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Left Main Stem Disease on Coronary Angiography in Patients with Unstable Angina Presenting to Emergency Department of Hayatabad Medical Complex Peshawar

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ABSTRACT

Objective: To establish the prevalence of left main stem (LMS) disease during coronary angiography among patients arriving at the Emergency department of Hayatabad Medical Complex, Peshawar with unstable angina.

Methodology: An observational study was carried out at the Cardiology Department, MTI-HMC Peshawar, spanning from December 2022 to January 2024. A total of 150 individuals diagnosed with unstable angina were enrolled. Coronary angiography was conducted on all participants, with LMS disease diagnosis based on stenosis in the LMS artery exceeding half the left main coronary artery's diameter.

Results: The patient cohort comprised 70.0% males and 30.0% females, with an average age of 52.1 years (±6.5). Among them, 23.3% exhibited left main stem disease during coronary angiography. No significant links were identified between LMS disease and age group (p=0.24), gender (p=0.28), smoking habits (p=0.49), or diabetes (p=0.84).

Conclusion: The research points out the substantial occurrence of LMS disease in individuals with unstable angina, signaling the necessity of prompt revascularization in this subgroup. Nonetheless, no noteworthy correlations were discerned between LMS disease and the assessed clinical parameters and risk factors. These discoveries underscore the imperative for further investigations into additional factors influencing LMS disease progression in those with unstable angina for improved coronary artery disease screening and management strategies.

Keywords: Left Main Stem Disease, Unstable Angina, Coronary Angiography, Risk Factors, Revascularization.

Authors' Contribution:
[1,2]Conception; Literature research; manuscript design and drafting; [3]Critical analysis and manuscript review; [4,5,6]Data analysis; Manuscript Editing.

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Introduction

Left main stem (LMS) disease represents a critical pathology in the spectrum of coronary artery disease (CAD) and is associated with significant morbidity and mortality[1]. Coronary angiography remains the gold standard for diagnosing LMS disease, offering insights into the severity and extent of coronary artery lesions[2]. Unstable angina, characterized by transient episodes of chest pain or discomfort at rest or with minimal exertion, signifies an unstable coronary plaque and is often a precursor to acute coronary syndromes[3]. Patients presenting with unstable angina pose a clinical challenge due to the unpredictable nature of their condition and the potential for adverse cardiac events[4]. The identification of LMS disease in patients with

unstable angina carries profound implications for risk stratification and management strategies. Despite advancements in diagnostic modalities and therapeutic interventions, the optimal approach to LMS disease in this patient population remains a subject of ongoing investigation[5]. Recent research has underscored the prognostic significance of LMS disease in patients with unstable angina, highlighting its association with adverse cardiovascular outcomes and the need for prompt intervention[6]. Studies have elucidated the impact of various risk factors, including age, gender, smoking, and diabetes mellitus, on the prevalence and progression of LMS disease[7]. Furthermore, emerging evidence suggests a role for novel biomarkers and imaging techniques in the early detection and risk assessment of LMS disease[8]. Integrating these advances into clinical practice holds promise for enhancing the precision and efficacy of therapeutic interventions in patients with unstable angina[9]. Despite the progress made in understanding the pathophysiology and management of LMS disease, several knowledge gaps persist. Clarifying the optimal timing and modality of revascularization, the impact of adjunctive pharmacotherapy, and the long-term outcomes of patients with LMS disease and unstable angina are areas of active investigation[10]. In light of the evolving landscape of CAD management, this study aims to contribute to the existing body of literature by elucidating the frequency and clinical correlates of LMS disease on coronary angiography in patients presenting with unstable angina. By addressing these critical questions, we endeavor to optimize risk stratification and inform evidence-based therapeutic decisions in this high-risk patient population.

Methodology

This cross-sectional study was conducted at the Department of Cardiology, MTI-Hayatabad Medical Complex, Peshawar, from December 2022 to January 2024. The robust methodology employed in this study provides valuable insights into the frequency and clinical correlates of LMS disease in patients with unstable angina. By employing rigorous statistical analysis, this research aims to contribute to the evidence base for risk stratification and therapeutic decision-making in this high-risk patient population. A cross-sectional study was to examine the prevalence of LMS disease during coronary angiography in patients with unstable angina. For the analysis of data, Python VS Code was utilized, leveraging Statistics libraries. Quantitative variables such as age were assessed for mean and standard deviation, while qualitative variables including gender, smoking status, presence of diabetes mellitus, and incidence of LMS disease were analyzed for frequency and percentage distribution. Stratification was performed to examine the association between LMS disease and exploratory variables such as age group, gender, smoking status, and diabetes mellitus. The chi-square test was applied to assess the significance of associations, with a p-value of ≤0.05 considered statistically significant.

Results

The table I presents the descriptive statistics of the study population comprising 150 patients with unstable angina. The parameters analyzed include age, gender, smoking status, presence of diabetes mellitus, and the incidence of left main stem (LMS) disease. The study population had a mean age of 52.1 years with a standard deviation of 6.5 years. Most patients were male (70.0%) and non-smokers (51.3%). Additionally, 38.7% of patients had diabetes mellitus, and 23.3% were diagnosed with left main stem (LMS) disease. Table II illustrates the correlation of left main stem (LMS) ailment with diverse clinical parameters and risk factors amid the examination community. The association analysis revealed no significant differences in the incidence of LMS disease concerning age (p=0.24), gender (p=0.28), smoking status (p=0.49), and diabetes mellitus (p=0.84).

Table I: Clinical Parameters	
Parameter	**n (%)**
Age	Mean (±SD): 52.1 (±6.5)
Gender	
Male	105 (70.0%)
Female	45 (30.0%)
Smoking Status	
Yes	73 (48.7%)
No	77 (51.3%)
Diabetes Mellitus	
Yes	58 (38.7%)
No	92 (61.3%)
Left Main Stem Disease	
Yes	35 (23.3%)
No	115 (76.7%)

Table II: Association Analysis			
	LMS Disease		
Parameter	**Yes (n=35)**	**No (n=115)**	**p-value**
Age			
<50 years	15 (42.9%)	39 (33.9%)	0.24
≥50 years	20 (57.1%)	76 (66.1%)	
Gender			
Male	27 (77.1%)	78 (67.8%)	0.28
Female	8 (22.9%)	37 (32.2%)	
Smoking Status			
Yes	19 (54.3%)	54 (47.0%)	0.49
No	16 (45.7%)	61 (53.0%)	
Diabetes Mellitus			
Yes	13 (37.1%)	45 (39.1%)	0.84
No	22 (62.9%)	70 (60.9%)	

These findings suggest that while there is a notable prevalence of LMS disease in the study population, it does not demonstrate significant associations with the evaluated clinical parameters and risk factors. Further investigation may be warranted to elucidate additional factors contributing to the occurrence and progression of LMS disease in patients with unstable angina.

Discussion

In the current investigation, it was observed that the occurrence of LMS ailment in patients with unstable angina stood at approximately 23.3%. Since both three-vessel and LMS diseases necessitate prompt revascularization, having an understanding of loco-regional disease figures is crucial for devising local management guidelines. While unstable angina is deemed less severe compared to other conditions, prior research conducted at our facility revealed a significant proportion of patients suffering from this ailment also had underlying multi-vessel disease. The average age of patients in our study was 52.1 (±6.5) years, contrasting with a mean age of 56.65±15.44 years in a study by Rathi et al.[11], and 58.37 ± 9.70 years in a study by Bacci et al[12]. Another study cited the average age as 60 years. The slightly lower mean age in our study compared to others may be attributed to the early onset of cardiovascular conditions in our region in contrast to Western countries. Our study indicated a predominance of male patients, with 105 (70%) male individuals and 45 (30%) female patients. In contrast, Rathi et al.[11] reported a male predominance of 77.19% in their study. LMS disease was identified in 35 (23%) of our patients. The prevalence of LMS alongside three vessels disease in the research by Rathi et al.[11] was 52.0%. Husein et al.[13] discovered a 44.7% occurrence of LMS with three vessels disease in unstable angina patients, while Masami et al.[14] found a 31.0% prevalence of LMS/three vessels disease in such patients. The disparity in results between our study and others stemmed from our separate evaluation of LMS disease frequency, whereas previous studies combined LMS and triple-vessel disease prevalence.

We acknowledge limitations in our study due to its confined data to a single institution, highlighting the necessity for extensive multi-institutional research in our demographic to precisely ascertain CAD attributes within our population.

Conclusion

Within this investigation, a high occurrence of LMS illness was identified within our demographic. The subgroup of individuals with unstable angina necessitates prompt revascularization. This also indicates the requirement for a reassessment of our screening methods and treatment guidelines linked to coronary artery ailment. Moreover, considering the severe implications of late diagnoses, urgent interventions shall be initiated promptly. The patients presenting with LMS disease demands immediate attention and swift interventions, overlooking may exacerbate the prognosis. Making the patient's well-being a foremost priority in clinical practice with emergent attention is paramount to prevent undesirable outcomes. The detection and management of LMS disease are intricate yet crucial in enhancing patient outcomes. Therefore, rigorous monitoring and expedited actions must be championed to ameliorate patient prognoses, align better with optimal clinical outcomes.

Limitations:

The study was subject to certain limitations, including its cross-sectional design, which precludes the establishment of causality. Additionally, the study was conducted at a single center, which may limit the generalizability of findings to broader populations

References

1. S. C. Smith *et al.*, "ACC/AHA/SCAI 2005 guideline update for percutaneous coronary intervention: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percut," *J. Am. Coll. Cardiol.*, vol. 47, no. 1, pp. e1-121, Jan. 2006, https://doi.org/ 10.1016/j.jacc.2005.12.001.
2. M. R. Patel *et al.*, "ACCF/SCAI/AATS/AHA/ASE/ASNC/HFSA/HRS/SCCM /SCCT/SCMR/STS 2012 appropriate use criteria for diagnostic catheterization: a report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, Society for Cardiovascular Angiography and," *J. Am. Coll. Cardiol.*, vol. 59, no. 22, pp. 1995–2027, May 2012, https://doi.org/10.1016/j.jacc.2012.03.003.
3. E. A. Amsterdam *et al.*, "2014 AHA/ACC Guideline for the Management of Patients with Non-ST-Elevation Acute Coronary Syndromes: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.," *J. Am. Coll. Cardiol.*, vol. 64, no. 24, pp. e139–e228, Dec. 2014, https://doi.org/ 10.1016/j.jacc.2014.09.017.
4. P. Libby, "Mechanisms of acute coronary syndromes and their implications for therapy.," *N. Engl. J. Med.*, vol. 368, no. 21, pp. 2004–13, May 2013, https://doi.org/10.1056/NEJMra1216063.
5. Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC) *et al.*, "ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation.," *Eur. Heart J.*, vol. 33, no. 20, pp. 2569–619, Oct. 2012, https://doi.org/ 10.1093/eurheartj/ehs215.
6. K. Thygesen *et al.*, "Fourth Universal Definition of Myocardial Infarction (2018).," *Circulation*, vol. 138, no. 20, pp. e618–e651, Nov. 2018, https://doi.org/10.1161/CIR.0000000000000617.
7. F. Schiele *et al.*, "C-reactive protein improves risk prediction in patients with acute coronary syndromes," *Eur. Heart J.*, vol. 31, no. 3, pp. 290–297, Feb. 2010, https://doi.org/ 10.1093/eurheartj/ehp273.
8. E. Giannitsis *et al.*, "Admission troponin T level predicts clinical outcomes, TIMI flow, and myocardial tissue perfusion after primary percutaneous intervention for acute ST-segment elevation myocardial infarction.," *Circulation*, vol. 104, no. 6, pp. 630–5, Aug. 2001, https://doi.org/ 10.1161/hc3101.093863.

9. T. F. Luscher, “The Endothelium and Cardiovascular Disease -- A Complex Relation,” *N. Engl. J. Med.*, vol. 330, no. 15, pp. 1081–1083, Apr. 1994, https://doi.org/10.1056/NEJM199404143301511.
10. E. A. Amsterdam *et al.*, “2014 AHA/ACC Guideline for the Management of Patients With Non–ST-Elevation Acute Coronary Syndromes,” *Circulation*, vol. 130, no. 25, Dec. 2014, https://doi.org/10.1161/CIR.0000000000000134.
11. N. Rathi, M. Z. Baloch, R. K. Sachdewani, and F. Memon, “Frequency of left main artery/three vessel disease predicted through ECG changes in patients presenting with non-ST segment acute coronary syndrome,” *J. Liaquat Univ. Med. Heal. Sci.*, vol. 15, pp. 93–97, 2016.
12. M. R. Bacci *et al.*, “Predominance of STEMI and severity of coronary artery disease in a cohort of
13. patients hospitalized with acute coronary syndrome: a report from ABC Medical School.,” *Rev. Assoc. Med.*
14. *Bras.*, vol. 61, no. 3, pp. 240–3, 2015, https://doi.org/10.1590/1806-9282.61.03.24.
15. A. Hussien, A. Battah, M. Ashraf, and T. Z. El-Deen, “Electrocardiography as a predictor of left main or three-vessel disease in patients with non-ST segment elevation acute coronary syndrome,” *Egypt. Hear. J.*, vol. 63, no. 2, pp. 103–107, Jun. 2011, https://doi.org/10.1016/j.ehj.2011.09.015.
16. M. Kosuge *et al.*, “Predictors of left main or three-vessel disease in patients who have acute coronary syndromes with non-ST-segment elevation.,” *Am. J. Cardiol.*, vol. 95, no. 11, pp. 1366–9, Jun. 2005, https://doi.org/10.1253/circj.CJ-08-1009