



Takotsubo Cardiomyopathy

PSYCHIATRIC CONSIDERATIONS IN “BROKEN HEART
SYNDROME”

STEPHANIE H. CHO, MD PGY2

A Broken Heart



67 yo woman with a history of Chronic Kidney Disease and Hypertension presented for fatigue, shortness of breath and edema.

She was found to be severely anemic (Hgb 6.2), and on further work up, was found to have a colonic mass highly concerning for cancer.

Within 1 hour of being told findings and suspected diagnosis, the patient became acutely altered, non-responsive, tachycardic and hypotensive. She was transferred to ICU in cardiogenic shock and required pressor support.

A Broken Heart



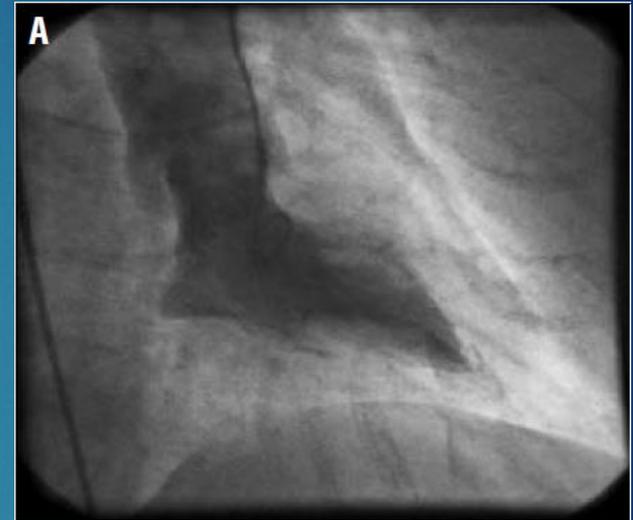
Cardiac workup revealed mild troponin elevation and new T wave inversions on EKG, concerning for an Acute Coronary Syndrome.

Echocardiogram showed severe Apical Hypokinesis, consistent with **Takotsubo Cardiomyopathy**, also known as “**Broken Heart Syndrome.**”

Within a week, the patient had recovered cardiac function.

Takotsubo Cardiomyopathy

- ▶ First described in 1990 in Japan
- ▶ Characteristic wall movement abnormality leading to apical ballooning and systolic dysfunction
- ▶ “Takotsubo” octopus trap



Clinical Presentation

- ▶ Indistinguishable from Acute Coronary Syndrome (ACS)
 - ▶ Chest Pain & Dyspnea
 - ▶ Elevated cardiac biomarkers
 - ▶ ECG changes
- ▶ **Often stressful triggering event**
- ▶ Urgent Cardiac Catheterization is required for definitive diagnosis
 - ▶ ABSENCE of coronary lesion

Epidemiology

- ▶ Initially thought rare or specific to Japanese
- ▶ In 2006, recognized as Primary Acquired Cardiomyopathy by American Heart Association
- ▶ 1-3% of patients presenting with ACS
 - ▶ Likely low due to lack of consensus, lack of awareness, misdiagnosis, current definitions
- ▶ Higher frequency in Caucasians (67.4%)
 - ▶ African Americans (4.4%) and Hispanics (4.3%)
- ▶ 90% postmenopausal women (Mean age 66-80)

Prognosis & Complications

- ▶ Moderate course, reversible with good prognosis
 - ▶ Significant systolic improvement within 1 week
 - ▶ Complete recovery usually by 3rd week
- ▶ Severe Complications
 - ▶ Heart failure & Pulmonary edema (15.9%)
 - ▶ Arrhythmias (14.6%)
 - ▶ Cardiogenic Shock (10.3%)
- ▶ Uncertain rate of Sudden death / Mortality
- ▶ Recurrence rate 3.5% - 11.4%
- ▶ No definitive prognostic factors

What is Takotsubo Cardiomyopathy (TCM)?

Classical Presentation:

- ▶ Acute
- ▶ Reversible
- ▶ Left ventricular systolic dysfunction
- ▶ Mimics Acute Coronary Syndrome
- ▶ Disproportionately affects post-menopausal women
- ▶ Frequently triggered by a stressful event

Mayo Clinic Criteria (2008)

- ▶ Transient dyskinesia of LV mid segments
 - ▶ Regions of wall motion abnormality extend beyond single epicardial vascular distribution
 - ▶ Stressful trigger often, but not always, present
- ▶ Absence of obstructive coronary artery disease or Angiographic evidence of acute plaque rupture
- ▶ New ECG abnormalities ST elevation and/or T wave inversions, or modest elevation in cardiac troponin
- ▶ Absence of other precipitants (eg. pheochromocytoma, myocarditis)

Takotsubo Cardiomyopathy

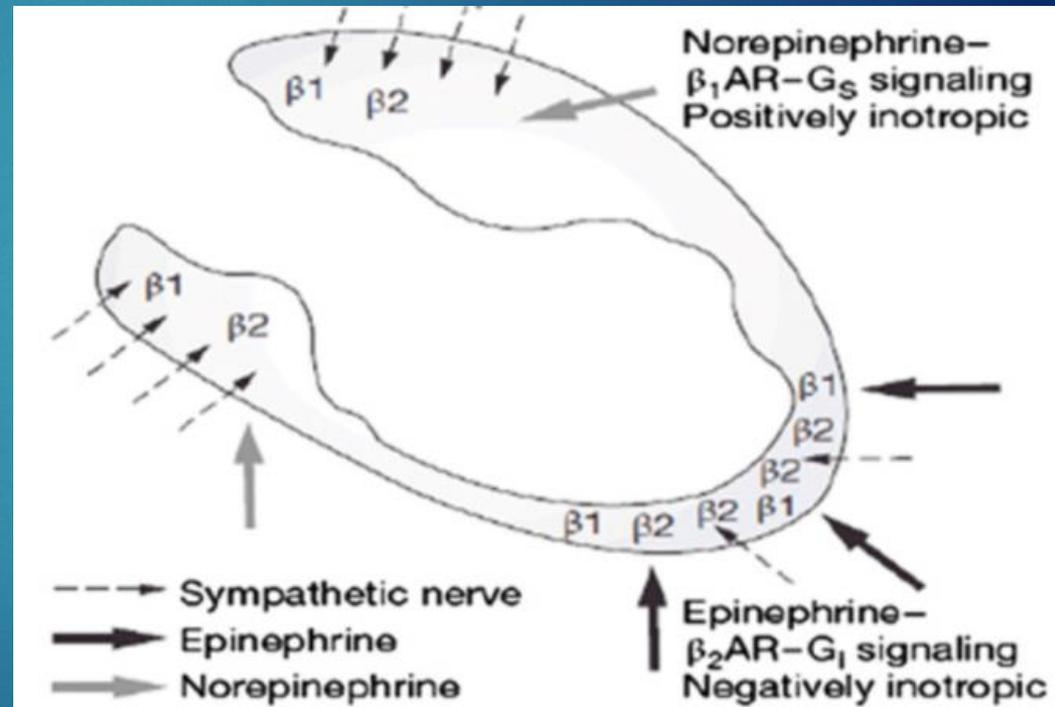
- ▶ Broken Heart Syndrome
- ▶ Stress induced Cardiomyopathy
- ▶ Stress induced Myocardial Stunning
- ▶ Adrenergic Cardiomyopathy
- ▶ Neurogenic Stress Syndrome
- ▶ Ampulla Cardiomyopathy
- ▶ Apical Ballooning Syndrome
- ▶ Transient Cardiac Ballooning
- ▶ Artichoke Heart

What Causes TCM?

- ▶ NOT Coronary Artery Disease
- ▶ Catecholamine Theory:
 - ▶ Excessive sympathetic stimulation leads to myocardial stunning
- ▶ Serum catecholamine levels are 2-3 times greater in TCM than MI (Wittstein et al 2005)
- ▶ TCM has been observed with pheochromocytoma and iatrogenic administration of catecholamines (Takizawa et al 2007; Abraham et al. 2009)
- ▶ Animal models in rats and monkeys (Ueyama et al 2002; Izumi et al 2009)
- ▶ Myocardial biopsies show direct catecholamine toxicity (contraction band necrosis, inflammatory cell infiltration, localized fibrosis) (Nef et al 2007)

Pathophysiology

- ▶ Supraphysiologic catecholamine levels
 - ▶ Increased Beta-2 receptor binding
 - ▶ Hypercontraction
 - ▶ Apoptosis
 - ▶ Necrosis
 - ▶ Rising troponin levels
- ▶ “Stimulus Trafficking”
 - ▶ Via PI3K/AKT pathway
 - ▶ Switch from G_s to G_i
 - ▶ Declining contractile function
 - ▶ Hypokinesis
 - ▶ Apical ballooning
 - ▶ Rapid recovery



Predisposing Factors

- ▶ Cardiac Risk Factors
 - ▶ Typical: Hypertension, Hyperlipidemia, Diabetes, Smoking, family history, alcohol abuse
 - ▶ Overall CV risk similar to cardiac patients
 - ▶ Endothelial Dysfunction
 - ▶ Estrogen deficiency, post-menopausal women
 - ▶ Inflammatory disorders
- ▶ “Extracardiac” Risk Factors
 - ▶ Endocrine disease, malignancy, Neurologic trauma
 - ▶ Sepsis, chronic liver disease
 - ▶ Psychiatric

Psychiatric Factors

- ▶ Triggering Event
 - ▶ Stressful trigger is positive predictor of TCM
 - ▶ Emotional type better prognosis
 - ▶ Physical type more often in males
- ▶ High prevalence of psychiatric disorders
 - ▶ Anxiety, Depression (including family hx)
 - ▶ Chronic psychological stress
 - ▶ Conflicting evidence regarding prevalence vs ACS and Risk contribution
- ▶ Overall major limitations given studies are limited, small, heterogenous in design

Psychiatric Factors: Recent Studies

- ▶ Personality types / Social Isolation
- ▶ Stress management strategies
- ▶ Biological response to stress
- ▶ Psychological prognosis

Psychiatric Factors: Type D Personality

- ▶ Negative affectivity
 - ▶ Negative emotions
 - ▶ Negative view of self
- ▶ Social Inhibition
 - ▶ Inhibit emotional expression or behaviors in social settings to avoid disapproval
 - ▶ Feeling inhibited, tense, insecure when with others
- ▶ 24-31% general population
- ▶ 15-53% cardiac population
- ▶ Independent predictor of major adverse cardiac events in coronary heart disease

Psychiatric Factors: Type D Personality

- ▶ Categorical assignment of Type D personality
 - ▶ 76% TCM with emotional trigger
 - ▶ 43% TCM with non-emotional (physical) trigger
 - ▶ 32% Acute MI with emotional trigger (control)
- ▶ Primarily due to differences in social inhibition scores
 - ▶ Social inhibition higher with emotionally triggered TCM in continuous scoring as well

Psychiatric Factors: Type D Personality

- ▶ Expression suppression (Social inhibition) associated with:
 - ▶ increased cardiovascular sympathetic activation
 - ▶ Exaggerated sympathetic and cardiovascular response
- ▶ Social inhibition associated with higher cardiovascular reactivity to acute stress
- ▶ Suggests that Type D personality increases biological reactivity to acute stress triggers

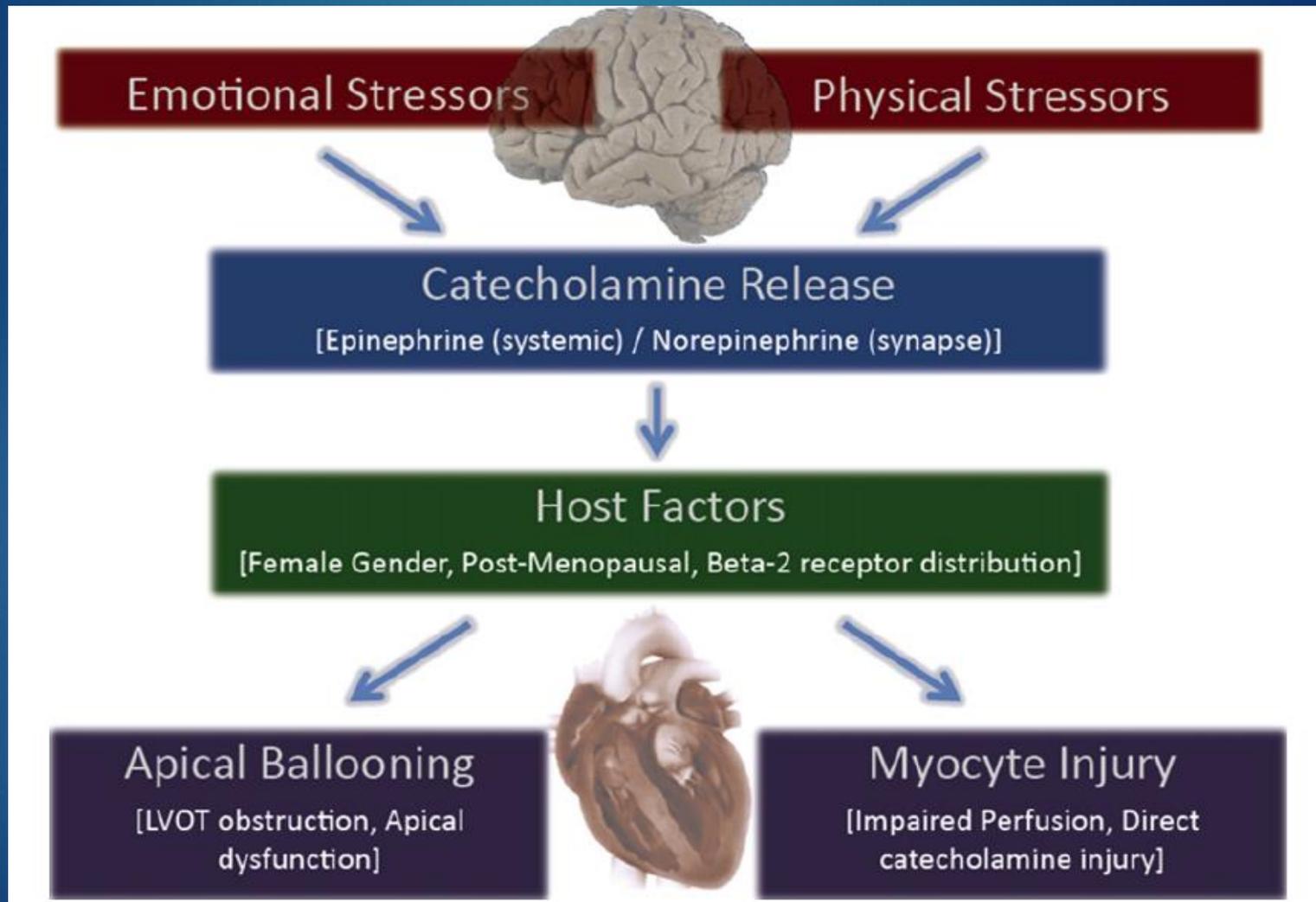
Psychiatric Factors: Stress Management

- ▶ TCM patients used positive stress management strategies *less* often than controls
 - ▶ Distracting self
 - ▶ Control of stressful situation
 - ▶ Control of reactions to stressor
 - ▶ Positive self-instruction
- ▶ No difference in maladaptive strategies
- ▶ Follow up study: No significant difference between women with TCM vs ACS

Psychiatric Factors: Stress Response

- ▶ Blunted Cortisol Stress Response (CSR) in TCM and NSTEMI vs healthy controls
 - ▶ NO differences between groups:
 - ▶ Hypothalamus-Pituitary-Adrenal Axis basal activity
 - ▶ Personality traits, psychiatric profiles, chronic stress
- ▶ Greater frequency stressful/traumatic life events in TCM (42%) versus NSTEMI and control (10%)
- ▶ Cortisol suppresses catecholamine turnover
 - ▶ Blunted cortisol response to acute stress may result in excessive catecholamine levels

Complex Interplay



Psychological Prognosis

- ▶ Patient profiles in TCM and ACS are similar in chronic factors: cardiac risk factors, psychiatric history, personality traits, cortisol reactivity and biological reactivity
- ▶ 1 year after acute event
 - ▶ Moderate or Severe Psychological Distress
 - ▶ 70.2% TCM vs 37.8% Acute MI
 - ▶ Depressed mood, vitality and general health
- ▶ Overall Health Related Quality of Life (HQRL) is worse in MI
 - ▶ TCM decreased ability to feel calm, to socialize, and to be confident with others
- ▶ Why?

Psychological Experience

- ▶ Qualitative study on Takotsubo experience in women
- ▶ “Continuous process of making sense and adapting”
- ▶ Acute - Presentation
 - ▶ Initial signs and symptoms – Anxiety/Fear
 - ▶ Seeking treatment – Acceptance & Coping
 - ▶ Receiving treatment for ACS – Fear and Shock/Disbelief
 - ▶ Diagnosis with TCM – Relief and Uncertainty

Psychological Experience

- ▶ Subacute - Hospitalization
 - ▶ Understanding diagnosis
 - ▶ Treatment for TCM – Uncertainty
 - ▶ Reflection on past circumstances – anxiety/grief
 - ▶ Future planning
 - ▶ Expectations – Hope, Optimism
 - ▶ Limitations – Helplessness, Pessimism

Psychological Experience

- ▶ Chronic - Recovery
 - ▶ Returning home - demoralization
 - ▶ Greater insight to seriousness of condition
 - ▶ Impaired physical and social capacity
 - ▶ Uncertainty of prognosis
 - ▶ Fear of stress
 - ▶ Continuing medical care – distrust, insecurity, isolation
 - ▶ Lack of experience among local healthcare professionals
 - ▶ Reassurance when physicians sought advice
 - ▶ Frequent follow up in Nurse Clinics provided safety and was highly valued
 - ▶ Desire for network of peers

Psychiatric Considerations

- ▶ Multiple stressors
 - ▶ Acute stressor
 - ▶ Acute illness – initially familiar but serious diagnosis
 - ▶ Adjustment to a new, unfamiliar diagnosis
 - ▶ Adjustment of expectations during recovery
- ▶ Response to stress
 - ▶ Self blame
 - ▶ Helplessness
 - ▶ Underlying resilience / coping strategies
- ▶ Other
 - ▶ Limited support resources (providers, peer networks)
 - ▶ Psychosocial environment

Psychiatric Interventions

- ▶ Inpatient Hospitalization
 - ▶ Validation and Supportive therapy for acute stressor(s)
 - ▶ Patient education and management of expectations
 - ▶ Assessment and reinforcement of stress management strategies
 - ▶ Encouragement and referral to supportive resources
- ▶ Continued Care
 - ▶ Frequent follow up during initial recovery
 - ▶ Education / support to outpatient providers
 - ▶ Support networks of peers
 - ▶ Continued validation with focus on stress management and coping during recovery

Conclusions

- ▶ Patients with TCM may have increased biological reactivity leading to condition
- ▶ Risk profiles of TCM patients are generally similar to ACS with the exception of acute stressors
- ▶ Recent studies indicate poor psychological prognosis in TCM compared to ACS, likely due to unique psychological experience of TCM
- ▶ Patients may be better served by interventions aimed at assessment of coping strategies and adaptation to clinical diagnosis

