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In This Issue...

► Broken Heart Syndrom(Takotsubo
Cardiomyopathy(TCM) 2-4

► Scheuermann disease 5-6

Skincare compound that kills drug-resistant
bacteria.....6-7

Real Enquiries.....7

Test Your Knowledge8

Ask the expert.....8

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Broken heart syndrome (Takotsubo Cardiomyopathy)

1.Introduction and Definitions

Broken heart syndrome (Takotsubo Cardiomyopathy (TCM)), first described in 1990 by Sato et al, is a transient cardiac syndrome that typically involves left ventricular (LV) apical akinesis and basal hypercontraction; it may symptomatically mimic acute coronary syndrome (ACS).

A significant emotional stressor (eg, unexpected death of a loved one, divorce, bad financial news) or physical stressor (eg, motor vehicle collision, significant surgery, a stay in the intensive care unit) typically precedes the development of takotsubo cardiomyopathy (TCM) in two thirds of patients; thus, the condition is also known as "broken heart syndrome" or stress-induced cardiomyopathy. In the end-systolic phase, aneurysmal dilatation (ballooning) of the anterior, apical, and inferior segments of the left ventricle (LV) is apparent; accordingly, another alternative term for TCM is apical ballooning syndrome.

2.Pathophysiology

This syndrome occurs more commonly in postmenopausal women and is thought to be due in part to the effects of stress-induced catecholamine release on the myocardium (myocardial stunning, intracellular calcium overload, microvascular dysfunction, microinfarction).

Other pathophysiologic mechanisms include multivessel epicardial coronary artery spasm, impaired myocardial fatty acid metabolism, and a central role of inflammation, including oxidative stress and the activation of multiple inflammatory markers and cytokines. Myocardial regional differences in response to high levels of catecholamine (eg, apical segments more responsive to negatively inotropic epinephrine) appear to support the role of catecholamines in the pathogenesis of TCM.

A 2023 study by Khan et al suggested that higher-level brain function centers are involved in TCM, as evidenced by abnormalities in the thalamus-amygdala-insula and basal ganglia. The investigators hypothesized that patients may benefit from treatment to modulate these abnormalities.

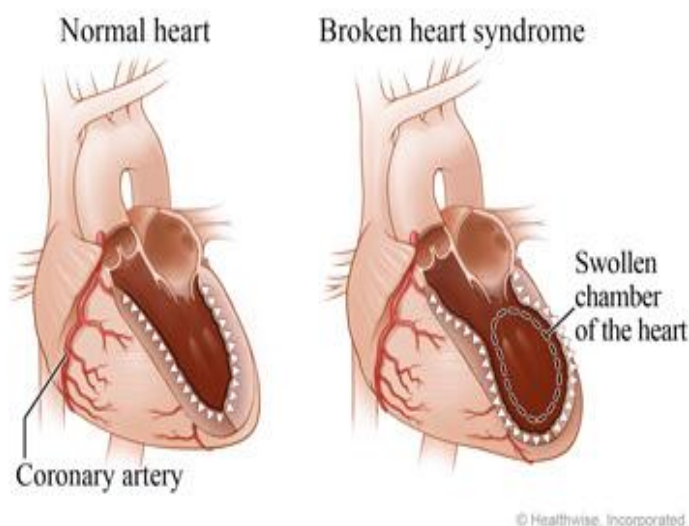
3.Clinical Features

The actual prevalence of TCM is unknown, but this syndrome likely accounts for 1%-2% of all cases of the suspected acute myocardial infarction (MI). Patients with TCM often present with chest pain, electrocardiogram ST-segment elevation, and elevated cardiac enzyme levels, all of which are consistent with an acute MI. However, when the patient undergoes coronary angiography, no significant obstructive coronary artery stenosis is evident, and when left ventriculography is performed, LV apical ballooning is present.

Endomyocardial biopsies in those with TCM have revealed interstitial infiltrates of mononuclear lymphocytes, leukocytes, and macrophages, as well as the presence of myocardial fibrosis and contraction band necrosis.

4.Diagnostic Criteria

Multiple diagnostic criteria and recommendations exist for TCM. According to the modified Mayo Clinic criteria, all four of the following must be present for the diagnosis of TCM :

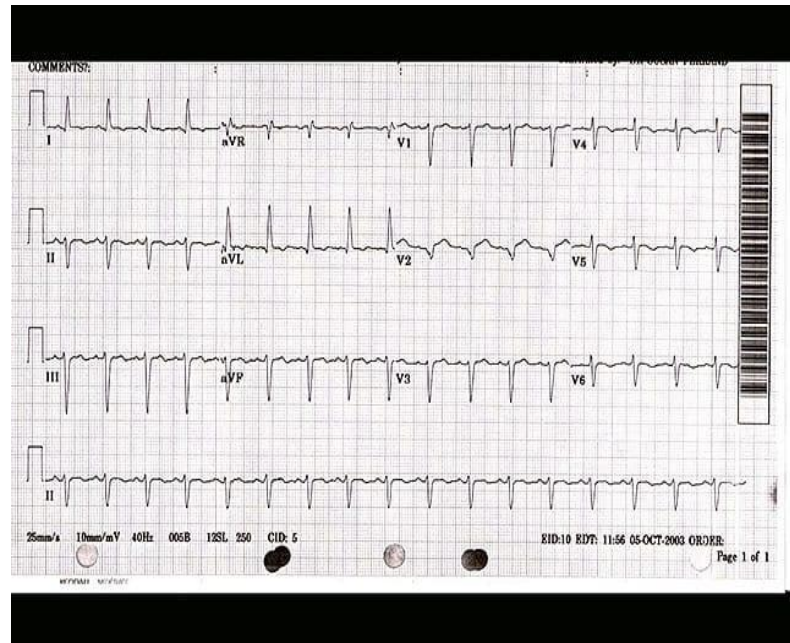


- 1-Transient hypokinesis, dyskinesis, or akinesis of the LV midsegments, with or without apical involvement; the regional wall-motion abnormalities extend beyond a single epicardial vascular distribution; a stressful trigger may or may not be present
- 2-Absence of obstructive coronary artery disease (CAD) or angiographic evidence of an acute plaque rupture
- 3-New echocardiographic (ECG) abnormalities (ST-segment elevation and/or T-wave inversion) or modestly elevated levels of cardiac troponin
- 4-Absence of pheochromocytoma or myocarditis

Electrocardiography

The most common ECG finding in acute TCM is ST-segment elevation in the precordial leads (usually V2-V3), although an initially normal or nonspecific ECG finding is seen in 20%-30% of affected patients. The ST-segment elevation is then followed by diffuse T-wave inversions (as the ST segments normalize) along with QT prolongation. There is no reliable way to differentiate TCM from ST-elevation acute Myocardial Infarction (STEMI) based on ECG findings alone.

Levels of cardiac biomarkers (eg, troponin) are usually elevated in TCM, but the rise tends to be lower than that seen in ACS (including STEMI). Coronary angiography is usually required for the diagnosis.



The above ECG, from a patient with TCM, showing sinus tachycardia and nonspecific ST and T wave changes.

Echocardiography

Transthoracic echocardiography provides a quick method of diagnosing the wall-motion abnormalities typically seen in TCM, specifically LV hypokinesis or akinesis of the midsegment and apical segment. These wall-motion abnormalities extend beyond the distribution of any single coronary artery. The LV ejection fraction (EF) can be estimated by means of echocardiography, cardiac MRI, or left ventriculography.

Cardiac Magnetic Resonance Imaging (CMRI)

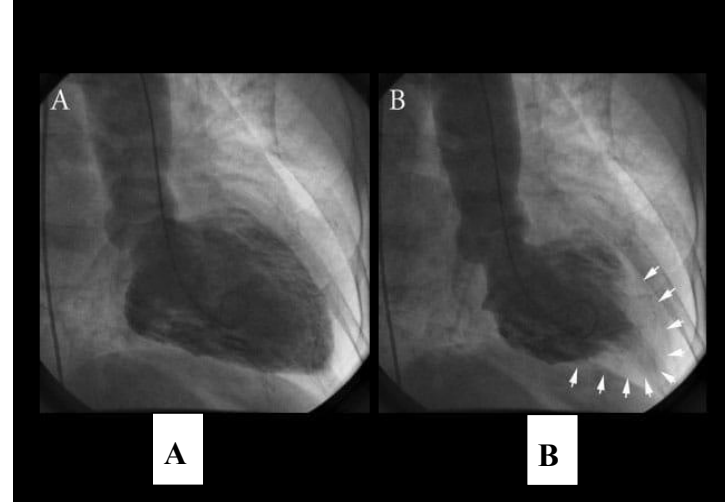
CMRI may provide new insight into the pathophysiology of TCM and may potentially be useful at a patient's acute presentation, broadening recognition of the condition and improving clinical outcomes. In patients with TCM, delayed enhancement on four-chamber CMRI shows no abnormal LV enhancement. However, in a patient with an acute MI due to coronary occlusion or with acute myocarditis, contrast enhancement may be seen, which can be useful for differentiating between TCM and these other conditions.

TCM Variants

Variants to the typical pattern of TCM have been recognized, but they occur much less commonly than the conventionally identified TCM. The left ventriculograms above are from a patient with reverse

TCM, in which there is apical hyperkinesis and basal akinesis rather than the characteristic TCM pattern of apical dilatation and hypokinesis with basal hyperkinesis.

Image A was obtained during diastole. Image B was taken during systole. The arrows in the apical segments show where normal ventricular movement in this patient occurred.



5. Management

No standard treatment guidelines exist for TCM; all patients with suspected TCM should be treated as having ACS until proven otherwise. TCM therapy is mainly empirical and supportive. When the patient's hemodynamic status permits, beta-blockers may be helpful. In the 5%-8% of patients with TCM who have an LV thrombus, anticoagulation is needed.

Despite the lack of treatment guidelines, the prognosis for patients with TCM is excellent (95%-98% inpatient survival), with complete recovery often occurring in 4-8 weeks. However, as many as 10% of patients will have a recurrence.

6. Complications

Although management of TCM is mainly supportive and the outcomes are typically good (with a full recovery achieved by about 95% of patients), there are a variety of complications that can increase mortality and prolong time to recovery. Patients may present with heart failure and cardiogenic shock, which may be severe. No definitive data provide guidance in avoiding complications; in general, it is advised to avoid catecholaminergic inotropic agents such as dobutamine, because these may serve to exacerbate the theorized stress caused by endogenous epinephrine.

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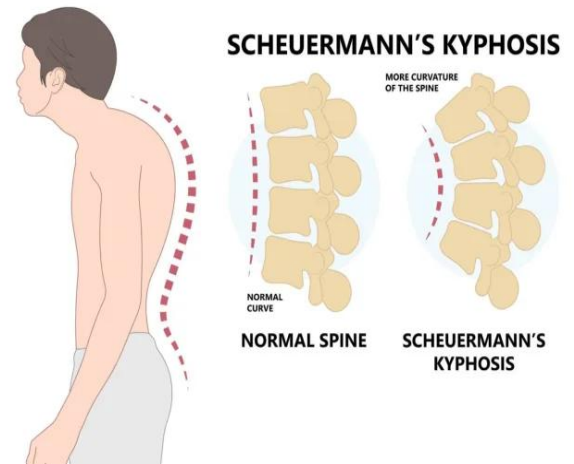
Scheuermann Disease

1. Introduction

Scheuermann disease (juvenile kyphosis) refers to osteochondrosis of the secondary ossification centers of the vertebral bodies. The lower dorsal and upper lumbar vertebrae are involved initially. The process may be limited to several bodies or may involve the entire dorsal and lumbar spine.

Scheuermann disease is marked by a deformity in the thoracic or thoracolumbar spine, with pediatric patients having an increased kyphosis along with back pain.

Scheuermann disease probably is heterogeneous (ie, not a single entity but a group of conditions sharing similar features).



2. Etiology and Pathophysiology

The etiology and pathogenesis of Scheuermann disease are a matter of debate. Many theories have been advanced, including mechanical, metabolic, and endocrinologic causes.

Osteochondritis of the upper and lower cartilaginous vertebral plates has been incriminated in the development of Scheuermann disease.

Trauma sometimes seems to be a causative factor. In addition, a definite hereditary component is involved in the development of the condition, but the mode of inheritance has been debated.

Reports of identical radiologic changes in monozygotic twins and transmission over three generations suggest underlying heritability. In study by McKenzie and Sillence, 12 probands were referred, and upon radiologic examination of their parents and siblings, seven were shown to have familial Scheuermann disease with an autosomal dominant pattern of inheritance. Of the remaining five probands, four had chromosomal anomalies.

A study by Hershkovich et al suggested that height and body mass index (BMI) are associated with the risk and severity of spinal deformities in adolescents. The study, which involved the medical records of 829,791 males and females aged 17 years, including 103,249 who had been diagnosed with some degree of kyphosis or scoliosis, found a significantly higher rate of spinal deformities, and a greater likelihood of such deformities being severe, in underweight males and females. Greater height was also found to be associated with increased risk and greater severity of spinal deformities in males and females.

A study by Peleg et al suggested that a greater horizontal orientation of the sacrum may lead to a change in spinal biomechanics that in turn contributes significantly to the development of Scheuermann disease. The study involved the evaluation of the sacral anatomic orientation in 183 persons with Scheuermann disease and 185 controls.

3. Epidemiology

United States: The prevalence rate of Scheuermann disease is thought to be 0.4-8%.

International: A study by Armbricht et al found the prevalence of Scheuermann disease in Europe to be 8% in persons aged 50 years and above, with no difference between males and females. The sample, consisting of more than 10,000 individuals, came from 27 centers across Europe that participated in the European Vertebral Osteoporosis Study.

Sex : Scheuermann disease affects males more frequently than it does females.

Age: Scheuermann disease affects children aged 13-16 years, and the diagnosis is rarely made in

patients younger than 10 years. Diagnosis may be delayed to early adulthood due to misattribution of the kyphotic deformity to “poor posture.”

4. Patient Education

Patient education is very important throughout the treatment process for Scheuermann disease. Patients who are treated with bracing need to be educated in the proper techniques of donning and doffing their braces, as well as in an appropriate wearing schedule.

An exercise program needs to be prescribed, with a focus on spinal extension exercises and hamstring stretching. Education is necessary also to improve the patient's posture and overall body mechanics with daily activities.

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Scientists discover skincare compound that kills drug-resistant bacteria

1. Introduction

Madecassic acid is widely known in Korean skincare as a calming "hero ingredient," but new research suggests it may have a much bigger role to play. Scientists at the University of Kent have found that this plant-derived compound could help fight antibiotic-resistant bacteria, one of the most pressing global health threats.

2. How Madecassic Acid Targets Dangerous Bacteria

Madecassic acid can stop antibiotic-resistant *E. coli* from growing. The compound works by binding to the cytochrome bd complex, a protein system that bacteria rely on for respiration and survival during infection. This system is not present in humans or animals, making it an attractive target for new treatments.

By interfering with this process, madecassic acid disrupts the bacteria's ability to function normally. This suggests it could be developed into an alternative antimicrobial that works differently from existing antibiotics.

3.Modified Versions Show Even Stronger Effects

Another key advantage of madecassic acid is that its chemical structure can be altered. Researchers extracted the compound from a plant sample in Vietnam and created three modified versions. Each of these variants successfully blocked the cytochrome bd complex and halted bacterial growth. One version was even able to kill E. coli at higher concentrations.

Scientists plan to continue refining these compounds to improve their effectiveness and explore their potential as future medicines.

4.Potential Impact on Skincare and Skin Microbiome

Beyond its medical promise, the findings may also shed light on how madecassic acid affects the skin's natural bacteria when used in skincare products. This could help researchers better understand its broader biological effects.

Lead author Dr. Mark Shepherd, Reader in Microbial Biochemistry at Kent said: "Plants have been a source of natural medicines for millennia, and now contemporary research approaches can reveal the mechanisms of action. This is an exciting time, and we hope to further our understanding of natural antimicrobials from plants, nature's great chemical factories."

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Real Enquiries

At the “ Drug Information Center” we respond to enquiries from the professional health team as well as from others. Here’s one of the enquiries received at the

Inquiry:What is protocol storage for intralipid is it sensitive to sun light?

The answer:

Storage: Must be stored at temperatures not exceeding 25° C (77° F). Specific storage conditions required Do not freeze. Manufacturer recommends admixtures (3 in 1) be refrigerated for no more than 24 hours after mixing and completely infused within 24 hours after removal from refrigeration. There is no sensitivity to sun light

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Test Your Knowledge

- 1-Efavirenz is classified as a (an)
A.muscle relaxant
C.tranquilizer
E.antiviral
B. sedative–hypnotic
D.analgesic
- 2- Lepirudin is used mainly to treat
A. gastritis
C. heparin-induced thrombocytopenia
E. nausea
B. minor anxiety states
D. severe pain
- 3- Histamine is found in the human body in
A. the granules of mast cells in blood
C. the hypothalamus
E. A, B, and C
B. the mucosal layer of the GI tract
D. A and B
- 4-Orlistat is used as a (an)
A. narcotic antagonist
C. weight loss agent
E. Anesthetic
B. narcotic analgesic
D. antiepileptic

Ask the expert

Is green tea extract and garcinia cambogia combination effective in weight loss?

Green tea extract (GTE) contains bioactive polyphenols, primarily catechins such as epigallocatechin gallate (EGCG), which is the most abundant and studied compound. EGCG works through multiple mechanisms: it inhibits catechol-O-methyltransferase (COMT), an enzyme that degrades norepinephrine, thereby prolonging norepinephrine's thermogenic effects in the body. This theoretically increases fat burning and energy expenditure which leads to weight loss.

Garcinia cambogia contains hydroxycitric acid (HCA), which theoretically works by inhibiting citrate lyase, an enzyme involved in fatty acid synthesis, and by increasing serotonin levels to promote satiety. Despite widespread marketing claims, the clinical evidence for garcinia cambogia is considerably weaker than for green tea extract.

When examining the combination of GTE and garcinia cambogia, the research is limited. The theoretical synergy would involve GTE's thermogenic effects enhancing fat oxidation while garcinia cambogia's HCA theoretically reduces fat synthesis and increases satiety. However, very few clinical trials have specifically studied this combination. The available evidence suggests that combining these ingredients does not produce additive effects beyond what would be expected from GTE alone.

Answers:

1-(E) 2- (C) 3-(E) 4-(C)