

An explanation for the so-called 'broken-heart syndrome'

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It seems an infarction, but it's not. It's called Tako-Tsubo syndrome, or stress-induced cardiomyopathy, and it's a rare disease which at first used to be confused with the far more common (and dangerous) cardiac infarction. Patients arrive to the emergency room with the characteristic heart attack symptoms: acute pain in the chest, an electrocardiogram with the typical changes and the release of those enzymes associated with the usual heart disease. Yet, as soon as a coronarography is performed, in order to discover the location where the occlusion preventing the blood reaching the heart was formed, nothing is found. In the infarction this occlusion causes a number of heart cells to die.

Many have defined it also as the "broken heart disease": it affects mostly women in post menopause period, when they are no longer protected by the estrogen hormones, and it is associated with strong emotional stress, like a bereavement, in 80% of the cases. This is the reason why it is often associated with a broken heart.

Leda Galiuto, Alberto Ranieri De Caterina, Angelo Porfidia, Lazzaro Paraggio, Sabrina Barchetta, Gabriella Locorotondo, and Antonio Giuseppe Rebuzzi of the Department of Cardiovascular Medicine of the Catholic University - Policlinico Gemelli of Rome, led by Filippo Crea, have identified the mechanism underlying this peculiar pathology and have recently published an article in the [European Heart Journal](#), of the European Society of Cardiology. This article is already among the fifty most-read in the field.

"In 80% of the patients, symptoms disappear spontaneously after a couple of weeks, leaving no trace behind", explains Filippo Crea, "whilst in the other cases the damage persists. The fact is that the damage caused by this syndrome is in the heart but not in the coronaries. What we have tried to explain is the mechanism which leads to the onset of these symptoms".

To perform this analysis, the group led by Crea has studied fifteen women aged on average 68 for a month. Thanks to this study, they were able to identify for the first time the physiopathological mechanism of the disease.

"We concentrated on the apical region of the heart", explains first author Leda Galiuto, "because that is the area where the dysfunction is localized. Due to this, the heart takes on the characteristic shape of an air balloon, or - as the Japanese observed - of a local octopus trap. The Tako-Tsubo is as a matter of fact the name of this pot in Japanese."

The hypothesis the researchers developed is that the mechanism which influences the dysfunction resides in the spasm of the small coronary vessels, the so-called coronary microcirculation.

"To prove our hypothesis we used the myocardial contrast echography, a method we pioneered and which allows us to study the coronary microcirculation in a selective, safe and cheap way at the patient's bedside", explains the young researcher.

"The microcirculation plays an important role in cardiac diseases", adds Crea, "and the intense vasoconstriction of these small vessels cannot normally be noticed in a coronarography."

Researchers have also been able to demonstrate that this microvascular spasm is reversible and, once over the acute phase, the microvascular

dysfunction causing the symptoms is also resolved. "Usually patients are not left with any damage, because the lowering of the blood input is sufficiently serious to prevent the heart from contracting properly, and hence the balloon-like shape, but not enough to determine the death of blood cells, which is what normally happens in an infarction", concludes Crea.

Provided by Catholic University of Rome

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