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Inverted Takotsubo (About a Case with Literature Review)

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ABSTRACT
Takotsubo cardiomyopathy is characterized by transient systolic dysfunction of LV apical midventricular segments in the absence of obstructive coronary artery disease. Inverted Takotsubo is a very rare variant in which a patient's transthoracic echocardiogram that we report revealed the characteristic basal and midventricular segmental kinetic disorders.The non-association with coronary artery disease can be differentiated with the use of echography by evaluating the temporal changes of akinetic areas and coronarography by showing the normality of the coronary arteries.

Introduction

The Takotsubo cardiomyopathy is characterized by reversible systolic dysfunction of apical segments of the left ventricle mimicking those of acute coronary syndrome with normal coronary angiography. It represents about 1.2% of all acute coronary events [1]. The inverted Takotsubo, a rare variant in which the basal and midventricular segments of the left ventricle had kinetic disorders [1]. There is nearly complete resolution of the basal and midventricular akinesis in the majority of the patients within six months. We present the case of a patient with inverted Takotsubo cardiomyopathy with a literature review.

Case Report

A 63-years-old woman having an under-treatment Dyslipidemia and a type 2 Diabetes under oral antidiabetic agents as a cardiovascular risk factor without other particular history, which consults on Day 2 of an acute constrictive retrosternal chest pain without irradiation prolonged more than 45 min following an emotional shock (death of a family member).

Faced with this clinical picture the patient consulted a private cardiologist and then transferred to the cardiology department B for additional support

Initial clinical examination finds a conscious patient, supporting supine position, no longer chest pain, BP = 150/60, HR = 90 RR= 15 SPO2: 98%, the examination reveals no abnormalities. The rest of the examination was also normal.

The initial ECG made by the private cardiologist showed a negative T wave in AnteroSeptoApical and bottom lateral with a straight ST segment in inferior, (Fig. 1) the patient was given a loading dose of clopidogrel and aspirin and then referred to the hospital, where the patient underwent an ECG that shows the same aspect ASA, but T wave became positive in bottom lateral and inferior (Fig. 2), during the shift the patient was given subcutaneous anti-coagulant. The next day the patient ECG showed positivation of T waves ASA. (Fig. 3)

Figure 1. ECG showing T-wave - ASA and bottom lateral

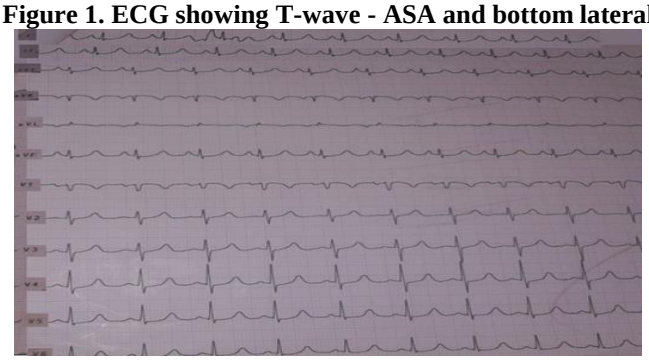

Figure 2. ECG showing T-waves – ASA

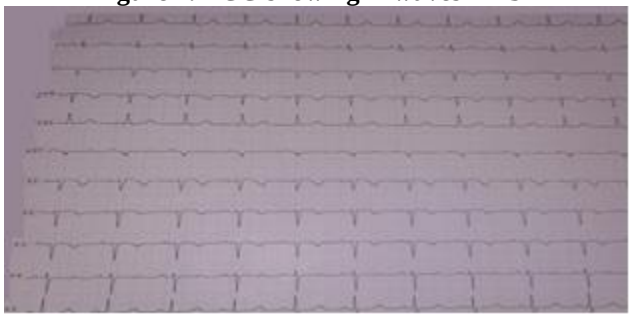

Figure 3. Normal ECG

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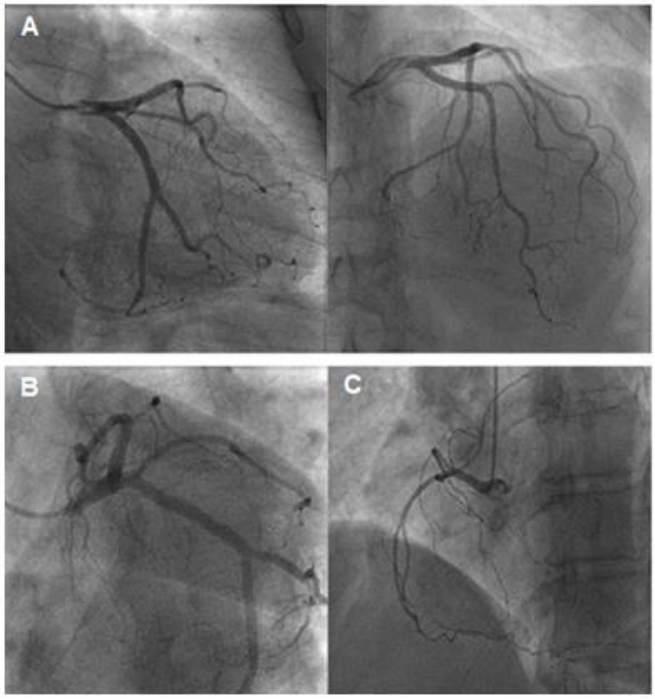

Figure 4. coronary angiography of (A) anterior interventricular artery (B) circumflex artery and (C) the right coronary artery without anomalies.

Laboratory tests showed initial troponin 600 x the normal, then at 60 x the normal and then at 50 x the normal rest of the test showed a fluctuant blood sugar level,

A TTE of the patient showed hypokinesis mainly in the basal segments with good apical segments contractility and altered LVEF 48%, with an overall longitudinal strain to -10% Cardiac catheterization revealed no significant coronary stenosis (fig. 4)

A week later a control TTE showed an improvement in the contractility of LV function and strain. (Fig. 5)

MRI was normal

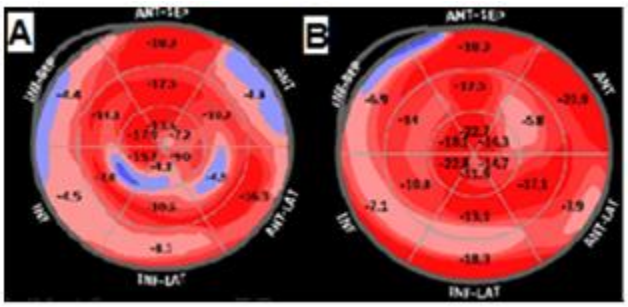

Figure 5. Global Longitudinal Strain A)Day2 B)Day12.

Discussion

Takotsubo, also called the broken heart syndrome, is a cardiomyopathy seen into an acute emotional or physical stress, in which the role of a catecholamine agent is strongly suspected [2].

The pathological role of catecholamines may be indirect, as there have been cases in the endogenous adrenergic stimulation (e.g., iatrogenic or via pheochromocytoma) and that resulted in the manifestation of this entity.[3]

The exact mechanism of damage caused by catecholamines still unexplained. There are two main theories –vascular dysfunction and toxicity induced by catecholamines. Vasospasm is strongly associated with Takotsubo cardiomyopathy. Patients with multifocal coronary vasospasm underwent a ventriculography that demonstrate balloon shaped apical segment. [4] An alternative mechanism is microvascular spasm. Abnormal coronary flow in the absence of obstructive disease has recently been reported in patients with stress-related myocardial dysfunction, suggesting an alteration of epicardial coronary circulation due to spasm of the microcirculation. [5] Endomyocardial biopsy data in patients with Takotsubo shows that the myocyte injury occurs due to the excessive presence of catecholamines.[6]

Histological results of patients with Takotsubo cardiomyopathy shows a myofibrillar degeneration, necrosis bands and mononuclear leukocytes infiltration, which are forms of myocyte injury observed in catecholaminergic toxicity [7]. Molecular studies have shown that high doses of epinephrine are directly toxic to cells, resulting in an increase in the levels of adenosine 3 ': 5'-cyclic monophosphate and calcium which then trigger the formation of free oxygen radicals, initiating the expression of stress response genes, and the induction of apoptosis [8].

Compared to patients with apical ballooning, patients with inverted Takotsubo cardiomyopathy are more common among younger, with an average age of 36 years old, often following a trigger factor such as emotional or physical stress [9,10]. The belief is that catecholamines act on adrenergic receptors which have their greatest density in the apex of the heart in postmenopausal women, which explains the occurrence of apical variant in older women.[8]

The presentation of the inverted Takotsubo cardiomyopathy may be due to the abundance of adrenergic receptors at the base of the heart, compared to the apex in classic Takotsubo. The reverse Takotsubo cardiomyopathy patients may present less pulmonary edema, dyspnea and cardiogenic shock than patients with classic Takotsubo cardiomyopathy [9]. This finding suggests that the differences in the clinical characteristics are concomitant with possible hemodynamic changes caused by the difference where the kinetic disorders occur.

In the classic Takotsubo cardiomyopathy, the obstruction of the outflow chamber of the left ventricular and hyperkinesia can contribute to a shock or severe mitral regurgitation. [11] Patients with invert Takotsubo cardiomyopathy had significantly higher level of cardiac markers, such as creatine kinase M (muscle type) or B (brain type) and troponin-I, then patients with apical or mid ventricular Takotsubo cardiomyopathy [10]. This could be explained by the extension of the myocardium involved in every form, with more myocardial tissue being affected on the reverse Takotsubo cardiomyopathy rather than the classical one.

Conclusion

The inverted Takotsubo is a rare variant of the classic Takotsubo with similar symptoms and pathophysiologic mechanism, its identification is crucial because it tends to not be recognized as easily as the traditional presentation. Its recognition improves the prognosis.

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