Case Report

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Management of Partial Hanging Accompanied with Acute Onset Decreased Left Ventricular Systolic Function: A Case Report

Anaesthesia Section

AISHWARYA RAMANATHAN[1], MEENAL MUTHIAH[2], RAGAVENDRA CHANTHANAMUTHU[3], KEERTHIGA MOHAN[4]

ABSTRACT

Hanging can lead to cardiovascular complications like negative pressure pulmonary oedema, ventricular tachycardia and fibrillation, hypotension, shock, myocardial infarction, heart blocks, carotid dissection and even cardiac arrest. Stress cardiomyopathy after attempted hanging is an unusual and rarely encountered complication, particularly in young patients. It is usually a transient and reversible condition. Routinely, patients have no antecedent cardiac history or symptoms. It is precipitated by extreme physical and emotional stress. The presenting symptoms can mimic those of myocardial infarction, leading to a misdiagnosis of cardiac pathology. Extreme vigilance and awareness are paramount for the diagnosis and management. The blood investigations and electrocardiogram can be normal in the initial stages, but with careful monitoring, this complication can be successfully treated. In the current case, the patient was a young female with no significant cardiac history who presented with an alleged history of attempted hanging. Echocardiography revealed severe left ventricular dysfunction with an ejection fraction of 30%. She was intubated and managed for cardiac failure. Coronary angiography was done to rule out any organic lesions, which came out negative. She was discharged after seven days in stable condition with improvement in cardiac function to near normal with an ejection fraction of 55%. We report this as a case of stress-induced cardiomyopathy precipitated by acute stress of hanging to ensure that clinicians have a high index of suspicion while dealing with a patient with hanging.

Keywords: Echocardiography, Global hypokinesia, Stress cardiomyopathy, Suicide

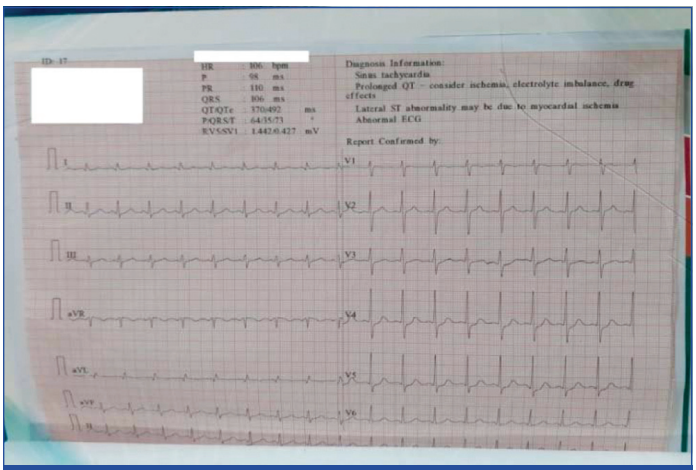
CASE REPORT

A 25-year-old female patient with American Society of Anaesthesiologists Physical Status (ASA-PS) I was brought to the emergency department after attempting suicidal hanging, which lasted for 15-20 minutes according to the attender. On arrival in the emergency department, the patient was conscious but irritable with a Glasgow Coma Scale (GCS) of 10. A ligature mark was present on the anterior aspect of the neck [Table/Fig-1]. The patient was haemodynamically stable with vitals, which were as follows: blood pressure of 90/60 mmHg, heart rate 104/minute and oxygen saturation of 92% on 6 L oxygen supplementation with a face mask. Auscultation of the chest revealed basal crackles. Arterial blood gas analysis revealed a partial Pressure of Oxygen (Po_2) of 108 mmHg, a partial Pressure of Carbon Dioxide (pCO_2) of 26.9 mmHg, with a pH of 7.37. Routine investigations were done and reports noted [Table/Fig-2]. Two hours after admission, in view of worsening GCS, the patient was electively intubated with seven size endotracheal tube and mechanically ventilated. Computed Tomography (CT) brain and screening CT of the neck were done, which were unremarkable. Treatment was initiated with intravenous fluids, antibiotics, proton pump inhibitors, antiemetics and one gram methylprednisolone infusion over 24 hours. Urine ketone was found to be positive. Neurology consultation was done and mannitol, piracetam and citicoline were added as a part of the treatment regimen for neuro-protection. Electrocardiography revealed ischaemic changes [Table/Fig-3] and echocardiography was done, which revealed global hypokinesia of the left ventricle with severe systolic dysfunction with an ejection fraction of 30%, mild mitral regurgitation, mild tricuspid regurgitation and pulmonary artery systolic pressure of 30 mmHg [Table/Fig-4]. Cardiology consultation was done and the patient was started on heart failure treatment with a beta blocker and angiotensin converting enzyme inhibitors. Chest X-ray revealed bilateral lower zone infiltrates [Table/Fig-5], following which, a CT chest was done and an endotracheal tube aspirate was sent for culture and sensitivity. CT chest revealed bilateral symmetrical confluent areas of consolidation and centrilobular nodules suggestive of aspiration pneumonia. Antibiotics were escalated. Otorhinolaryngology opinion was sought; fibre optic laryngoscopy was done under local anaesthesia, which showed an adequate glottic chink with pooling of secretions. With improvement in the general condition patient was gradually weaned off the ventilator and extubated after four days. Repeat echocardiography revealed improvement in left ventricular function to an ejection fraction of 40%. The patient was advised to undergo coronary angiography, which was found to be normal [Table/Fig-6]. Psychiatric counselling was done and suicide prevention counselling was given to the patient. After seven days of admission, the ejection fraction improved to 55% and the patient had no cardiac complaints or significant electrocardiographic changes and was discharged in stable condition with advice to follow up in the cardiology department.

[Table/Fig-1]: Ligature mark on the anterior aspect of the neck.

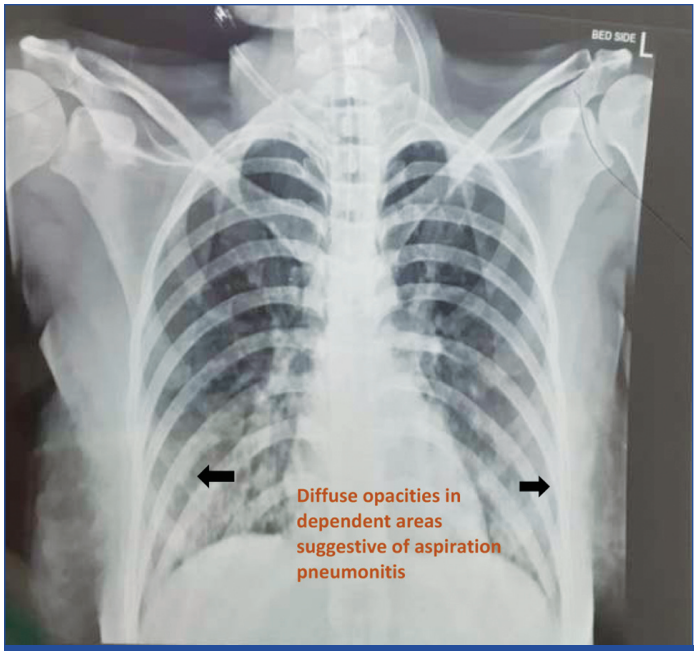
Investigation	Day of admission	Day 4 of admission
Haemoglobin (g/dL)	12.7	12.3
Total leukocyte count	13,100	16,680
Platelet count (lakh/cc)	3.069	1.92
Fasting blood glucose (mg/dL)	214	115
Serum urea (mg/dL)	29	30
Serum creatinine (mg/dL)	1.1	0.8
Serum bilirubin	0.5 mg/dL	
Aspartate aminotransferase/Alanine aminotransferase	19/11 IU/L	
Serum sodium/ serum potassium	137/3.4 meq/l	
Glycated haemoglobin (HbA1c)	4.5%	
Thyroid-stimulating hormone	1.9 mcIU/mL	
Echocardiography	Global hypokinesia with severe left ventricular dysfunction with an ejection fraction 38%. Grade II diastolic dysfunction, grade II mitral regurgitation. Mild pulmonary artery hypertension	Global hypokinesia with moderate left ventricular dysfunction with ejection fraction 40%. Normal diastolic function, grade I mitral regurgitation. No pulmonary artery hypertension

[Table/Fig-2]: Investigation trend of the patient.

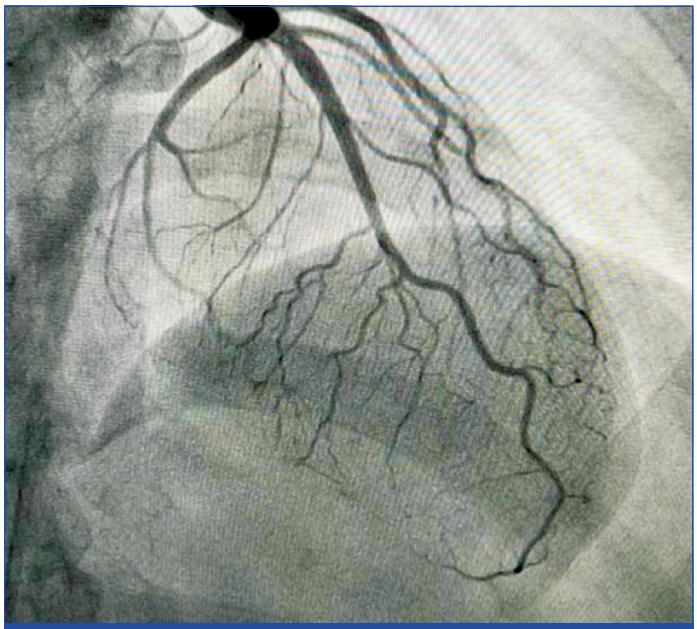


[Table/Fig-3]: ECG showing ischaemic changes.

[Table/Fig-4]: Echo showing global hypokinesia.



[Table/Fig-5]: Chest X-ray showing aspiration pneumonitis.



[Table/Fig-6]: Normal coronaries in angiography.

DISCUSSION

Suicide is an important cause of mortality and morbidity worldwide in adults [1]. According to the World Health Organisation (WHO), suicide is a global burden and it is the third leading cause of death in the world. India accounts for being the third largest in the world in terms of female suicides yearly [2]. Hanging is an important method of suicide. In suicidal hanging, the mechanism of death is usually cerebral hypoperfusion, whereas in judicial drop-hanging, the cause is fracture of the axis pedicle [3]. Neurological deficits, cardiac arrest, and cardiovascular complications are common following attempted hanging. The prognosis of hanging is generally poor, particularly in people with cardiopulmonary arrest [4]. This patient was a young female with attempted suicidal hanging and no apparent deficits on admission.

These patients pose several anaesthetic challenges, particularly for airway management strategies. This particular patient had no significant airway injuries necessitating intubation, but was electively intubated in view of worsening GCS. Imaging studies revealed features of aspiration pneumonitis, which was treated with antibiotics and positive pressure ventilation. Tracheal and laryngeal cartilage trauma, aspiration, and laryngeal oedema can be encountered following near hanging, which can pose a significant challenge for placing an endotracheal tube [5]. A case report by O'Connor PJ et al., emphasised the anaesthetic implications of laryngeal trauma and the difficulties in airway management, stressing the importance

of being prepared for a difficult airway with operating room and ENT backup [6]. Hypoxia and ischaemia can lead to pulmonary oedema and acute respiratory distress syndrome [5]. Neurological deficits including cerebral oedema and hypoxic brain damage, can lead to delayed recovery and make the patient prone to prolonged ventilation-related complications [5].

Various adverse cardiovascular outcomes, such as carotid artery dissection or occlusion, heart block, ventricular tachycardia, ventricular fibrillation, stress cardiomyopathy-Takotsubo syndrome, have been reported following attempted hanging [7]. In this case, the patient did not have any chest pain or elevation of cardiac enzymes, but echocardiography revealed global hypokinesia with a decreased ejection fraction and angiography was found to be normal. Takotsubo cardiomyopathy, also called transient left ventricular ballooning syndrome or stress-induced cardiomyopathy, is characterised by transient Left Ventricle (LV) dysfunction in the absence of angiographic coronary stenosis. It is provoked by an episode of emotional or physical stress. It makes up for 1 to 2% of patients suspected of having acute coronary syndrome [8]. It is known to mimic acute coronary syndrome presenting with chest pain, elevation of Troponin levels, T-wave and ST-segment abnormalities on electrocardiogram and left ventricular regional wall motion abnormalities [9]. A case report by Sengupta S et al., described two patients who presented with heart failure and desaturation around 12 hours after hanging with ECG findings of ischaemia and Echo findings of left ventricular ballooning and hypokinesia, with normal angiographic findings, who were treated with supportive failure management and made a full recovery [9].

The exact aetiology of this condition is still not clear. The high catecholamine levels seem to be a triggering factor, as they damage cardiac muscle directly, which could be the cause in this patient. The excessive circulating epinephrine induces epicardial coronary spasm, causing microvascular dysfunction and spasm [10]. The negative inotropic effect due to an anomaly in the intracellular calcium metabolism can also cause myocardial damage [11]. The mental stress because of the state of increased sympathetic tone can also cause vasoconstriction in patients without coronary disease. In an angiographic study of patients with takotsubo cardiomyopathy by Kurisu S et al., 70% had coronary spasm and electrocardiographic evidence of ST-segment elevation, which was absent in this patient [12]. Rather the patient had non-specific ST segment depression in leads V3, V4 and V5 and normal coronaries. In this case exact apical ballooning of cardiac morphology is not present, but a part of this syndrome is seen in the form of LV dysfunction with global hypokinesia.

The treatment of this condition is focused on supportive care with management of complications with drugs like ACE inhibitors and beta blockers. This patient had a successful recovery with improvement in echocardiographic findings on regular follow-up.

CONCLUSION(S)

Patients with hanging can present with stress-induced cardiomyopathy, which is characterised by transient left ventricular dysfunction caused by intense emotional and physical stress. Though rare, its incidence is on the rise, particularly in women. The definitive cause is still unknown but postulated to be due to the catecholamine surge or oxidative inflammatory injury that causes cardiomyocyte toxicity and coronary vascular dysfunction. Early recognition can lead to timely intervention and with vigilant and aggressive monitoring, the patients can make a successful recovery.

REFERENCES

[1] Nagar N, Bastia BK. The demographic profile of suicidal hanging deaths in North India. Cureus. 2022;14(10).
[2] Sharma S, Kumar R. Suicide rates in India and its implications for National Mental Health Programme. Delhi (IN): Population Research Centre, Institute of Economic Growth; 2024.
[3] Coombs AE, Ashton-Cleary D. Hanging and near-hanging. BJA Education. 2023;23(9):358-63.
[4] Jin U, Park JS, Min YG, Yang HM, Lim HS, Choi BJ, et al. Hanging-associated left ventricular systolic dysfunction. Resuscitation. 2015;88:01-05.
[5] Gandhi R, Taneja N, Mazumder P. Near hanging: Early intervention can save lives. Indian J Anaesth. 2011;55(4):388-91.
[6] O'Connor PJ, Russell JD, Moriarty DC. Anesthetic implications of laryngeal trauma. Anesth Analg. 1998;87(6):1283-84.
[7] Sawamoto K, Hase M, Uemura S, Kasai T, Narimatsu E. Takotsubo cardiomyopathy induced by suicidal neck hanging. J Emerg Med. 2015;48(2):e35-e38.
[8] Gianni M, Dentali F, Grandi AM, Sumner G, Hiralal R, Lonn E. Apical ballooning syndrome or takotsubo cardiomyopathy: A systematic review. Eur Heart J. 2006;27(13):1523-29.
[9] Sengupta S, Mungulmare K, Wadaskar N, Pande A. Inverted Takotsubo cardiomyopathy after attempted suicidal hanging–Two cases. Ind Heart J. 2016;68:S52-S56.
[10] Khalid N, Iqbal I, Coram R, Raza T, Fahsah I, Ikram S. Thrombolysis in myocardial infarction frame count in Takotsubo cardiomyopathy. Int J Cardiol. 2015;191:107-08.
[11] Ramaraj R, Movahed MR. Reverse or inverted takotsubo cardiomyopathy (reverse left ventricular apical ballooning syndrome) presents at a younger age compared with the mid or apical variant and is always associated with triggering stress. Congest Heart Fail. 2010;16(6):284-86.
[12] Kurisu S, Sato H, Kawagoe T, Ishihara M, Shimatani Y, Nishioka K, et al. Tako-tsubo-like left ventricular dysfunction with ST-segment elevation: A novel cardiac syndrome mimicking acute myocardial infarction. Am Heart J. 2002;143(3):448-55.

PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Anaesthesiology, Bhaarath Medical College and Hospital, Affiliated to BIHER, Chennai, Tamil Nadu, India.
2. Assistant Professor, Department of Anaesthesiology, Bhaarath Medical College and Hospital, Affiliated to BIHER, Chennai, Tamil Nadu, India.
3. Consultant Cardiologist and Assistant Professor, Department of Medicine, Bhaarath Medical College and Hospital, Affiliated to BIHER, Chennai, Tamil Nadu, India.
4. Assistant Professor, Department of Anaesthesiology, Bhaarath Medical College and Hospital, Affiliated to BIHER, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Aishwarya Ramanathan,
Flat B-2-1, Ruby Grand Aparatment, Agaram Main Road, Tiruvancherry, Selaiyur,
Chennai-600126, Tamil Nadu, India.
E-mail: ashirocks1989@gmail.com

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