Tako-Tsubo Syndrome
A broken heart is not just folklore

A new study examines 19 patients who suffered cardiac problems following sudden emotional stress. The study offers a possible explanation.

1. Grief or fear is experienced...

2. ...stimulating the adrenal glands and nerves to produce stress hormone including adrenaline...

3. ...that can sharply lower the heart’s pumping ability

4. The reduced pumping causes chest pain and other symptoms similar to a heart attack

SOURCE: New England Journal of Medicine
Tako-Tsubo Syndrome

- *Tako-tsubo*" is the japanese name for an octopus traps
Tako-Tsubo Syndrome

- Tako-Tsubo Cardiomyopathy also known as:
  - Stress Cardiomyopathy
  - Transient (Catecholaminergic) Myocardial Stunning
  - Transient (neurogenic) Myocardial Stunning

- transient left ventricular apical ballooning,
- "ampulla" cardiomyopathy
- "broken heart syndrome".

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• Tako-Tsubo syndrome thought somewhat rare appears under circumstances of extreme stress, often associated with anger

• About 70-80% of cases of Tako-tsubo Syndrome (TTS) occur in post-menopausal women under some form of extreme stress,...
Tako-tsubo Syndrome  TTS

• The tako-tsubo syndrome is characterized by transient left ventricular dysfunction in the absence of obstructive coronary disease, typically precipitated by severe emotional or physical stress

• In this syndrome, the left ventricle takes the shape of an octopus trap (*tako-tsubo*). During contraction (systole)

• Takotsubo cardiomyopathy mimics ACS/AMI:
  – Clinical presentation; symptoms
    • acute chest pain and dyspnea,
    • ST-segment elevations
    • Cardiogenic dysfunction
Phenomena Noted for Long Time

- **Multi-vessel coronary artery spasm is a possibility**
  - *Dote K, Sato H, Tateishi H, Uchida T, Ishihara M.*

- **Neurogenic cause is quite likely.**
  - *Akashi YJ, Nakazawa K, Sakakibara M, Miyake F, Musha H, Sasaki K.*
Local Famous Case

- Syndrome seen in Worcester woman for a long time (11 years), multiple acute “heart attacks”, but no damage or ‘culprit vessels’. Reported and named differently.

- "Massive T wave inversion mainly in women, with prognosis independent of ECG changes". LA Walder and DH Spodick.

Answer Found in Full Cardiac Examination

• Echos displays that the left ventricle takes a ampule like shape (tako-tsubo shape)

• Nuclear medicine demonstrates that portions of the Left ventricle are not contracting equally.

• Some portions are in a a state of complete exhaustion (myocardial stunning) often the mid-section and apex (tip)

• But Angiography showed that the patients had no significant blockage (stenosis) of their coronary arteries
• Normal left ventricular contraction
So What’s Happened ??

Must Current Theory
mental or physical
stress - anger
pain - trauma

left ventricle

sympathetic
nervous system
i am irked!
totally!

left ventricle

Takotsubo

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catecholamine-induced transient myocardial stunning
Ennezat PV, Pesenti Rossi D, Aubert MM, Rachener V, Baez-Mejia J, Karmy-Jones R, Logeat D, Cohen-Solal A, Asseman P. Transient left ventricular
Ventriculogram during systole in a patient with takotsubo cardiomyopathy

Ventriculogram during diastole in a patient with takotsubo cardiomyopathy

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Previous Post-menopausal woman – demonstrating at onset of *tako-tsubo syndrome* again

Same patient, 3 months after the *tako-tsubo* episode: there is full recovery. The tip of the left ventricle contracts normally again.
Post-menopausal woman - Cardiac ultrasound in the E.R. - Day 1 of a *tako-tsubo syndrome*: the left ventricular tip (apex) is "paralyzed"
ECG Changes in *Tako-Tsubo* Cardiomyopathy

• The electrocardiogram can evolve through 3 stages:

• **Stage 1:** *acute stage,*
  This stage lasts only a few hours. Stage of ST elevation and fairly short QT interval. The R wave might be preserved.

• **Stage 2:** *sub acute stage.*
  This stage can last days. QT segment prolongation and large and deep negative T waves.

• **Stage 3:** *recovery stage.* Flipped T wave persists for days to weeks, but QT interval is again normal.
Electrocardiogram of a patient with takotsubo cardiomyopathy demonstrating ST-segment elevation in anterior and inferior leads.
• Not always so evident
• ECG showing **sinus tachycardia** and non-specific **ST** and **T wave** changes from a patient with confirmed takotsubo cardiomyopathy.
Management Tako-Tsubo Cardiomyopathy

• Just like any other possible STEMI
  – 12 Lead, IV, NTG, O2, ?MS
  – Code AMI Notification

• Patient will get CLA
  – Possible no culprit vessel
  – Echo will demonstrate TTS
  – Bur require management for cardiogenic dysfunction
good news

• **Treatment:** *Tako-tsubo* syndrome is only treated with support measures. Maintenance of cardiac output and reduction of catecholamine effect (B-Blockers etc)

• **Outcome:** Excellent in 95% of cases. Recovery takes place over a few days with full recovery over a few weeks. Recurrence rare /c Rx.
But Complications are Possible

• Complications occur in 20% of takotsubo cardiomyopathy cases and include the following:
  
  – Left heart failure with and without pulmonary edema
  – Cardiogenic shock
  – Left ventricular outflow obstruction
  – Mitral regurgitation
  – Ventricular arrhythmias
  – Left ventricular mural thrombus formation
  – Left ventricular free-wall rupture
  – Death
Medicolegal Pitfalls

- EMS should be aware of the presentation of takotsubo cardiomyopathy (TCM) because as described above,
  - chest pain after a recent stressor is not necessarily due to anxiety.
  - The chest pain may be more complicated and deteriorate into dysrhythmias and/or shock.
  - Patients with takotsubo cardiomyopathy do not usually have cardiac risk factors, but their pain should be taken seriously.
  - Patients presenting after a natural disaster, MCI or acute stress event should be evaluated for takotsubo cardiomyopathy.
  - These patients should be treated as having acute coronary syndrome (ACS), given supportive treatment, and undergo subsequent cardiology evaluation.
Conclusion...

Leave your octopus in its takotsubo!

stress
↓
Neurogenic

myocardial stunning
heart failure
angina
coronary spasm
arrhythmias
stress cardiomyopathy,...

~ 80% are women

sympathetic nervous system

left ventricle

Takotsubo

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