



**ORIGINAL RESEARCH PAPER**

**General Surgery**

**INCIDENCE OF ACUTE LIMB ISCHEMIA IN COVID POSITIVE PATIENTS IN RGGGH, CHENNAI**

**KEY WORDS:**

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**INTRODUCTION :**

Acute Limb Ischemia is defined as any sudden decrease in limb perfusion causing potential threat to limb viability. It can be caused by embolism or thrombosis. Commonly affects arteries of lower extremities. The risk factors for ALI can be multifactorial. The commonest include embolic predisposition like atrial fibrillation or coronary artery disease, trauma or thrombosis due to atherosclerosis or hypercoagulable state like malignancy, leukemia, Antiphospholipid syndrome, protein C /S/ antithrombin deficiency, polycythemia vera, thrombocytosis.

Thrombosis of a bypass graft is common in western countries which occurs at the site of anastomosis. A sudden and significant increase of COVID-19-infected patients who were presenting with ALI has been noted at our institutions recently. A prothrombotic state, is present in patients with severe COVID-19 illness, where increased fibrin and fibrin degradation products are noted. This has been shown to adversely increase the severity of ALI and affect outcomes

**AIMS AND OBJECTIVES**

The aim of our study was to determine the incidence of Acute Limb Ischemia to general surgery department in RGGGH, Chennai.

**METHODS:**

This is a prospective observational study. From the COVID 19 positive callovers given to the general surgery department, the incidence of Acute Limb Ischemia (ALI) was noted from July 2020 to October 2020. The diagnosis was acute limb ischemia was based upon history, physical examination - the common 5 Ps ( pain, paraesthesia, paresis, poikilothermia, pulselessness and pallor) including assessment of Ankle Brachial Pressure Index (ABPI) bilaterally, sensory and motor impairment and hand doppler arterial and venous signals. The severity of Acute Limb Ischemia was then graded according to Rutherford classification.

Category	Sensory impairment	Motor impairment	Arterial Doppler signal	Venous Doppler signal
Class I Viable - No immediate threat	No	No	Audible	Audible
Class IIa Marginally threatened	Minimal in the toes) or none	No	Often inaudible	Audible
Class IIb Immediately threatened	Involves forefoot ± Rest pain	Mild to moderate	Usually inaudible	Audible
Class III Irreversible	Anaesthetic	Paralytic / rigor	Inaudible	Inaudible

**Fig 1 : Rutherford Classification Of Acute Limb Ischemia**

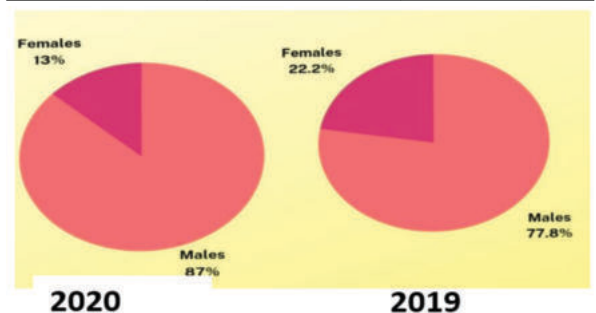


**Fig 2: Edinburgh Peripheral Arterial Disease Questionnaire**

**RESULTS :**

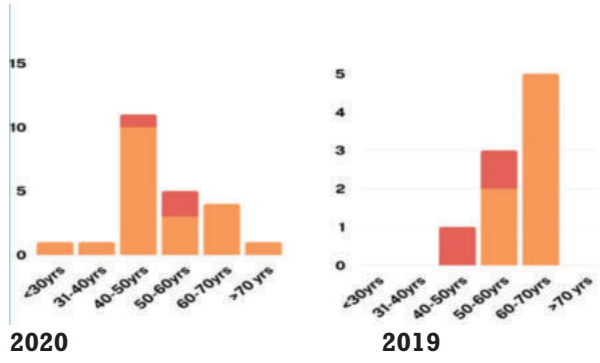
We collected data from 23 patients of ALI out of the COVID 19 positive callovers from the period of July 2020 to October 2020. The incidence rate of patients presenting to general surgery department with ALI between July 2020 to October 2020 (23- all 23 were covid positive already) was significantly greater than July 2019 to October 2019 (9). Also out of the 23, majority were (19) were belonging to class 2b or 3 of Rutherford classification of ALI.

Year	2020	2019
MALES	20 (87%)	7 (78%)
FEMALES	3(13%)	2(22%)
TOTAL CENSUS	23	9



**Fig 3 : Showing Sex Incidence :**

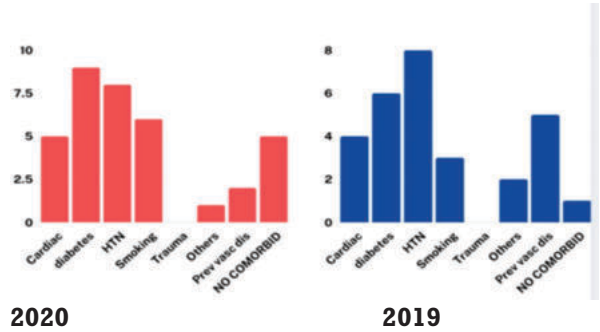
AGE	MALE		FEMALE	
	2020	2019	2020	2019
<30 yrs	1			
31-40 yrs	1			
41-50 yrs	10		1	
51-60yrs	3		2	1
61-70yrs	4		5	
>70yrs	1			



**Fig 4 : Showing Age Incidence**

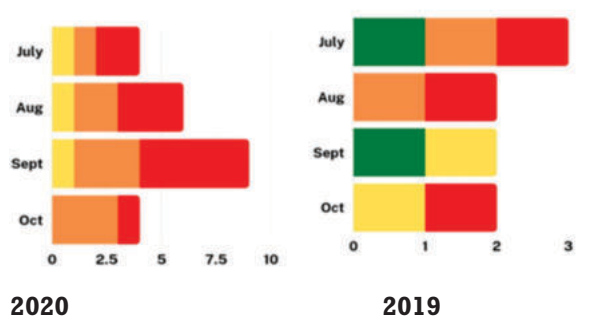
RISK FACTORS	2019	2020
CARDIAC DISEASE	4	5
DIABETES	6	9
HYPERTENSION	8	8
SMOKING	3	6
TRAUMA	0	0
OTHER HYPERCOAGULABLE STATES	2	1
PREVIOUS VASCULAR DISORDERS	5	2
NO COMORBIDS	1	5

**Fig 5 Showing Risk Factor Assessment**



**Fig 6 Showing Severity Of Acute Limb Ischemia According To Rutherford Classification**

GRADE	JULY		AUG		SEPT		OCT	
	2020	2019	2020	2019	2020	2019	2020	2019
1		1				1		
2A	1		1		1	1		
2B	1		2	1	3			
3	2	2	3	1	5		1	2



**DISCUSSION:**

Acute limb ischemia (ALI) presents as sudden lower limb ischemia that can result in amputation, regardless of the underlying cause, unless appropriate treatment is administered. It has poor prognosis not only for the limb but also for survival. It has a reported mortality rate of 15%–20% due to concurrent illness such as cardiovascular or cerebrovascular disease and ischemia-reperfusion injury. The reported incidence of ALI is 1–1.5 individuals per

10,000 individuals per year. The causes of ALI, excluding trauma, are broadly divided into embolism and thrombosis.

Most cases of embolism are cardiogenic embolism, among which atrial fibrillation accounts for the majority. Other causes include valvular diseases, including post-valve replacement, left ventricular wall thrombosis following myocardial infarction, cardiac/aortic tumor, and paradoxical embolism. When surgical treatment is performed for embolism of unknown etiology without arrhythmia, a pathological specimen should be submitted for analysis to differentiate malignant tumors. Generally, the most common site of embolism is the femoral artery.

ALI due to peripheral embolism caused by popliteal artery aneurysm and thrombotic occlusion of an actual aneurysm are not rare and require another caution. Thrombosis occurs when chronic stenotic lesions in occlusive atherosclerosis cause acute obstruction resulting from plaque breakdown, circulatory failure, or a hypercoagulable state. This also includes thrombotic occlusion of stents and bypass grafts. The embolus can be trapped at stenotic lesions of arteriosclerosis obliterans, and it is often difficult to clearly distinguish embolism from thrombosis. Furthermore, in aortic dissection, compression of the true lumen by the false lumen can cause lower limb ischemia.

COVID 19 creates a profound prothrombotic milieu leading to both arterial and venous thrombosis. Consistently, elevated D-dimer level has emerged as an independent risk factor for poor outcomes, including death. However, a growing body of data suggests that the initial events occur in the lung. A severe inflammatory response, originating in the alveoli, triggers a dysfunctional cascade of inflammatory thrombosis in the pulmonary vasculature, leading to a state of local coagulopathy. This is followed, in patients with more severe disease, by a generalized hypercoagulable state that results in macro- and microvascular thrombosis. Proposed hypotheses include a severely heightened inflammatory response that leads to thrombo-inflammation, through mechanisms such as cytokine storm, complement activation, and endotheliitis. It has also been suggested that the virus itself can possibly activate the coagulation cascade.

**CONCLUSION:**

There is increased incidence and severity of Acute Limb Ischemia in COVID 19 positive cases in RCGGH, Chennai. Early diagnosis and treatment will aid in limb salvaging along with reduction in morbidity and mortality. Early administration of prophylactic anticoagulation for all moderate and severe cases of COVID 19 will reduce the prothrombotic milieu which increases the risk of Acute Limb Ischemia.

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