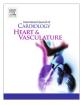
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Correspondence

COVID-19 pandemic induced stress cardiomyopathy: A literature review



Letter to Editor,

Takotsubo syndrome (TTS, takotsubo cardiomyopathy, stress cardiomyopathy, or "broken heart syndrome") is a sudden transient, reversible cardiac dysfunction that can cause symptoms like those of a heart failure characterized by acute regional and/or global left ventricular dysfunction usually in the setting of physical or emotional stress [1]. According to the World Health Organization, the current ongoing COVID-19 pandemic has infected over 20,439,814 people and has led to approximately 744,385deaths worldwide as on 13th August 2020 [2]. A high burden of acute cardiac injury (19.7–27.8%), leading to significantly high mortality, has been reported in these patients [3,4]. TTS is usually more prevalent amongst postmenopausal women but in one of the previous study on TTS in COVID-19 positive patients it was observed that both the gender are equally affected [5]. First case of TTS was reported on 1990 [6]. This is the first ever truly major pandemic in history since 1990. It is of no surprise that incidence of TTS is likely to increase in times of such pandemic due to increased anxiety and stress that has long been associated with development of TTS [7]. COVID-19 has not only affected the physical health, but also triggered social, economic, and psychological distress.

In case reports by Chadha et al [8] and Sofia et al, [9] during hospitalization both the patients presented with chest pain and anxiety due to COVID-19 pandemic and both of them were Postmenopausal women with mean age of 82 years. One of them was hypertensive. Cardiac imaging showed reduced mean Ejection Fraction of 35%, and both ECG and Echocardiography were consistent with the TTS. One of the patient had elevated Troponin level. Both the patients recovered and were successfully discharged (Table 1).

A recent cohort study reported that incidence of Stress cardiomyopathy has increased in COVID-19 pandemic compared to pre-pandemic (7-8% vs 1-2%). All the patients in the cohort were negative for rt-pCR for COVID-19 [10]. That TTS may also present later after recovery COVID-19 infection as delayed sequalae can't be ruled out for sure as one of the recent study reported that 78% of recovered COVID-19 patients had positive cardiac MRI findings [11]. Moreover, TTS can also present in previously treated COVID-19 patients as Posttraumatic stress disorder or surge in number of TTS cases is plausible during or after ongoing pandemic due to possibly emergence of anxiety cases or as a manifestation of Posttraumatic stress disorder [12]. Study by Jabri A. et al also reported that TTS patients during pandemic had significantly longer median hospital stays than pre-pandemic (8 days vs 4-5 days) [10]. Study also showed that incidence of TTS in male (35%) was higher compared to Takotsubo Cohort [10]. Study by Desai HD et al observed that Males had predominantly physical stress compared to emotional triggers as possible causative etiology [5]. Furthermore, Jabri A. et al also reported that pandemic induced stress too may be an important mechanism in development of TTS. However, study has not clearly mentioned if TTS patients had a proven history of stress or anxiety due to COVID-19 pandemic. In our previous study we observed that one patient presented with anxiety during hospital admission, while 2 had psychiatric illness as co-morbidity [5]. Emotional factors such as contact with hospitalized family member, worry about socioeconomic costs, nightmares, intrusive thoughts of COVID-19 related morbidity all may lead to central sympathetic hyperactivation and may contribute in development of Stress syndrome/Takotsubo Syndrome. According to one survey, most common concern of fear of the COVID-19 was health of others (parents, loved one and grandparents), followed by healthcare collapse, breakdown of economy, mass panic, personal health, societal breakdown, personal economy [13]. It is observed that patients of TTS with COVID-19 have higher mortality compare to Non COVID-19 TTS patients [5].

We recommend that Patients who present with Takotsubo like syndrome should undergo nasopharyngeal rTpCR and/or antibody testing for COVID-19 as there is a certain likelihood in this pandemic era.

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| : Past Medical History ; HTN: Hypertension ; LV: Left Ventricle ;ECG: | |
|--|---|
| istics, clinical outcome in patients of COVID-19 pandemic induced Stress Cardiomyopathy" (Abbreviations: PMH | tuatary-Adrenal;TC: Takotsubo Cardiomyopathy;ACE: Angiotensin Converting Enzyme). |
| Baseline clinical and laboratory characte | lectrocardiogram ; HPA: Hypothalamic-Pi |

| | clinical and laboratory characteristics, clinical outcome in patients of COVID-19 pandemic induced Stress Cardiomyopathy" (Abbreviations: PMH: Past Medical History ; HTN: Hypertension ; LV: Left Ventricle ;ECG: | diogram;HPA: Hypothalamic-Pituatary-Adrenal;TC: Takotsubo Cardiomyopathy;ACE: Angiotensin Converting Enzyme). | |
|---------|--|---|--|
| Table 1 | "Baseline clinical and | Electrocardiogram ; HI | |

| | tcome Medical Management | provement with - ptoms and good ompensation | dyspnea & ACE the hospital. inhibitors, beta blockers, statins |
|--------------|---|--|--|
| | Improvement/Outcome | Discharged & improvement with resolution of symptoms and good haemodynamic compensation | Improvement of dyspnea & discharged from the hospital. |
| | Troponin- Mechanism I/T (pg/ ml) | catecholamine induced myocardial stunning, coronary ar- tery spasm, plaque rupture and microvascular dysfunction have been suggested. | acute psychological or physical stress mediated via the sympathetic-adrenal- medulla axis with catecholamine release in the adrenal medulla and the HPA axis with consecutive cortisol release from the adrenal cortex may act as a |
| | | 112 (כTnT) | 2.950 (cTnT) |
| | Echocardiography/ Ventriculography Findings | Basal hyperkinesis Apical ballooning | Severe hypokinesia in mid apical segment. basal segment. |
| | ECG findings | Septal g ST pattern in V1-V3 | Diffuse ST segment elevation |
| yopuny , in | Ejection Fraction LV (%) | 35 | 35 |
| | Covid- 19 | -ve | - ve |
| | Author Country Age/ Comorbidities/ Clinical Features and Sex PMH Medical Illness during Hospitalization | Sudden onset substernal chest pain Anxiety because of Corona Pandemic | Acute chest pain Anxiety because of Corona Pandemic |
| | Comorbidities/ PMH | N/A | London 79/F Arterial HTN |
| | Age/ Sex | 85/F N/A | 79/F |
| 111 (11m190 | Country | USA | London |
| | Author | Chadha USA | Sofia |

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