

Death Due to Myocardial Bridging

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ABSTRACT

Myocardial bridging is a congenital coronary pathology described as a segment of coronary artery which courses through the myocardial wall beneath the muscle bridge. Although the myocardial bridging prognosis is benign, have been also reported sudden death in medical literature. –A 30-year-old married woman was found dead at her home. After local prosecutors' investigation the death was declared as suspicious and forensic autopsy was obliged. The left anterior descending coronary artery was detected embedded deeply in the myocardium 2 cm from its coronary ostial origin. There were no other pathology to explain death. We analyzed sudden death case occurred because of myocardial bridging and the pathophysiological mechanisms in the light of medico-legal literature.

Keywords: bridging, death, autopsy

INTRODUCTION

Myocardial bridging is described as a congenital coronary anomaly involving a segment of coronary artery coursing through the myocardial wall (1-4). Myocardial bridging (MB) which is known as intramural coursing of coronary arteries in the myocardium was firstly recognized by Reymann in 1737 (5), but described by Crainicianu in 1920 (6). It is commonly seen at the proximal half of the anterior descending branch (4) or middle portion of the left anterior descending coronary artery (3). Ventricular arrhythmia, myocardial ischemia and infarction associated

with bridging have been reported in the literature (1,2,7). Incidence of MB in coronary angiographic studies has been reported as 1.5-16% (8,9), while its incidence in autopsy series was higher (1,2,7). In a Turkish population study performed by Çay et al. an incidence of 1.22% was detected (10).

Our case was a 30-year-old female patient without any previously known disease who was found death at her home. Her autopsy performed with the indication of suspicious death did not reveal any etiology excepting a left coronary artery anomaly, only nonocclusive atheromatous plaques at the coronary arteries. Besides the previous medical data, histopatho-

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logical and toxicological examinations were normal so myocardial bridging was blamed as a cause of sudden death. From the perspective of forensic medicine, we aimed to present our case by analyzing its pathophysiological mechanisms. □

CASE REPORT

Our case was a 30-year-old women. As reports indicated she was found lying on the floor unconscious by her son, and her husband immediately informed healthcare teams, November 27, 2013. Mobile emergency healthcare service 112 arrived at the scene within 30 minutes. Resuscitation was performed about 45 minutes but there was no response. One day before the incident, she had consulted to the hospital because of tightness on her chest, but her physical and electrocardiographic examination results were unremarkable. Previously didn't have any clinical complaints and medical applications according to the hospital data. External examination of the deceased on the event scene didn't reveal any evidence of trauma, and decision to autopsy was taken with the indication of sudden suspicious death.

On necroptic examination, any evidence of trauma was not encountered on external examination excepting marks of injection punctures. At autopsy, internal organs were congested. The heart weighed 305 g with a pale appearance. Left anterior descending branch of the coronary artery coursed intramurally within the myocardial muscles 2 cm away

from coronary ostial origin, it measured 20 mm in length and the width of bridge was 0.2 cm (Figure 1). Adipose, neural, and loose connective tissues were interposed between the muscle bridge and the artery. Nonocclusive atheromatous plaques were detected within the right coronary artery, and its circumflex branch and no atheromatous plaques at left coronary artery, also at the bridging area.

Histopathological examination revealed signs of cardiac autolysis, and of congestion in other internal organs. Toxicological examinations in blood, and urine samples disclosed that she wasn't taking alcohol while she was dying. Any trace of stimulating, and narcotic drug was not detected in her body. Her death was presumably attributed to coronary artery anomaly (myocardial bridging) detected during cardiac examination. □

DISCUSSION

Firstly, in 1960, Portmann and Iwig radiologically demonstrated segmental narrowing of the left anterior descending coronary artery which occurred during systole because of the bridging detected on the involved segment (11). In the literature, compression of the coronary artery with bridging during systole has been reported as the main angiographic finding (2). Only deeply imbedded myocardial bridging can be visualized on angiograms. Therefore most cases of the myocardial bridging cannot be seen on angiograms (12).

Middle segment of the left anterior descending coronary artery was indicated as the most frequent location of myocardial bridging, however bridging on the circumflex branch of the left coronary artery, and right coronary arteries have been also reported (3,7,13). In our case left anterior descending coronary artery penetrated into myocardial muscle 2 cm proximal to its origin, and coursed intramural for 2 cm.

Generally, myocardial bridges have a benign prognosis, however recent studies have demonstrated dangerous complications that including ischemia and acute coronary syndromes (14), coronary spasm (15), ventricular septal rupture (16), arrhythmias (17), exercise-induced atrioventricular conduction blocks (18), transient ventricular dysfunction (19) and sudden death (20). In cases without any other cardiac anomaly, though many case reports



FIGURE 1.

suggesting an association between bridging, and sudden death or ischemia, systolic compression of coronary artery has been considered as a benign phenomenon (2,21).

In various studies, an association between MB, and chest pain has been determined, and MB has been asserted as a possible cause of ventricular arrhythmia, and sudden death in young patients with hypertrophic cardiomyopathy (22). Channer et al. detected that longer intramural coronary artery segment increased compression on coronary artery, and so length of the involved segment was associated with left ventricular hypertrophy (23). Michels et al. reported cases with MB which is associated with Takotsubo-like left ventricular dysfunction syndrome characterized by ischemia, and anterior ST-segment elevation without any sign of coronary artery disease (24). Kracoff et al. claimed the presence of a potential correlation between myocardial bridging, and arrhythmia in a 35-year-old male patient with newly onset angina, and recurrent attacks of syncope, which were firstly documented by electrophysiological methods. (25). Haswani et al. reported a 24 year-male patient that myocardial bridging was detected at autopsy. He was an agriculturist, non-smoker, non-alcoholic, and that he did not have any systemic illness (26). Our case consulted to the hospital with chest

pain, but any pathological finding was not detected on physical examination, and electrocardiograms which obviated the need for angiographic examination. At the autopsy, no evidence of myocardial ischemia was detected. Recently, an unusual case was reported, 38-year-old woman who has a myocardial bridging of the circumflex artery leading to intractable chest pain relieved by the high dose calcium channel blockers (27). Kang et al. described a case of variant angina associated with myocardial bridging after a lumbar spine surgery that was started on calcium channel blockers, and the symptoms decreased in intensity and frequency (28). In our case, if angiography was performed due to chest pain or it was possible to start medical treatment, she might still be alive.

As is known already, clinical diagnosis of MB is impossible. Therefore, young individuals consulted to the hospital with chest pain, and similar cardiac complaints should be examined in detail. Besides, as is seen in our young patient with newly onset angina who was lost with a sudden death, it should not be forgotten that in suspect cases without any apparent cause of death, should be examined more carefully as for the presence of MB.

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