Takotsubo Cardiomyopathy and Structural Abnormalities of the Left Anterior Descending Coronary Artery

Stefan Peters*
Department of Cardiology, St. Elisabeth Hospital, Germany

Abstract

Takotsubo cardiomyopathy can be divided in apical ballooning, mid-ventricular ballooning, and rarely in basal ballooning.

The role of left anterior descending coronary artery is still in debate. Spasms, myocardial bridging and recurrent segment (wrap-around) LAD have been described in takotsubo cardiomyopathy.

8 patients (4 females, mean age 74.3 ± 9.7 years) with typical apical ballooning in 4 cases and atypical mid-ventricular ballooning in the other 4 cases were analyzed. In all cases rigid straightening of mid-LAD with systolic compression of septal branches could be described by coronary angiography. Spasms and recurrent segment phenomenon could be excluded. In addition, 1 case of clearly visible myocardial bridging could be described.

In conclusion, rigid straightening of the LAD with systolic compression of septal branches, but without wrap-around LAD is exactly located in mid-ventricular portions of the left ventricle where wrap-around LAD is not present.

INTRODUCTION

In typical but also in atypical takotsubo cardiomyopathy with either apical or in less cases mid-ventricular ballooning the role of the left anterior descending coronary artery is discussed in many articles.

Spasm [1], myocardial bridging [2] and recurrent segment or “wrap-around” LAD [3,4] of the LAD is matter of debate. A fourth abnormality of the LAD should be discussed in detail: rigid straightening of mid LAD with systolic transient compression of septal branches, where myocardial bridging can only be described by cardiac computer tomography.

In 1991 takotsubo cardiomyopathy was first described by Japanese authors [1]. They described 5 cases with apical ballooning with spasm of the LAD. Since then numerous papers were published all over the whole world. In most cases older female patients with physical or emotional stress developed takotsubo cardiomyopathy.

In most cases apical ballooning is present (about 85%). In the other cases mid-ventricular ballooning (about 14%) and basal ballooning (about 1%) have been described [5].

The causes of takotsubo cardiomyopathy have been controversially discussed over years and are up to now matter of debate.

In about 3% of cases ST-segment elevation (about 85%) in the ECG makes acute coronary angiography necessary. In cases with new T-wave inversions (about 15%) and isolated troponin rise coronary angiography is indicated, too. But in an additional 5% concealed takotsubo cardiomyopathy can be diagnosed by coronary angiography and echocardiography. These patients suffer form non-exercise related chest pain, no or slight ECG abnormalities. We describe in detail 8 patients (4 females, mean age 74.3 ± 9.7 years) with no gross abnormalities of the coronary arteries with the exception of clearly visible myocardial bridging of mid LAD in a case of a 84-year old female patient [6,7].

Four patients had atypical mid-ventricular ballooning or anteromedial and inferior hypo- to akinesia, respectively, in 3 cases by echocardiography only and in 1 case by left ventricular angiography. All patients had rigid straightening of mid LAD with transient systolic compression of septal branches. No patient had recurrent segment of the LAD. The distal parts of the left anterior descending coronary artery nearly reached the apex not supplying the inferior parts of the left ventricle.
Four other patients revealed typical apical ballooning demonstrated by echocardiography and left ventricular angiography. One patient had myocardial bridging of mid LAD and the other patients had again rigid straightening of mid LAD, again with transient systolic compression of septal branches. Also in these patients no recurrent segment phenomenon was present.

Nearly in all patients with typical (apical ballooning) and atypical takotsubo cardiomyopathy (mid-ventricular ballooning) a rigid straightening course of the mid LAD with transient systolic compression of septal branches was described. Typical myocardial bridging was seen in only one case recently reported [6,7].

Spasm of the LAD or recurrent segment phenomenon nearly reaching the apex not supplying inferior parts of the left ventricle could be excluded in all patients.

Especially mid-ventricular ballooning is present in inferior, but also in anteromedia lar parts of the ventricle. Rigid straightening of the LAD with systolic compression of septal branches is exactly located in these inferior or anterior or both areas where “wrap-around” LAD is not present.

Thus, it seems that abnormalities of the LAD cause takotsubo cardiomyopathy in addition to stress-related events. The other thing is that apical or mid-ventricular ballooning relapse after 1 or 2 weeks. But in no patient coronary angiography was repeated when myocardial function was again normal.

CONCLUSION

In conclusion, abnormalities of the LAD – spasm, myocardial bridging, recurrent segment and rigid straightening course of the LAD with transient systolic compression of septal branches, where myocardial bridging can be described only by cardiac computer tomography [2] cause takotsubo cardiomyopathy after physical or emotional stress events in postmenopausal female patients, but also in men. These abnormalities may lead to compromised antegrade systolic flow [8] due to vulnerable plaque surface, platelet activity or subsequent reversible thrombus surface formation [9].

REFERENCES