

ESCUELA DE MEDICINA Y CIENCIAS DE LA SALUD -CICS

Protocolo de investigación

Diagnostico eco cardiográfico de una presentación inusual perioperatoria de la cardiomiopatía por estrés (síndrome de Takotsubo). Reporte de caso

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1. Información general del proyecto:

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Resumen:

La miocardiopatía por estrés o síndrome de Takotsubo es una patología cardíaca ampliamente reconocida con una presentación clínica similar al síndrome coronario agudo y relacionado a estrés físico o emocional. Su identificación perioperatoria es un reto dada las diferentes formas y escenarios de presentación. Nosotros describimos una paciente de 22 años con una presentación atípica del síndrome de Takotsubo durante la inducción anestésica resaltando la utilidad de la ecocardiografía transesofágica para el diagnóstico inicial.

Planteamiento del problema:

La miocardiopatía por estrés, desde sus primeras descripciones a principios de los años noventa, a tenido un creciente interés como diagnostico diferencial del síndrome coronario agudo y falla cardiaca. Su presentación habitual envuelve pacientes mujeres de edad media bajo situaciones de estrés físico o emocional, pocos es el conocimiento sobre sus presentaciones perioperatorias dado su rara presentación y su complejo diagnostico. Este caso además de ser raro e interesante aporta herramientas para el diagnostico de esta patología.

Marco Teórico:

La miocardiopatía inducida por estrés o también llamada miocardiopatía takotsubo, tiene sus reportes iniciales datan de 1990 en Japón(1); se trata de una cardiopatía de inicio súbito, con signos y síntomas de falla cardiaca y síndrome coronario agudo tales como alteraciones electrocardiograficas, elevación de enzimas cardiacas y signos de bajo gasto(5). su característica principal es la falta de lesión coronaria evidente y la recuperación completa de la función ventricular al estado premorbido.

Desde los reportes iniciales, ha habido un crecimiento en el numero de publicaciones, con una prevalencia cercana al 1% en rangos desde 0,7 a 2.5% de los pacientes con sospecha de síndrome coronario agudo (SCA)(6-8). hay un creciente interés en dilucidar sus factores desencadenantes ya sean primarios o secundarios, así como la fisiopatología subyacente(9). Hay múltiples reportes en la literatura de casos relacionados con fármacos, los mas prevaleces son los alfa adrenergicos, y principalmente adrenalina . La administración de oximetazolina ha sido relacionada con esta patología en bajas dosis.

La presentación clásica predominante es dolor torácico en el contexto de una mujer de edad media sometida a un estrés emocional(5, 9). Sin embargo en pacientes jóvenes con factores estresores crónicos pueden generar una presentación atípica bajo el contexto de estrés quirúrgico o anestésico como lo mostrado en nuestro caso(10). los criterios diagnósticos requieren el descarte de enfermedad coronaria activa y evidencia de disfunción ventricular la cual es característica evaluada ya sea por cateterismo cardiaco o de forma eco cardiográfica(11). tabla criterios

Criterios Diagnósticos de la clínica Mayo

Hipoquinesia, aquinesia o disquinesia transitoria del ventrículo izquierdo en segmentos medios con o sin compromiso de los segmentos apicales; la alteración

en la motilidad regional va mas allá del territorio de una única arteria coronaria; el estrés desencadenante es probable pero no siempre presente

Ausencia de enfermedad coronaria o evidencia angiografía de una placa rota.

**Nueva Alteración en el electrocardiograma (S-T o Ondas T); elevación ligera de las troponinas
ausencia de feocromocitoma o miocardios**

El tratamiento depende de la presentación clínica, el cual es enfocado al manejo sintomático y al soporte vasopresor, mientras revierte la condición; la recuperación sintomática puede llevar 1 semana pero el proceso de normalización de las alteraciones en función ventricular pueden tomar 6 semanas en promedio(4, 5). los pacientes con presentaciones clínicas mas severas pueden tener complicaciones agudas como edema pulmonar, arritmias, choque cardiogenico, ruptura ventricular y muerte la cual se presenta en el ...7.1 % de los casos en los primeros 30 días.

Son múltiples los reportes de miocardiopatía por estrés en la literatura, ya sea desencadenado por estrés físico o emocional, con un aumento progresivo en el reporte de casos en el escenario intraoperatorio(8, 10, 12). El diagnóstico ecocardiográfico es utilizado de forma habitual durante la presentación típica (7); pero hay pocos reportes de su uso intraoperatorio. En este reporte de caso mostramos una presentación atípica, su diagnóstico ecocardiográfico intraoperatorio y el manejo agudo. Además de su evolución y resolución del cuadro agudo en la unidad de cuidado intensivo.

Objetivos específicos:

Describir el manejo y las herramientas diagnósticas usadas durante un caso de miocardiopatía por estrés intraoperatoria.

Tipo de diseño:

Descriptivo observacional

Población y muestra:

Será un reporte de caso de 1 paciente.

Plan de análisis:

Evaluaremos la historia clínica y se extraerán los hallazgos mas relevantes para el análisis del caso de la misma, así como las imágenes de los ecocardiogramas realizados en la hospitalización.

Aspectos Éticos:

Se cuenta con consentimiento informado para revisión de historia y publicación de hallazgos por parte de la paciente.

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Anexos:

Figuras e Ilustraciones

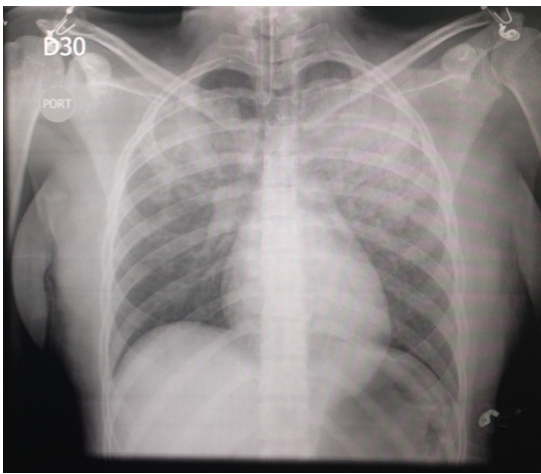


Figura 1. Radiografía de tórax con edema pulmonar bilateral

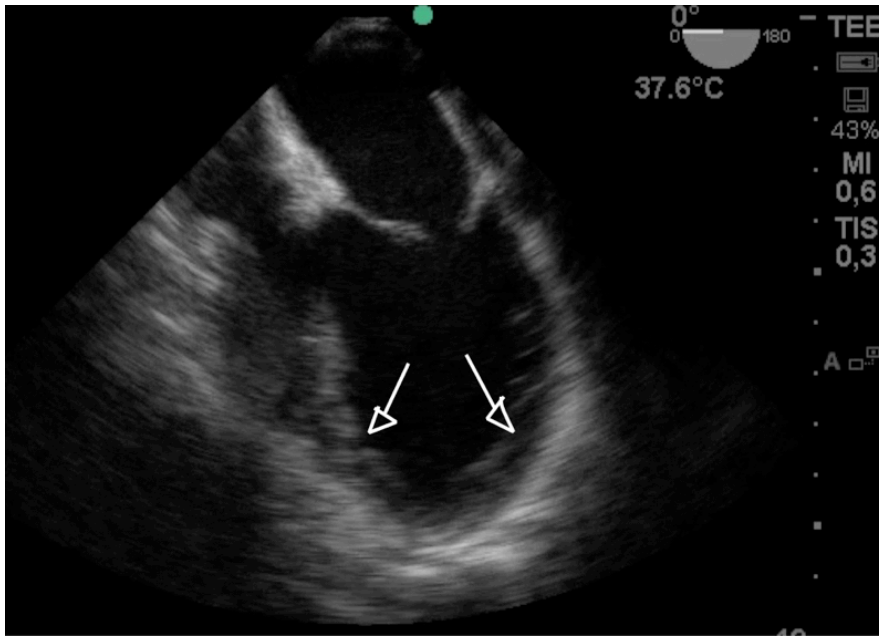


Figura 2. Ecocardiograma trans esofágico, 4 cámaras mostrando dilatación del ventrículo izquierdo



Figura 3 Ecocardiograma trans torácico mostrando resolución de la dilatación del ventrículo izquierdo

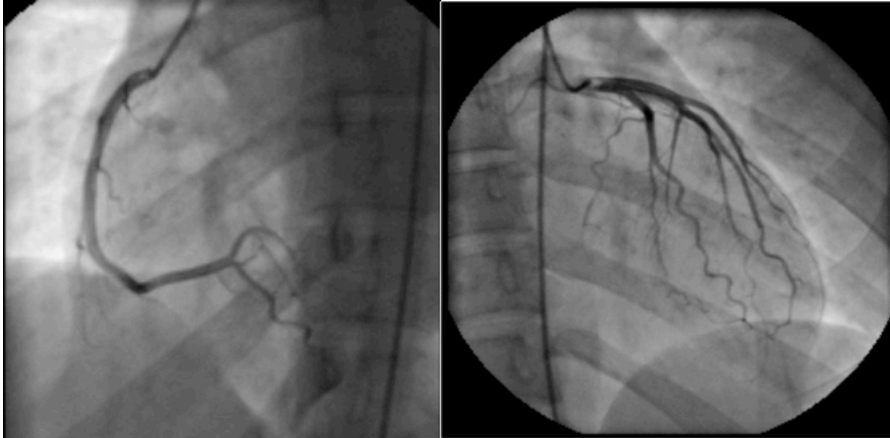


Figura 4. Arteriografía coronaria sin lesiones significativas

Tabla 1. Hemodinamia

	Día 1	Día 2	Día 4	Día 6
GC	2,3	2,93	4,9	
IC	1,63	2,07	3,1	
PAP	31/24-26	31/16-22	22/8	
PW	19	15	10	
PVC	10	8	13	

Tabla 2 Reportes Eco

	Día 1	Día 2	Día 6
FE	1,9	35	60

Conclusión	Disfunción sistólica severa del Ventrículo izquierdo.	Disfunción sistólica del ventrículo izquierdo con FE del 35% en las condiciones actuales.	1. Ventrículo izquierdo con dimensiones normales.
	alteración segmentaria de la contractilidad con aquinesia apical	Alteración segmentaria de la contractilidad de origen isquémico con compromiso descrito.	2. Función sistólica y diastólica normal FE: 60%. No se observan trastornos de la contractilidad segmentario.
		Disfunción sistólica leve del ventrículo derecho.	3. Cavidades derechas con dimensiones y función normales
			4. Insuficiencia tricuspídea leve, PAPS: 30 mmHg.

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Entrega del artículo: Requisito final

Introducción: Se logro desarrollar un reporte de caso mas revisión de literatura actualizada del estado del arte sobre la miocardiopatía por estrés en el ámbito perioperatorio, el cual se encuentra en proceso de publicación por una revista indexada internacional con un alto impacto en la especialidad (Annals of Cardiac Anesthesia). El objetivo principal era aportar nuestra experiencia en el manejo y el diagnostico agudo eco cardiográfico de una patología de presentación compleja e inusual.

A continuación el articulo revisado y en proceso de publicación.

Title: Trans Esophageal Echo Diagnosis of Perioperative Unusual Transient Left Ventricular Apical Ballooning Syndrome, Case Report

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Short Title: TEE Diagnosis of Perioperative Takotsubo, Case Report

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Abstract

Case Reports should have a one-paragraph, unstructured Abstract summarizing the article, including salient observations and conclusions.

Stress cardiomyopathy, or Takotsubo syndrome, is a widely recognized cardiac pathology with a clinical presentation similar to acute coronary syndrome, and related to physical or emotional stress. Perioperatively it is challenging to identify it given the variety of forms and scenarios in which it can present. We describe a 22 year old patient with an atypical presentation of Takotsubo syndrome during anesthesia induction, which highlights the usefulness of transesophageal echocardiography for the initial diagnosis.

Number of words: 74

Introduction

The introduction is a brief background statement of the problem, identifying the specific disease about which the case report is written or a device about which a complication occurred.

Stress cardiomyopathy, or Takotsubo syndrome, was first described in 1990 (1). The widespread recognition it has gained since then has allowed the definition of its clinical characteristics and its strong association with physical or emotional stress. From an anesthesiology point of view, there are several reports of perioperative presentations, most of which were initially interpreted as a perioperative coronary event (2,3). The growing use of intraoperative transesophageal echocardiography (TEE) has become an indispensable tool for early diagnosis and subsequent management.

Consent for publication: The patient gave her written consent to publish the case.

Case Description

A 22-years-old, 48-kg female patient with a 6-month history of temporomandibular joint pain was scheduled for bilateral temporomandibular meniscopexy. The patient underwent an uneventful general anesthesia for appendectomy at age 10.

The patient was admitted to surgery with a heart rate of 92 bpm, respiratory rate of 16 breaths per minute, blood pressure of 128/78 mm Hg, and oxygen saturation on room air at 91%. Pre-oxygenation was performed, and induction was begun with midazolam 2 mg, IV, remifentanyl 0.14 $\mu\text{g/kg/min}$ IV, propofol 140 mg IV, and rocuronium 35 mg IV. Following intranasal application of oxymetazoline HCl 0.025%, 5 drops, and topical lidocaine gel, the nasotracheal tube was inserted, with confirmation of proper placement through symmetrical auscultation and capnography. As the nasotracheal tube was being fixed, the patient presented bradycardia associated with ST changes, which rapidly progressed to supraventricular tachycardia with a heart rate of 168 bpm, hypotension, desaturation, and piloerection. Increased airway pressure associated with rhonchi was noted, and, therefore, bronchospasm was considered to be a possible etiology. After 4 puffs of salbutamol and 100 mg hydrocortisone IV, bloody material was seen coming from the nasotracheal tube, compatible with pulmonary edema. A chest x-ray was ordered, which showed severe bilateral pulmonary edema (Figure 1). In light of these findings, an emergency TEE was performed.

The TEE showed severe left ventricular dysfunction with akinesia of the apical and medial segments of the anterolateral and septal walls, without involvement of the basal segments of the septal and inferior walls. The right ventricle was dilated with a slightly diminished function and II/IV tricuspid regurgitation. The cardiac output was calculated at 1.8 l/min (Figure 2)(Supplemental Video 1). Vasopressor support was begun with noradrenaline at $0.1\mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}\text{IV}$, with which the patient improved slowly, reaching a heart rate of 103 bpm, blood pressure of 94/66 mmHg, and oxygen saturation at 92%.

Vasopressor support was continued, surgery was cancelled, and the patient was transferred to the intensive care unit (ICU) for stabilization.

In the ICU, a pulmonary artery catheter was placed, showing a cardiac index of $1.63 \text{ L} \cdot \text{min}^{-1} \text{ m}^2$, and a wedge pressure of 20 mmHg, with normal systemic and pulmonary resistance. A transthoracic echocardiogram reported severe biventricular dysfunction with hypokinesia of the distal third of the anterior and inferior septum, and therefore treatment was started with milrinone at $0.5 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ IV (Supplemental Video 2). Troponin I on day one was 3.7 ng/mL, and the control on the second day was 0.7 ng/mL (normal value less than 0.1 ng/mL). The patient continued a gradually favorable course with a progressive increase in cardiac index to $3.1 \text{ L} \cdot \text{min}^{-1} \text{ m}^2$, and an ejection fraction up to 60% (Figure3)(Supplemental Video 4). She was discharged from the ICU on the sixth day post-op. The following day, cardiac catheterization was performed, in which no coronary disease was found (Figure4).

Discussion

Stress-induced cardiomyopathy, also known as Takotsubo cardiomyopathy, was first described in Japan in 1990 (1). It is a sudden onset cardiopathy with signs and symptoms of heart failure and/or acute coronary syndrome (ACS), such as electrocardiographic changes, elevated cardiac enzymes, and signs of low output. Its main characteristic is the absence of an evident coronary lesion, and the complete recovery of ventricular function to pre-morbid levels in a relatively short period of time (4-5).

Since its initial description, there has been a gradual increase in the number of publications related to the disease, finding prevalence close to 1% (ranges from 0.7 to 2.5%) in patients with suspected ACS (6). Due to the fact that this pathology is not fully understood, there is a growing interest in elucidating the triggering factors, be they primary or secondary, as well as the underlying pathophysiology. The predominant classic presentation is chest pain in the context of a middle-aged woman undergoing emotional stress (5). However, young patients may have an atypical presentation in the context of surgical or anesthetic stress, such as that shown in our case.

The diagnostic criteria require both ruling out active coronary disease as well as confirming ventricular dysfunction. The first is typically evaluated through cardiac catheterization, which can be performed immediately, or after stabilizing the patient while ventricular dysfunction is easily characterized with echocardiographic assistance.

Intraoperative TEE becomes an invaluable diagnostic aid when the syndrome is suspected in patients undergoing a surgical intervention, and probably represents the diagnostic method of choice in this context (7).

Treatment depends on the clinical presentation, and is aimed at symptomatic treatment and vasopressor support until the condition reverses. Symptomatic recovery may take one week, but the process of normalization of ventricular function alterations is achieved, on average, at six weeks (4, 5). Patients with severe clinical presentations may have acute complications such as pulmonary edema, arrhythmias, cardiogenic shock, ventricular rupture and death. These last three outcomes present in 7.1% of cases within the first 30 days (4, 5).

Cases that appear during the intraoperative period represent a diagnostic challenge for the anesthesiologist (8). Among the differential diagnoses of our case are ACS, a reaction to medications, and pulmonary edema due to negative pressure. The literature contains multiple case reports related to the administration of medications, with the most prevalent being the alpha-adrenergic drugs, fundamentally adrenaline (9). The administration of oxymetazoline has been associated with this pathology, but in doses much greater than those used in the present case. Negative pressure edema was ruled out by the clinical presentation, and ACS presents with a more pronounced elevation of troponins, and was later ruled out with coronary angiography, which was normal.

There are multiple reports of stress cardiomyopathy in the literature, whether triggered by physical or emotional stress, with a progressive increase in the report of cases in the intraoperative setting (7). Echocardiographic diagnosis is generally used in the typical

presentation (10), but there are few reports on its use for diagnosis under anesthesia. In this case report, we show an atypical presentation with its echocardiographic diagnosis and acute intraoperative management, in addition to its progress and subsequent resolution in the ICU.

Figures and Illustrations

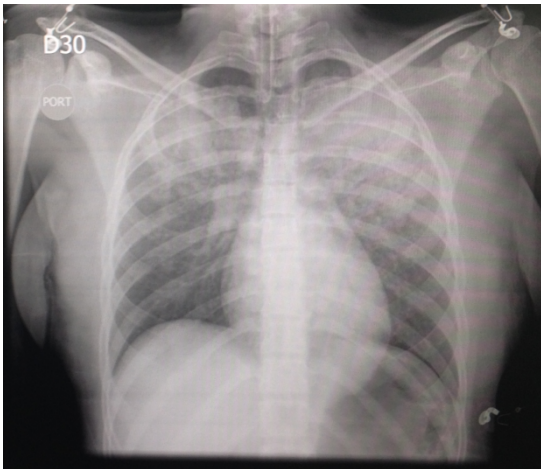


Figure 1.

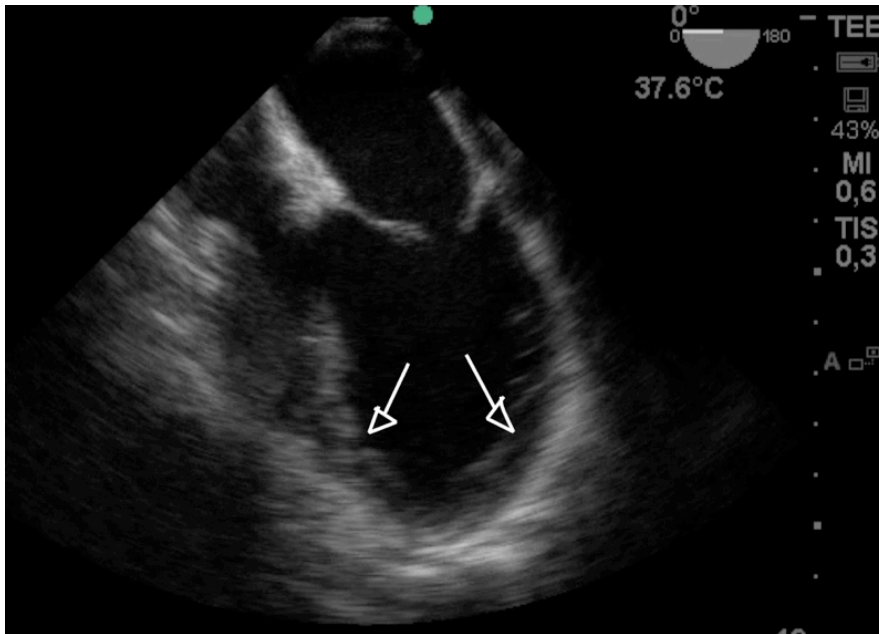


Figure 2.



Figure 3

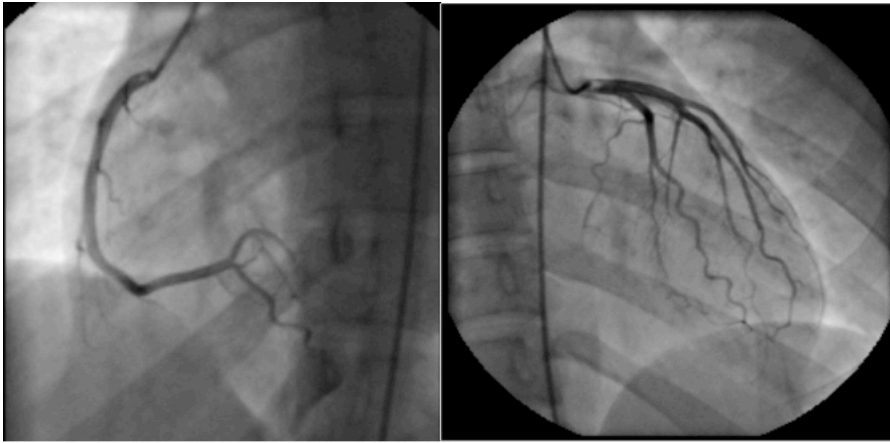


Figure 4

Figure Legends

Figure 1: Chest X-ray with bilateral pulmonary edema signs.

Figure 2: Mid esophageal, 4 chambers view transesophageal echocardiography (TEE).

Arrows showing left ventricular dilatation.

Figure 3: 4 chamber apical view from a transthoracic echocardiogram (TTE). The right heart is normal. The left ventricle is slightly dilated without atrial alteration.

Figure 4: Coronary arteriography showing no significant lesions.

Supplemental Legends

Supplemental video 1 : Mid esophageal, 4 chambers view transesophageal echocardiography (TEE) with akinesia of the apical and medial segments of the anterolateral and septal walls.

Supplemental video 2: Long Axis parasternal transthoracic echocardiography (TTE).
Arrows showing Wall motions compromise)

Supplemental video 3: 4 chamber apical view. Without wall motion alterations

Carta de Aceptación:

Dear Dr. Mantilla,

We are pleased to inform that your manuscript "Trans Esophageal Echo Diagnosis of Perioperative Unusual Transient Left Ventricular Apical Ballooning Syndrome, Case Report." is provisionally accepted. You would receive an edited version of article in about 2-3 weeks from now for a **final check and correction**.

We thank you for submitting your valuable research work to Annals of Cardiac Anaesthesia.

With warm personal regards,

Yours sincerely,

Poonam Malhotra

Annals of Cardiac Anaesthesia

Conclusiones:

La evolución del paciente y su manejo durante toda la hospitalización derivó en un gran interés por presentar nuestra experiencia en el manejo de esta compleja patología. Es de gran satisfacción que el caso tuviera la aceptación y el interés de revistas internacionales dada la complejidad del diagnóstico, el manejo y la línea de tratamiento tomada para terminar en un buen desenlace para el paciente.

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