CRITICAL ROUNDS

MICRO LABS LIMITED

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Dear Doctor,

Greetings from Micro Labs limited. We are happy to bring "CRITICAL ROUNDS" containing latest information in the field of Critical care medicine.

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Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Ltd

Cardioembolic Stroke with Peripartum Cardiomyopathy: An Unusual Presentation

Background:

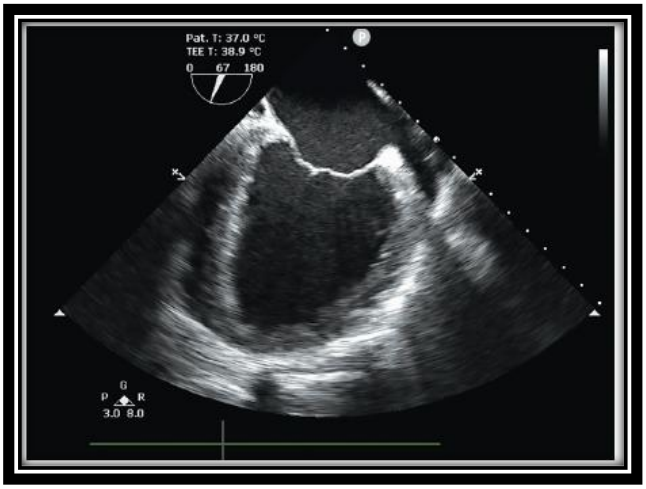
Acute ischemic stroke during a peripartum period is uncommon and is usually associated with either hypertensive disorder of pregnancy or pre-existing chronic hypertension. Cardioembolic stroke in PPCM is reported very rarely. The etiopathogenesis of PPCM is unclear. There is a higher incidence of systemic and pulmonary thromboembolic events in patients of PPCM. The hypercoagulable state of the peripartum period itself, enlarged cardia, endothelial injury, and additionally, immobility may be contributing to the increased propensity of thromboembolism. The majority of the PPCM is postpartum within the first week of delivery and symptoms like orthopnea, paroxysmal nocturnal dyspnea. There are no recommendations available for the management of stroke in such patients. There is also controversy regarding the use of anticoagulation to prevent stroke recurrence in patients with PPCM because of the risk of intracranial hemorrhage (ICH). Recent guidelines recommend anticoagulation therapy can be used within 4–14 days after stroke in the setting of atrial fibrillation with cardioembolic stroke. The guidance in the case of cardiomyopathy is still unclear. The consensus management of PPCM recommends anticoagulation during pregnancy and up to two months postpartum along with heart failure medications till recovery of left ventricle function.

Case Description

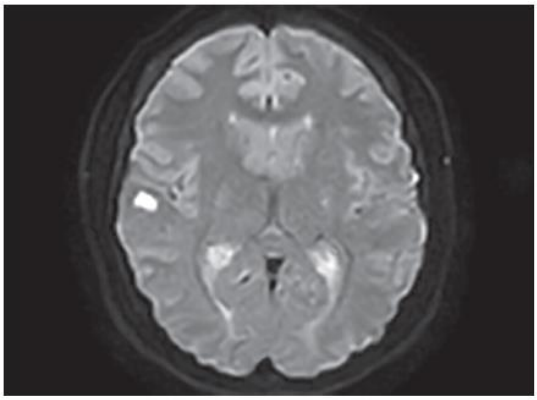
A 39-year-old woman presented with left-sided numbness and weakness, facial asymmetry, and difficulty in speech for one hour. Patient had delivered two months back. On neurological examination, patient had dysarthria, left sided hypoesthesia, upper motor neuron seventh nerve palsy, and left hemiparesis; National Institutes of Health Stroke Scale (NIHSS) score 8. On examination, patient was dyspneic, tachypnea (respiratory rate 24/minute), pulse 104/minute, SpO2 89%, respiratory examination showed bilateral crepitations. Bedside transthoracic echocardiography (TTE) showed global hypokinesia of left ventricle (LV) with ejection fraction (EF) 30%, mild-to moderate mitral regurgitation. Started on noninvasive ventilation and oxygen for acute heart failure. The computed tomography (CT) brain showed no

abnormality and patient was thrombolyzed with intravenous alteplase. Transesophageal echocardiography showed no intracardiac thrombus.

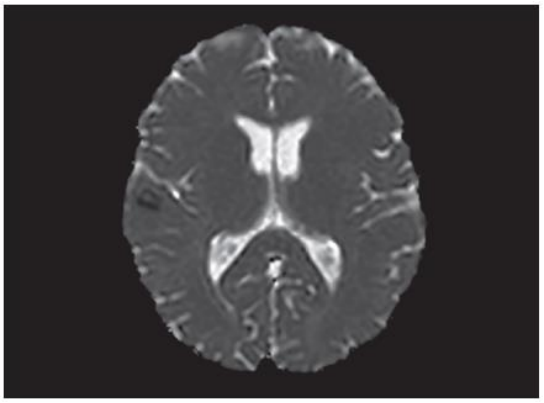
Transesophageal echocardiography showed global hypokinesia of left ventricle and no intracardiac thrombus



Started on other anti-heart failure medications, candesartan, bisoprolol, and aldactone in the next 72 hours. The enoxaparin at 1 mg/kg body weight 12 hourly was started after 24 hours of thrombolysis and repeat CT scan showed no hemorrhage. The magnetic resonance imaging (MRI) brain after 72 hours of thrombolysis showed multiple focal areas of acute ischemic infarct in the right centrum semiovale and frontal parieto-temporal region with normal carotid and cerebral vessels Doppler.



MRI diffusion sequence showing one of the infarct areas in right frontal-parieto-temporal region



MRI showing apparent-diffusion coefficient (ADC) sequence taken from the same area

Patient's thrombophilia profile was normal. Patient was started on warfarin after 5 days and enoxaparin was stopped after International Normalized Ratio (INR) increased above 2. Patient was discharged on the 8th day with warfarin, candesartan, bisoprolol, and aldactone and necessary education on INR monitoring. Followed for 5 months and warfarin was stopped after 4 months and serial TTE showed resolution of cardiomyopathy.

Conclusion:

Acute ischemic cardioembolic stroke is a rare presentation of PPCM and requires standard management of heart failure with anticoagulation. This case highlights the importance of consideration of anticoagulation to prevent thromboembolism in patients with PPCM.

Source: Nasa. P et al. Cardioembolic Stroke with Peripartum Cardiomyopathy: An Unusual Presentation. Indian Journal of Critical Care Medicine; Volume 25 Issue 1 (January 2021)

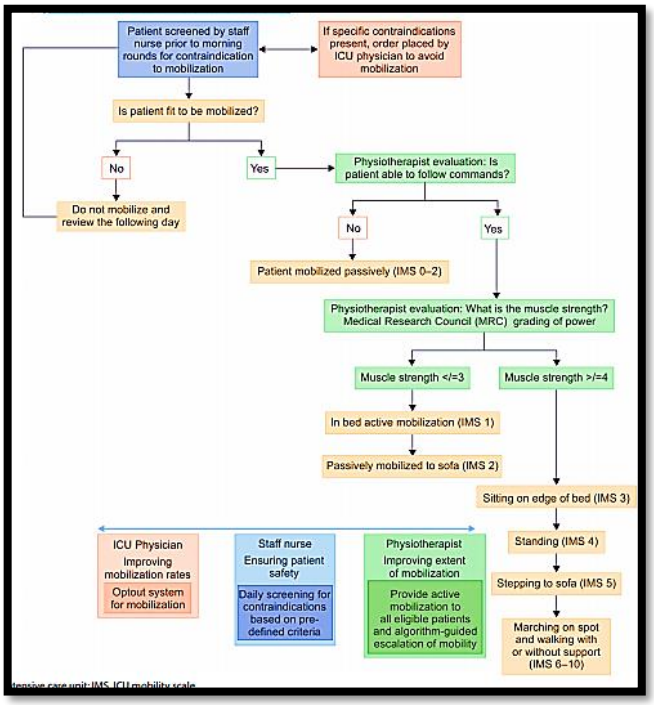
Improving Mobility in Critically Ill Patients in a Tertiary Care ICU: Opportunities and Challenges

Introduction:

Patients in the intensive care unit (ICU) are prone to prolonged periods of bed rest secondary to critical illness and the treatments they receive such as mechanical ventilation, vasopressors, and renal replacement therapy. Data suggest that physical impairment can affect nearly half of the patients admitted to ICUs and that 50% of those are unable to return to premorbid levels of functional activity at 1 year after discharge. This ICU-acquired weakness is associated with poor functional outcomes and increased mortality. There is limited data from India and South Asia on mobilization practices for critically ill patients. In India, a survey among ICU physicians reported that 92% of respondents were aware of the benefits of mobilization, yet remained apprehensive of adverse events.

Materials and methods: A three-phase Quality Improvement (QI) project, and the study was conducted in our 24-bedded ICU. Pre-intervention and post-intervention mobilization performance and scores were analyzed. We also recorded data on adverse events and barriers to mobilization. Descriptive statistics were used to report all the results.

Protocol for mobilization in the intensive care unit



Results: A total of 140 patients (1,033 patient days) and 207 patients (932 patient days) were included in our initial audit and post-implementation audit, respectively. In pre-implementation, 31.3% of patients were mobilized with an average mobility score of 2 and this improved to 57.9% with average mobility score of 3.4. Additionally, we demonstrated improvements in the mobility scores of our intubated patients (49.8% achieving a mobility score of 3–5 as compared to 16.7%).

MOBILIZATION LEVEL ACHIEVED

	Pre-intervention	*Post-intervention*	*p value*
All patient days	*N* = 1033	*N* = 932	
Total number of days mobilized	323 (31.3% of total days)	540 (57.9% of total days)	<0.00001
Average mobilization per IMS	2	3.4	
1—Active movement in bed (%)	193 (59.7%)	161 (29.8%)	<0.001
2—Mobilized passively out of bed (%)	68 (21.1%)	44 (8.1%)	<0.001
3–5—Sitting on side of bed, stepping to chair, standing (%)	54 (16.7%)	269 (49.8%)	<0.001
6–10—Marching, walking with and without support (%)	8 (2.5%)	66 (12.2%)	<0.001
Endotracheal tube			
Number of days with endotracheal tube (%)	480 (46.47%)	406 (43.6%)	0.19
Number of days mobilized	80	110	
IMS 1 (%)	78 (97.5%)	80 (72.7%)	<0.001
IMS 2 (%)	1 (1.25%)	7 (6.4%)	0.083
IMS 3–5 (%)	1 (1.25%)	20 (18.2%)	0.0002
IMS 6–10 (%)	0	3 (2.7%)	0.13
Tracheostomy			
Number of days with tracheostomy	193 (18.68%)	61 (6.5%)	<0.001
Number of days mobilized	69	45	
IMS 1 (%)	22 (31.9%)	19 (42.2%)	0.26
IMS 2 (%)	42 (60.9%)	0	<0.001
IMS 3–5 (%)	5 (7.2%)	26 (57.8%)	<0.001
IMS 6–10 (%)	0	0	–

Discussion:

This study describes the mobilization practices from a large tertiary care ICU in Southern India and the challenges and barriers. Initial audit revealed a low mobilization rate of 31.3% and that, patients when mobilized, achieved a low mobilization score (average IMS of 2). Collaborative QI initiative resulted in important improvements on both counts—were able to mobilize patients on 57.9% of their ICU days and were able to improve the highest level of mobilization achieved (average IMS of 3.4). Internationally, there is wide variability in the performance of ICUs as far as early mobilization is concerned. The baseline rates of mobilization were comparable to a point-prevalence study across 42 ICUs in the United States (mobilization rate of 32%). Globally, barriers to mobilization include disease severity, sedation requirement, mechanical ventilation, presence of multiple invasive lines and tubes, and physiological

instability. Broadly, the barriers identified are similar to those reported in other studies, chief among which is non-modifiable disease-related factors. Some specific barriers such as lack of couches and manpower, which were reported during our informal audits, are likely common to other resource-limited settings

Conclusion: A multidisciplinary approach is feasible and resulted in significant improvements in early mobilization among critically ill adults.

Source: Mohan S, Patodia S, Kumaravel S, Venkataraman R, Vijayaraghavan BKT. Improving Mobility in Critically Ill Patients in a Tertiary Care ICU: Opportunities and Challenges. Indian J Crit Care Med 2021;25(1):34–42.

Clinical Profile and Outcome of Critically Ill Patients with Tuberculosis

Introduction: Tuberculosis (TB) remains a major public health problem, particularly in low- and middle-income countries. India accounts for the highest incidence of TB, including multi-drug resistant TB and features among the top countries of TB associated with human immunodeficiency virus (HIV) infection. Despite curative therapy, TB is the leading cause of infectious disease deaths, with almost 2 million deaths annually. There is limited information on the outcome of TB patients who require intensive care unit (ICU) management. There are studies that have profiled patients with TB and evaluated for factors associated with poor outcomes. In these studies, mortality ranged from 21.6% in developed countries to 81%20 in those requiring mechanical ventilation. High APACHE-II score, severe respiratory failure, coinfection with HIV, and multi-organ failure were some factors associated with unfavorable outcome. In developing countries, delayed diagnosis and drug resistance may additionally contribute to poor outcome. Majority of these studies looked at critically ill patients with pulmonary TB. It is unclear whether the type of TB impacts outcomes, as studies have suggested that pulmonary TB and miliary TB are associated with poor outcome.

Objective: Although studies have described the clinical profile of patients admitted to the intensive care unit (ICU) with tuberculosis, it is unclear if the type of tuberculosis (pulmonary, extrapulmonary, or disseminated) impacts outcome.

Matrials and methods: Demographic data, microbiology, treatment, and outcomes over 5 years (2012–16) were obtained from electronic records. Patients were categorized as pulmonary, extrapulmonary, or disseminated tuberculosis. Comparisons were done using t test and Fisher's exact test as appropriate. Predictors of outcome were explored using bivariate and multivariate logistic regression analysis and expressed as odds ratio (OR) with 95% confidence intervals (CI).

Processes in tuberculosis that may require intensive care admission and management

Site	*Primary process*	*Secondary process**
Parenchymal lung	Fibrocavitary disease	Bacterial infection
	Miliary TB	Fungal (e.g., aspergillosis) infection
	Tuberculous ARDS	TB sequel (e.g., fibrosis)
	TB bronchopneumonia	Immune reconstitution
		Hemoptysis (Rasmussen aneurysm)
Pleural disease	TB pleural effusion	Pneumothorax
	TB empyema	
Central nervous system	TB meningitis	Noncommunicating hydrocephalus
	Basal arachnoiditis due to TB	Seizures
	Tuberculoma	Electrolyte abnormalities
	TB brain abscess	
Abdominal tuberculosis	Massive ascites	Secondary sepsis
	Intestinal obstruction	
Pericardial tuberculosis	Pericardial tamponade	Organ dysfunction secondary to heart failure
	Constrictive pericarditis	
Musculoskeletal tuberculosis	Psoas abscess	Paraplegia
		Superimposed bacterial infection
TB lymphadenopathy	Airway obstruction	
Disseminated TB	Multi-organ dysfunction	Secondary sepsis
	Hypotension†	

Results: Of the 428 ICU admissions with suspected tuberculosis, 212 (121 male) patients with mean (standard deviation) age of 41.9 (16.7) years and APACHE-II score of 20.8 (6.6) were diagnosed as pulmonary (n = 55) and extrapulmonary (n = 52) or disseminated tuberculosis (n = 105). In 50.5%, the diagnosis of tuberculosis was established during the current ICU admission when they presented with organ dysfunction. Overall, microbiological confirmation was possible in 75.5%; 14 (10.3%) isolates were Rifampicin resistant. ICU admission was required primarily for ventilation (n = 176; 83%) and hemodynamic instability (n = 67; 32%).

Factors associated with mortality

	Bivariate analysis			Multivariate analysis		
Factor	*OR*	*95% CI*	*p value*	*OR*	*95% CI*	*p value*
Age*	1.02	1.0–1.03	0.05	1.0	0.98–1.02	1.0
APACHE II*	1.11	1.06–1.17	<0.001	1.06	1.1–13	0.09
Gender* (male)	1.65	0.96-2.86	0.07	2.16	0.99 – 4.70	0.053
Pulmonary site*	1.73	0.93–3.22	0.09	2.83	1.15–6.95	0.02
Vasoactive support*	9.3	4.7–18.3	<0.001	15.8	6.4–39.2	<0.001
Ventilation	15.2	3.5–66.3	<0.001			
Dialysis*	5.6	1.83–17	<0.003	3.63	0.87–15.1	0.08
Ventilation duration	0.97	0.93–1.02	0.23			
VFD	1.03	0.98–1.08	0.32			
HAI	1.37	0.72–2.6	0.33			

Hospital mortality was 50%. Outcomes were similar in the three groups except for longer duration of stay (p value = 0.04) in disseminated tuberculosis. On multivariate logistic regression analysis, pulmonary tuberculosis (OR 2.83; 95% CI 1.15–6.95) and vasoactive treatment (OR 15.8; 95% CI 6.4–39.2) were independently associated with death; need for ventilation predicted mortality perfectly.

Conclusion: In this cohort of patients admitted to ICU with tuberculosis, 50% were newly diagnosed during ICU admission. Pulmonary site of involvement and need for organ support are independent risk factors for death.

Source: Thomas L, Chacko B, Jupudi S, Mathuram A, George T, Gunasekaran K, *et al.* Clinical Profile and Outcome of Critically Ill Patients with Tuberculosis. Indian J Crit Care Med 2021;25(1): 21–28.