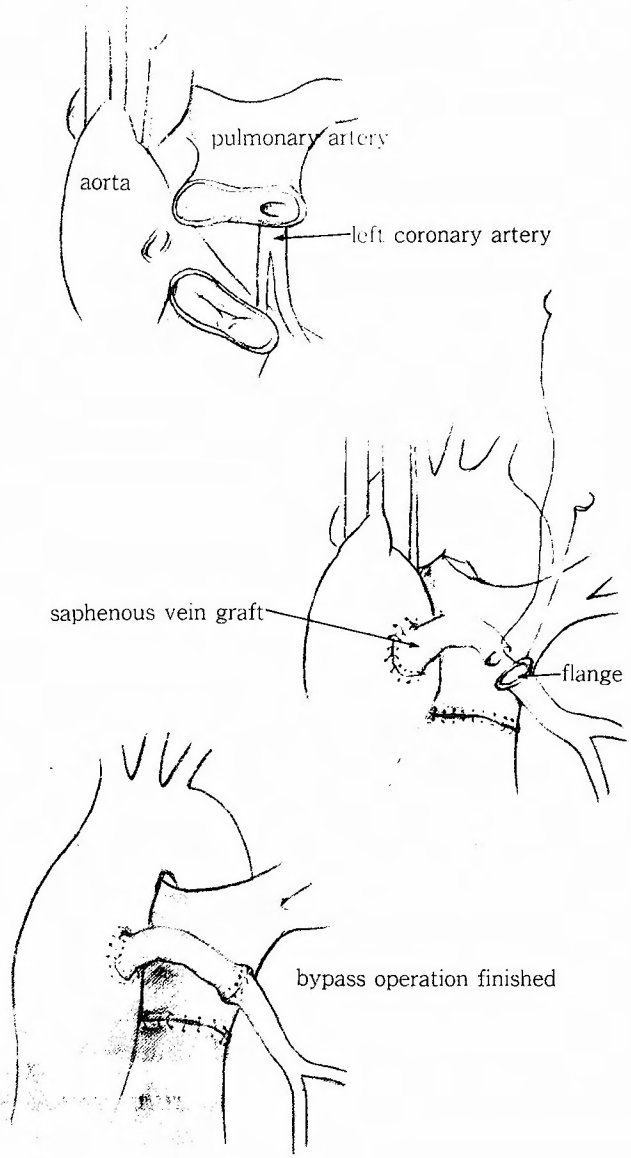


**Fig. 4.**

This patient shows a slight enlargement of left ventricle in the electrocardiogram and chest X-ray film, and had left to right shunt of 39% shown by the cardiac catheterization.

Operative method advocated conventionally for this anomaly conatains mainly ligation of the anomalous vessels and establishment of a two coronary arterial system. TAKEUCHI[13] and his associates reported another surgical method in 1978, the principle of which is to transmit the oxygenated blood to the anomalous left coronary artery through the aortocoronary window and the internal tunnel created surgically in the main pulmonary artery.

Simple ligation of the left coaronary artry at the origin may be effective for the patients who have well-developed collaterals between the bilateral coronary arteries. However, it is sometimes ineffective or rarely reponsible for sudden death.[6,14] On the other hand, reconstruction of a two coronary system can be generally and easily performed since excision of a flange of pulmonary arterial wall attached to the origin of the left coronary artery facilitates the anastomosis to saphenous vein graft or systemic artery or aorta. Therefore, establishment of a two coronary system is preferable, even for the younger patients than one year of age. MATSUMOTO[7] and his coworkers reported a successful use of a homologous saphenous vein from the patient's mother instead of his too small autosaphenous vein. Direct anastomosis of the excised left coronary artery to the subclavian artery or the common carotid or the aorta is preferable to saphenous vein grafting and more effective[8,11]. Aorto-pulmonary arterial baffle operation by TAKEUCHI is also an excellent method, but the long-term results must be followed up from now.

We should accomplish a surgical reconstruction for this anomaly aggressively whenever medical treatment is ineffective, since cardiac surgery has developed surprisingly today.

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**和文抄録**

# Bland-White-Garland 症候群に対する大伏在静脈を用いた大動脈冠動脈バイパス術の1成功例

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三ケ島尊利，赤木 正信

我々は左冠動脈肺動脈起始症の29才男性に対し，自家大伏在静脈による Aorto-coronary bypass を行ない成功したので報告した．体外循環下に，肺動脈を横切し，左冠動脈開口部を肺動脈壁を含む直径 5 mm 程度の Flange 付とし，先ず自家大伏在静脈と端々吻合し，次に大動脈と端側吻合を行なった．一般的に BWG の乳幼児はできるだけ内科的治療を行ない，少なくとも，3～4才以降に外科的治療を考えるべきであり，特に左右冠動脈間吻合枝が発達した動静脈瘻期に手術するのが，予後がよいとされる．BWG の手術法としては，結紮による One coronary system よりは Aorto-coronary bypass か，左冠動脈の大動脈への直接移植による Two coronary system の方が生理的であり，血流も多く，予後もよい．一方，乳幼児でも，冠動脈外科の発達した現在，内科的治療が無効のときには，左総頸動脈，左鎖骨下動脈などを用いて，積極的に，Two coronary system の再建に向かうべきと考える．