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Review Article

Early Recognition and Case Report of Broken Heart Syndrome

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Abstract

Broken Heart Syndrome also known as Takotsubo cardiomyopathy is principally characterized by left ventricular hypokinesis and wall motion abnormalities. These abnormalities usually include apical wall motion defects during the systolic phase of heart contraction. To avoid complications and mortality, early recognition and treatment of Broken Heart are significant.

Keywords: Takotsubo cardiomyopathy; Broken heart; Risk factors.

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Introduction

When you think of heart disease, most will go straight to correlate the disease with heart attacks. They're serious, sudden, and if not treated promptly they can also be lethal. Heart diseases account for the majority of deaths worldwide year after year excluding traumatic deaths. The innate importance of the heart, as a blood pumping muscular organ, that keeps us alive reflects the gravity of the burden heart diseases pose to our lives. Heart disease comes in various forms including myocardial infarctions (heart attacks), cardiac arrhythmias, cardiac failure, disorders with heart muscle (cardiomyopathy) and the rare but possible heart tumors.

The heart is subject to influence by various infections, physical, chemical and emotional states. A block in life-giving blood supply leads to heart attacks, severe imbalances in blood electrolytes and hormones can cause the heart to speed up or slow down, various drugs can negatively affect the heart and our lifestyle choices can predispose us to heart disease by way of increased blood pressure and obesity. In this article, I would like to draw your attention to a peculiar form of cardiomyopathy that is deeply connected to

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our emotional state, called Stress Cardiomyopathy, Takotsubo Cardiomyopathy or 'Broken Heart Syndrome'.

Noted by researchers in the 1980s and then described for the first time in 1991 by the Japanese scientist Sato, Broken Heart Syndrome is an often-temporary heart condition whereby the heart musculature and its blood supply can become transiently compromised after a bout of overwhelming stress. Despite what the name implies, the heart is not physically broken in Broken Heart Syndrome.

Stress Cardiomyopathy affects up to 2% of the population and oftentimes the damage to the heart is completely reversible leading to normal autopsies which confounded experts as the presentation of Broken Heart Syndrome is only slightly different from the classical myocardial infarction.

What the researchers found was that the key lies in the history. Let's look at 2 examples.

Case 1

Uvalde, Texas saw a devastating school shooting incident at the Robb Elementary School in May 2022 that claimed the lives of 21 people, 19 children and 2 teachers. One of the teachers was Irma Garcia, who heroically lost her life while trying to protect her students against the shooter. Irma had been a teacher for 23 years and she was survived by her husband Joe Garcia and their 4 children. Two days after the horrific shooting incident, Joe fell prey to a sudden heart attack and lost his life after his wife's viewing. Many associated this case to be caused by Broken Heart Syndrome.

Case 2

A 76-year-old male with a past medical history of resolved Covid-19 and who had recently lost his beloved wife. Not long after her death, the patient developed chest pain, difficulty breathing and frequent palpitation. His cardiovascular work up for heart disease, however, was completely normal. This work up included an ischemic work up with a nuclear stress test, and echocardiogram and holter monitoring. Shortly afterwards he passed away from a myocardial infarction. It was only after his death that it was revealed that he had sent text messages on his phone to his late wife even after her passing. This is a case of Broken Heart Syndrome.

What Causes Broken Heart Syndrome?

In the two cases discussed, there is one common element between both victims. Both of them had recently lost their wives. Both are a case of Broken Heart Syndrome based on their history and the fact that their heart did not show the damage you would expect from someone having a heart attack. Both had suffered immense emotional trauma and were likely experiencing depression leading up to their fateful passing.

Broken Heart Syndrome is a product of the heart malfunctioning or failing due to trauma or stress. That stress can be physical or emotional, with emotional stress being the more common of the two. Physical stress can be in the form of blunt force or penetrating trauma, previous heart attacks, massive loss of blood or use of certain drugs like Cocaine, Meth or other recreational drugs.

Emotional stress can be caused by the examples above, both men experienced a

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sudden emotional stress upon the passing of their wives and this stress was strong enough to malfunction their hearts. Other emotional triggers that can predispose to Broken Heart Syndrome include but are not limited to:

- Loss of a job
- Money issues
- Problems with addiction or gambling
- Divorce

Risk Factors

There are a couple factors that may predispose someone to developing Broken Heart Syndrome even if they have not gone through the above mentioned physical or emotional stressors. While studies are still underway to better understand the condition, a few notable commonalities found from epidemiological data include:

- Being over the age of 50
- Female gender- because of the waning cardio-protection provided by Estrogen as menopause approaches
- Genetics- Some scientists believe genes coding for myocardial contractile proteins may influence a person's risk of getting Broken Heart Syndrome

What does it Look Like?

Broken Heart Syndrome is a topic of interest to researchers across the globe due to its similarities with the classical myocardial infarction. In both cases the patient experiences one or more of the following cardinal symptoms.

- Chest Pain- A sudden crushing pain usually at the center of the chest which may radiate towards the left arm of the jaw. The pain may or may not be related to exertion and usual over-the-counter painkillers do not alleviate the pain. (Note: Be aware long-term diabetics may not even feel the pain of heart attack due to nerve damage, which makes the attack even deadlier because it is 'silent')
- Breathlessness- Coupled with the chest pain is the feeling of being out of breath and having difficulty breathing even at rest. This may or may not be accompanied with coughing.
- Diaphoresis- Sudden profuse sweating accompanies the chest pain regardless of body temperature or whether the person feels warm or cold.
- Palpitations- A feeling of the heart racing or thumping against the person's chest may also be observed.

Broken Heart Syndrome, like myocardial infarction, also appears on a spectrum of different severities. Some people may experience a mild combination of the abovementioned symptoms which indicates a good outcome as the damage at this level is usually reversible. Others may experience a much more severe version of the attack which can lead to shock, heart failure, irregular heart rhythms and even death.

Broken Heart vs Heart Attack

Seeing the similarities between a heart attack and the Broken Heart Syndrome, you would

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not be blamed for wondering then what the difference between them is. As we saw with the example cases above, the key lies in the history. Emotionally strong incidents like the loss of a loved one or a sudden instance of failure usually prelude to Broken Heart Syndrome.

Furthermore, the damage from Broken Heart Syndrome is usually reversible unless it is a severe enough attack to be potentially lethal. Heart attacks on the other hand are almost always physically damaging to the heart muscle and do not necessarily require a strong physical or emotional trigger in order to happen.

How Does it Happen?

On the surface, Broken Heart Syndrome may look like a classical heart attack but on a microscopic level, the two entities are very different in how they occur. While a classical heart attack is caused by the blockage of blood vessels supplying the heart muscle following clotting or atherosclerosis, Broken Heart Syndrome deals more with the vessel walls than the actual vessel lumen.

Vasoconstriction

When a person undergoes a sudden and extreme emotional event, there is a release of massive amounts of stress hormones by the body's endocrine system. These hormones include Cortisol, Adrenaline and Noradrenaline.

The main function of these stress hormones is to prime the body for fight or flight. However, in this case the hormones are released in such a large volume that they exert an almost overdosing effect on the body.

One of the key effects of this excess of stress hormones is the excessive constriction of blood vessels, leading to narrowing of their lumen and reduction in the blood supply of the organs supplied by those vessels, including the heart. This reduction in blood supply is what generates the symptoms of chest pain, breathlessness, and palpitations.

Besides emotional events, certain drugs also cause excessive vasoconstriction of the heart's own blood vessels similar to stress hormones, such as Cocaine (also notorious for heart attacks), Methamphetamine (whose stimulant effect extends to narrowing blood vessels) as well as Levothyroxine (synthetic thyroid hormone)

Myocardial Stunning

Another proposed mechanism for Broken Heart Syndrome goes like this. When there is a surge of stress hormones following a strong emotional event, the hormone levels cause an influx of calcium ions into the cardiac muscle cells. This influx of calcium in turn disrupts the normal contraction of the heart muscles which become "stunned" and unable to properly pump blood, leading to heart failure

What can be done about it?

As with all heart diseases, diagnosing a case of Broken Heart Syndrome becomes the first step towards managing it before a severe enough case can threaten the life of a patient.

Because the circumstances surrounding the episode of chest pain and other symptoms is what broadly differentiates between a myocardial infarction from Broken Heart Syndrome, a good and thorough history and physical examination are an absolute must.

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Investigations

If the doctor suspects Broken Heart Syndrome from the first consultation, the patient may have a number of different tests run to confirm the diagnosis, including an EKG to check for heart rhythm abnormalities, an Echocardiogram to check for heart muscle contraction and blood pumping metrics. If blood flow compromise is suspected, an Angiogram may also be ordered to visualize the vessels and assess for any blockages.

Additionally, the patient may also be admitted for observation especially if the emotional trauma is very recent. This is to make sure if another attack occurs then it can be handled immediately.

Management

Once diagnosed with Broken Heart Syndrome, the road to recovery involves the use of medications to normalize the offending circumstance (if applicable) such as antihypertensive if blood pressures are high, blood thinners to reduce chances of blood clotting related blockages as well as appropriate antidotes if vasoconstriction drugs are the cause.

Additionally, the doctor may also set up a referral for a Cardiologist to further optimize the treatment regimen as well as arrange for regular follow up with the cardiologist so that your recovery is monitored and maintained as best as possible.

Cardiac Rehabilitation is also an option whereby an individually tailored program is created to combine diet, exercise, relaxation techniques and educational material to maximize the chances of your recovery from the condition as well as reduce chances of a future more serious attack.

Managing the Broken Heart Syndrome cannot be complete without addressing the broken heart. Therapy sessions with Psychologists and Grief Counselors cannot be emphasized enough when it comes to truly helping people navigate not just their own heart condition but also the loss that triggered the condition in the first place.

Life with Broken Heart Syndrome

Broken Heart Syndrome, although usually a reversible and temporary condition, still warrants a close watchful eye on the patient even after recovery from the initial attack. This is because there is still a 5% chance of recurrence of attacks, with the risk being higher if you're over a middle age to elderly woman with a history of heart conditions in your family.

Conclusion

Episodes of Broken Heart Syndrome caused by emotional triggers carry a much better prognosis and higher chances of recovery than those caused by a physical trigger. Either way, a holistic management plan involving cardiac management as well as psychological help is the way to go for those with a broken heart.

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