

Incidence of Acute Mesenteric and Limb Ischemia in Post COVID19 Patients: A Retrospective Comparative Study

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Abstract: ***Background:** Acute Mesenteric Ischemia (AMI): Acute mesenteric ischemia is a sudden loss of blood flow to a portion of the small intestine, which can lead to tissue death if not treated promptly. It is often caused by an embolus, thrombosis, or non-occlusive ischemia, usually in the superior mesenteric artery. AMI presents with severe, diffuse abdominal pain that is disproportionate to physical findings, accompanied nausea, vomiting, and sometimes bloody diarrhea. It is a life-threatening condition requiring immediate intervention, typically surgical or endovascular, to restore blood flow. Delay in treatment can lead to bowel necrosis, sepsis, and death if left untreated. Acute Limb Ischemia (ALI): Acute limb ischemia refers to a sudden decrease in limb perfusion that threatens the viability of the limb. It is commonly caused by embolism, thrombosis, or trauma. Symptoms include the "6 P's": pain, pallor, pulselessness, paresthesia, paralysis, and poikilothermic (coldness). The rapid progression of symptoms necessitates urgent intervention or delay in the treatment can lead to sepsis, gangrene and to death if left untreated. **Objective:** To assess the occurrence of vascular complications in POST COVID-19 patients and to study the relation of risk factor associated with the covid affected patient in ALI and AMI and the morbidity and mortality. **Results:** The study investigates the incidence of Acute Mesenteric Ischemia AMI and Acute Limb Ischemia ALI in postCOVID19 patients. Using a retrospective analysis of patients treated in a tertiary hospital, we evaluate the impact of COVID19 on the incidence of vascular complications. The results indicate a significant rise in both AMI and ALI, particularly among men with comorbid conditions such as smoking. The study emphasizes the importance of early diagnosis, surgical intervention, and the need for prophylactic measures to reduce morbidity and mortality.*

Keywords: vascular complications, post COVID-19, acute mesenteric ischemia, acute limb ischemia, morbidity and mortality

1. Introduction

Acute ischemia is a group of disease characterized by an interruption of the blood supply to various portion of the body. various factor affect acute ischemia in the patient like dehydration, diabetes, hypertension, hypercoagulable state, arrhythmia, post covid patients, atherosclerosis, trauma and other factors

The acute ischemia had been increased since post covid era. so the aim of this study is to relate the factors associated with acute ischemia

Acute Mesenteric Ischemia (AMI):

Acute mesenteric ischemia is a sudden loss of blood flow to a portion of the small intestine, leading to tissue death if not promptly treated. It is often caused by an embolus, thrombosis, or non-occlusive ischemia, usually in the superior mesenteric artery. AMI presents with severe, diffuse abdominal pain that is disproportionate to physical findings, nausea, vomiting, and sometimes bloody diarrhea. It is a life-threatening condition requiring immediate intervention, typically surgical or endovascular, to restore blood flow. Delay in treatment can lead to bowel necrosis, sepsis, and death.

Acute Limb Ischemia (ALI):

Acute limb ischemia refers to a sudden decrease in limb perfusion that threatens the viability of the limb. It is commonly caused by embolism, thrombosis, or trauma. Symptoms include the "6 P's": pain, pallor, pulselessness, paresthesia, paralysis, and poikilothermia (coldness). The

rapid progression of symptoms necessitates urgent intervention or delay in the treatment can lead to sepsis, gangrene and to death.

SARS-CoV-2 rapidly disseminated across the world in a short span of time.¹

SARS-CoV-2 infects the host using the angiotensin converting enzyme 2 (ACE2) receptor, ACE2 receptors are expressed by several organs but more importantly expressed by endothelial cells.²

Endothelial dysfunction inevitably leads to a pro-inflammatory state and a pro-coagulant state by shifting the vascular equilibrium towards more vasoconstriction which leads to ischemia and is considered as marker for atherosclerosis.³

There is also additional evidence that hyper-coagulability state is caused by either a direct complement-mediated effect of the virus or an antibody mediated immunological response.⁴ This was evidenced by the increase in D-dimer and Prothrombin time in COVID-19 patients, and more so in ICU patients.⁵ This prothrombotic and pro coagulation state would eventually lead to a rise of surgical complications such as Acute limb ischemia and Mesenteric ischemia and other surgical emergencies

Objective of the study

The study is undertaken to evaluate the incidence of vascular emergencies like acute limb ischemia and mesenteric ischemia and evaluation of the factors causing them and its

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implications on the limb/bowel salvageability with treatment and overall survival of the patient.

2. Materials and Methodology

Study Design:

A retrospective observational study was conducted from Jan 2023 to mar 2024 in dept. of general surgery in Victoria hospital attached to Bangalore medical college and research institute, Bengaluru

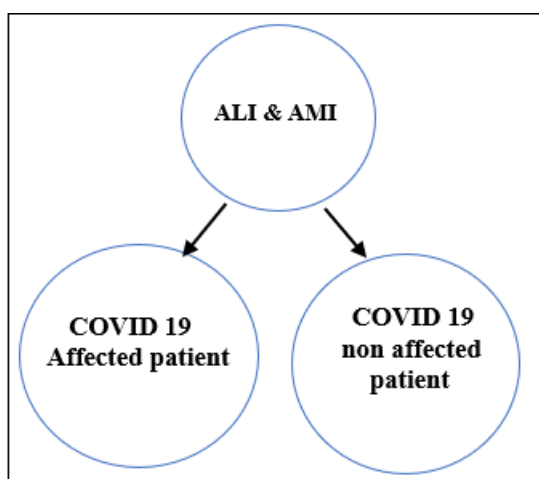
Sample Size

Data collection will be started after obtaining clearance from the institution ethical committee. Patients will be selected from hospitals associated with Bangalore Medical College and Research Institute. Informed consent for the study will be obtained from the patient. Direct interview with the patient and obtaining of detailed history is done regarding age, sex, symptoms and thorough clinical examination and telephonic interview for follow up status assessment.

Patient will be subjected to appropriate investigation pre-operatively with intra-operative findings. All the cases will be followed till discharge. The outcome will be measured in term of need for medications and need surgery procedure and outcome of the surgical intervention.

Statistical analysis:

- The data collected will be analysed statistically using descriptive statistics namely mean, standard deviation, percentage wherever applicable.
- Appropriate Parametric and non-parametric tests will be used.



Inclusion criteria:

- 1) Patient of age group more than 18 years

- 2) Patient who has given consent for the study
- 3) Patient diagnosed with Acute Limb Ischemia, clinically diagnosed using the Rutherford and Fontaine Classification
- 4) Patient diagnosed with Mesenteric ischemia using CECT
- 5) Patient who had diagnosed with RT PCR covid 19 positive.

Exclusion criteria:

- 1) Patient below the age of 18 years of age
- 2) Patient who does not give consent for the study
- 3) Patient who has not been RT PCR COVID 19 positive

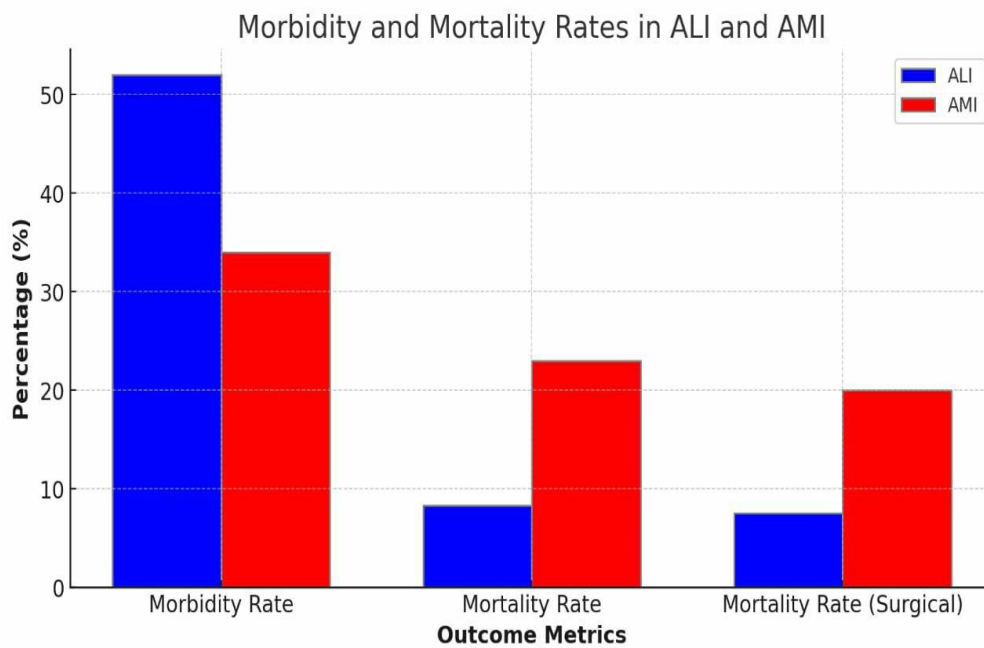
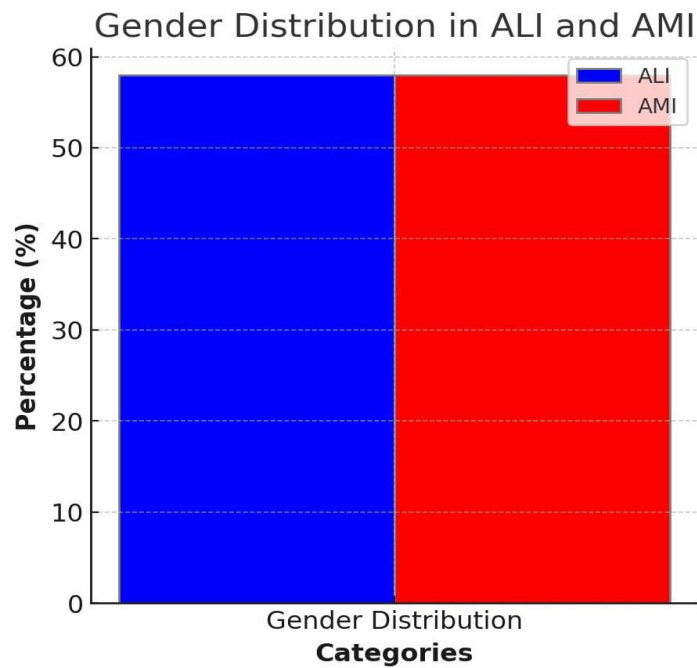
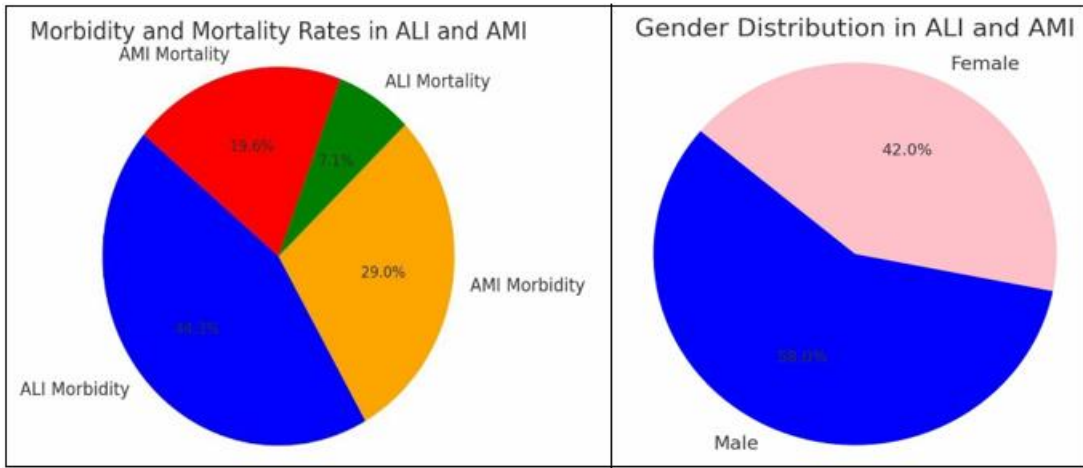
3. Results

The study result from Jan 2023 to Apr 2024 showed the increase in the vascular insult post covid era. i. e., raise in the incidence of the vascular insult. in this study the study examined AMI and ALI, the study showed raise in the significant incidence i. e., 1.4% to 3.2% in AMI, 3.7% to 9.5% in ALI after the covid in the Victoria hospital which was a epicentre during covid for Karnataka.

The total no. of patients came to Victoria hospital from Jan 2023 to Apr 2024 where 82 AMI and 190 ALI in that the history was taken of covid 19 and RTPCR positive history was considered and the 48 AMI and 86 ALI.

	AMI	ALI	P value
Early age of incidence	42.3 years	56 years	significant
Comorbidities			
Smoking			Significant
Diabetes			Non significant
Hypertension			Non significant
Alcohol			Non significant
IHD			Non significant
Incidence rate	3.1%	1.8%	significant
Death	8.3%	23%	Non significant
Covid vaccination	30%	25%	significant

The study examined for 272 patient 82 AMI AND 190 ALI retrospectively analysis of prospective collected data out of which 48 AMI and 86 ALI where covid 19 affected patients, p value was significant in the early incidence of age, co morbidity, incidence rate for both ALI and AMI. The age of the patient was from 20 years to 90 years, with average age being 56 years for ALI and 42 years for AMI mostly being men in both. The patients had treated according to the symptoms and was considered conservative/operative measure. the morbidity and mortality of the patients showed significant raise with covid 19 affected patients then the non



Gender	AMI	ALI	TOTAL
Male	35	58	73
Female	13	28	27
Mean age	42.3yrs	56yrs	
Total	48	86	100

	AMI	ALI
Conservative management	66%	48%
Surgical management	34%	52%
Levels / R n A /Stoma	R AND A – 65% STOMA – 35%	AKA – 68% BKA – 32%
Death	23%	8.3%

4. Discussion

This study was conducted in the Victoria hospital attached to the BMCRI, Bengaluru 1 patient was taken into the study for this study to know the frequency of raise in AMI in covid 19 affected patients. the study was undertaken to see the demographic pattern i. e., raise in vascular complications in tertiary care centre in Karnataka

As the Victoria hospital is the state epicentre hospital of Karnataka, the study was undertaken to know the significant raise in vascular complication in the population covid 19 affected patients. the patient was treated conservative/surgical procedure based on the patient presentation and keeping the life of the patient.

The study investigates the incidence of Acute Mesenteric Ischemia AMI and Acute Limb Ischemia ALI in postCOVID19 patients. Using a retrospective analysis of patients treated in a tertiary hospital, we evaluate the impact of COVID19 on the incidence of vascular complications. The results indicate a significant rise in both AMI and ALI, particularly among men with comorbid conditions such as smoking. The study emphasizes the importance of early diagnosis, surgical intervention, and the need for prophylactic measures to reduce morbidity and mortality.

Age

Mostly mean age of incidence of the mesenteric ischemia has been reduced and has been reduced to 42.3years and the ALI been to 56 years

Gender

Mostly being men in both ALI and AMI

Morbidity

The morbid rate was noted to be 52% in ALI and 34% in AMI

Mortality

The mortality rate was noted to be 8.3% in ALI and 23% in AMI in which the patient who was operated was 7.5% in ALI and 20% in AMI

AMI

Mostly being mesenteric artery complete occlusion >> partial occlusion of MA > mesenteric vein occlusion

ALI

Mostly common femoral block till the popliteal artery >> popliteal >> ATA block

COVID 19

Out of the entire cases where covid 19 status was known in our investigation 61% had a history of covid 19 positive and required the surgical treatment in BOTH ALI and AMI. we collected covid 19 history and who where RTPCR positive during the covid 19 era

5. Conclusion

In conclusion, this study highlights a significant increase in vascular complications such as AMI and ALI in post COVID patients. Prompt diagnosis and timely surgical intervention are crucial in mitigating these life-threatening conditions. Further studies should investigate long term outcomes and explore prophylactic treatments to reduce morbidity and mortality in high risk patients.

The incidence in the vascular associated complications have been raised post covid era, that includes not only arterial even venous system which all leads to dreadful complications to the patient including the death. The mesenteric ischemia incidence has raised from 0.2% in pre covid era to 1.8% in post covid era, the ali has seen raised from 1.5% to 3.1% after covid 19. Most patients presented to the hospital late causing priority been given to the life of patient then treating the cause.

Despite advancements in endovascular therapies, the need for amputation and resection has not decreased including the death rate associated with it.

The high risk covid 19 affected patients has to be started with the antiplatelet/blood thinner s by the physicians based on the high risk of thrombosis.

Health education, early diagnosis, prophylactic medication in high risk patient and regular follow up of the patients can help in reducing the morbidity and mortality of the patient. early and easy asses to the vascular specialty can help the patient develop the advanced disease and with timely intervention can lead a normal to near normal life.

This study contributes to understanding the increased risk of ischemic complications in post COVID patients, with implications for improving patient outcomes through early intervention and treatment.

References

- [1] M, C., M, R., A, A., SC, D. and R, D., 2021. *Features, Evaluation, and Treatment of Coronavirus (COVID-19)*. [online] PubMed. Available at: <https://pubmed.ncbi.nlm.nih.gov/32150360/> [Accessed 15 June 2021].
- [2] Varga Z, Flammer A, Steiger P, Haberecker M, Andermatt R, Zinkernagel A et al. Endothelial cell infection and endotheliitis in COVID-19.2021.
- [3] Bonetti P, Lerman L, Lerman A. Endothelial Dysfunction.2021.4. Magro C, Mulvey J, Berlin D, Nuovo G, Salvatore S, Harp J et al. Complement associated microvascular injury and thrombosis in the pathogenesis of severe COVID-19 infection: A report of five cases.2021.

- [4] Middeldorp S, Coppens M, Haaps T, Foppen M, Vlaar A, Müller M et al. Incidence of venous thromboembolism in hospitalized patients with COVID-19.2021.
- [5] Bellosta R, Luzzani L, Natalini G, Pegorer M, Attisani L, Cossu L et al. Acute limb ischemia in patients with COVID-19 pneumonia.2021.
- [6] Deraje V, Gujjalanavar R, Das S, Janardhan R, Rao P. Acute Extremity Gangrene in COVID-19 Patients.2021.
- [7] Kaur P, Qaqa F, Ramahi A, Shamoony Y, Singhal M, Shamoony F et al. Acute upper limb ischemia in a patient with COVID-19.2021.
- [8] Parry A, Wani A, Yaseen M. Acute Mesenteric Ischemia in Severe Coronavirus-19 (COVID-19): Possible Mechanisms and Diagnostic Pathway.2021.
- [9] Singh B, Kaur P. COVID-19 and acute mesenteric ischemia: A review of literature.
- [10] Raghavendra nagaraja. Acute mesenteric ischemia – an Indian perspective
- [11] Varga Z, Flammer A, Steiger P, Haberecker M, Andermatt R, Zinkernagel A et al. Endothelial cell infection and endotheliitis in COVID-19.2021.
- [12] Bonetti P, Lerman L, Lerman A. Endothelial Dysfunction.2021.13. Magro C, Mulvey J, Berlin D, Nuovo G, Salvatore S, Harp J et al. Complement associated microvascular injury and thrombosis in the pathogenesis of severe COVID-19 infection: A report of five cases.2021.
- [13] Middeldorp S, Coppens M, Haaps T, Foppen M, Vlaar A, Müller M et al. Incidence of venous thromboembolism in hospitalized patients with COVID-19.2021.
- [14] Bellosta R, Luzzani L, Natalini G, Pegorer M, Attisani L, Cossu L et al. Acute limb ischemia in patients with COVID-19 pneumonia.2021.
- [15] Deraje V, Gujjalanavar R, Das S, Janardhan R, Rao P. Acute Extremity Gangrene in COVID-19 Patients.2021.
- [16] Kaur P, Qaqa F, Ramahi A, Shamoony Y, Singhal M, Shamoony F et al. Acute upper limb ischemia in a patient with COVID-19.2021.18. Parry A, Wani A, Yaseen M. Acute Mesenteric Ischemia in Severe Coronavirus-19 (COVID-19): Possible Mechanisms and Diagnostic Pathway.2021.
- [17] Singh B, Kaur P. COVID-19 and acute mesenteric ischemia: A review of literature.2021.
- [18] Manvendu jha. covid – related acute limb ischemia: the Indian data