International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

A Study of Angiographic Pattern in Diabetic Patients with Acute Coronary Syndrome in Correlation with HbA1c Levels

Dr. Pranav Nawkar[1], Dr. C. Senthil[2]

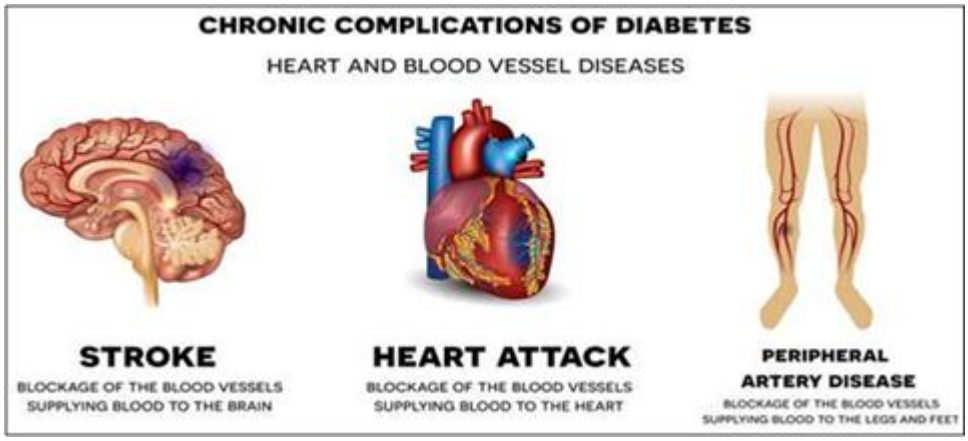
[1]Postgraduate, Department of General Medicine, ACS Medical College and Hospital, Chennai
[2]HOD, Department of General Medicine, ACS Medical College and Hospital, Chennai

Abstract: ***Background: Diabetes mellitus is a significant risk factor for acute coronary syndrome (ACS), often associated with severe and diffuse coronary artery disease. Glycated hemoglobin (HbA1c) levels serve as an indicator of long-term glycemic control and may correlate with the severity of coronary artery disease in diabetic patients. Methods: A cohort of diabetic patients admitted with ACS was retrospectively analyzed. Coronary angiography was performed to determine the extent and severity of coronary artery involvement. HbA1c levels were recorded to categorize patients into groups based on glycemic control (well-controlled, moderately controlled, and poorly controlled). Statistical methods were applied to assess the relationship between angiographic findings and HbA1c levels. Results: Higher HbA1c levels were significantly associated with complex angiographic patterns, including multivessel disease, diffuse lesions, and reduced vessel caliber. Patients with poor glycemic control (HbA1c >8%) exhibited a higher prevalence of critical stenosis and involvement of smaller-caliber vessels compared to those with better control. Conclusion: Elevated HbA1c levels correlate with more severe and complex coronary artery disease in diabetic patients with ACS. This highlights the importance of stringent glycemic control in mitigating the progression of coronary artery disease in diabetic populations. Further studies are warranted to establish causative mechanisms and evaluate the impact of glycemic management on angiographic outcomes.***

Keywords: Acute Coronary Syndrome (ACS), Diabetes Mellitus, HbA1c, Coronary Angiography, Coronary Artery Disease (CAD), Glycemic Control, Angiographic Pattern, Multivessel Disease, Diffuse Coronary Lesions, Critical Stenosis, Type 2 Diabetes, Cardiovascular Risk, Diabetic Complications, Coronary Artery Stenosis, Glycated Haemoglobin.

1. Introduction

Cardiovascular disease is the major cause of premature mortality in patients with Diabetes. According to the American Diabetes Association, 33-49% of patients still do not meet targets for HbA1C.

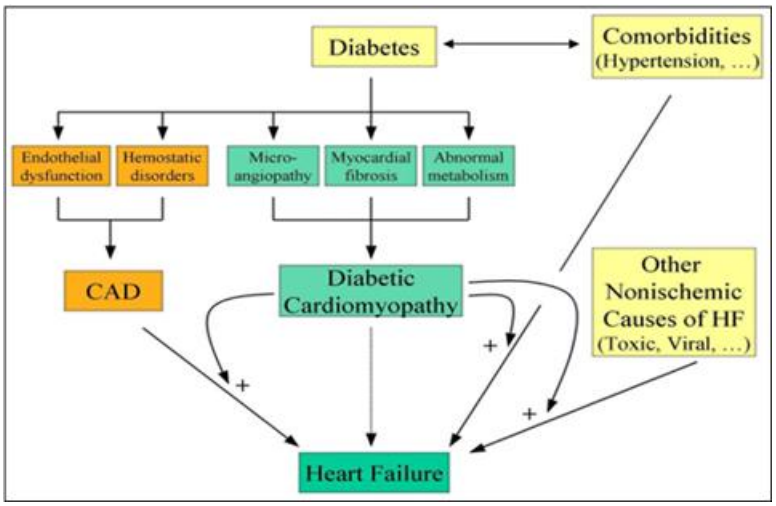


2. Background

1) Glycosylated haemoglobin (HbA1c) is a useful index of glucose intolerance and hyperglycaemia. HbA1c is an established marker of long-term glycaemic control. HbA1c can be assessed in the non-fasted state and has higher reproducibility than fasting glucose.
2) In patients with diabetes mellitus (DM), there may be poor long-term glycaemic control, even when fasting glucose concentrations are normal.
3) Elevated HbA1c levels are associated with an increased risk for both microvascular and macrovascular disease.
4) There is consistent evidence that optimal glycaemic control (defined as HbA1c ≤7%) results in a lower incidence of microvascular complications in both type 1 and type 2 DM.
5) Moreover, recent studies suggest that elevated HbA1c levels are also predictive for cardiovascular disease and mortality in patients without DM, independent of the fasting glucose value.
6) HbA1c levels may be of prognostic value regarding future cardiovascular disease. Several previous studies have demonstrated positive correlations of HbA1c with mortality and even subclinical cardiovascular disease in subjects without a history of diabetes.
7) A breakthrough in the field of cardiology came with the introduction of "interventional cardiology" which serves

as a diagnostic as well as a therapeutic aid in the management of coronary artery disease.

8) Coronary angiography or arteriography remains the "Gold-standard" technique for diagnosing and evaluating coronary artery disease.



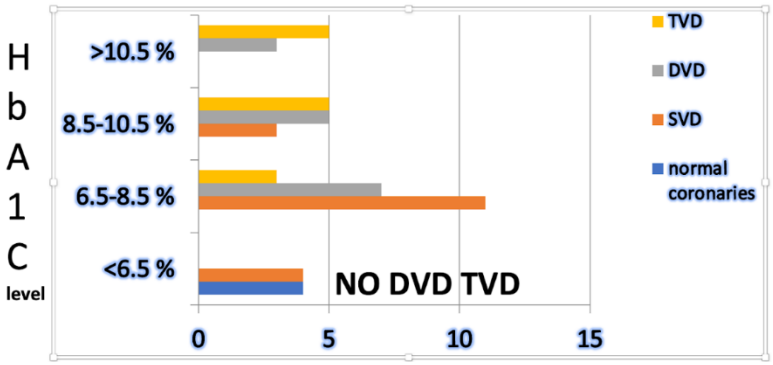
Aim and Objectives

To study and evaluate the angiographic patterns of CAD in diabetic patients presenting with Acute coronary syndrome and their correlation with HbA1c levels

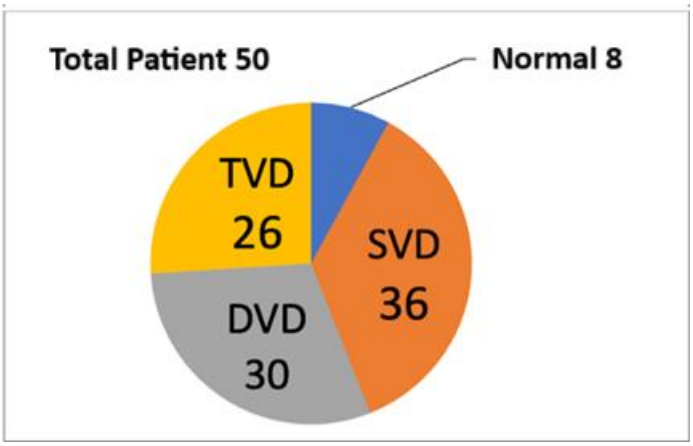
3. Materials & Methods

1) Study type: Cross-sectional study
2) Sample size: 50 Diabetic patients admitted in the medicine ward and the Cath lab, ACS Medical College and Hospital, with confirmed diagnosis of Acute Coronary Syndrome
3) After stabilizing the patient & getting informed consent, HbA1C was done along with other routine investigations, CAG was done & study was conducted based on their Coronary Angiography pattern.

4. Results



HBA1C and CAG Finding Correlations



5. Result and Discussion

The Total Population was divided into 4 classes based on their HbA1c levels.

1) In Class with HBA1c level <6.5%: 4 (50%) had reperfused Normal coronaries, 4 (50%) had single vessel disease with Type A lesion & 0% for Double vessel disease & Triple vessel disease.
2) In Class with HBA1c level 6.5-8.5: 3 had Triple vessel disease, 7 had Double vessel disease & 11 had Single vessel disease.
3) In class with HBA1c level 8.5-10.5: 5 had Triple vessel disease, 5 had Double vessel disease, 3 had Single vessel disease.
4) In Class with HBA1c level >10.5: 5 had Triple vessel disease, 3 had Double vessel disease & 0% had Single vessel disease & Normal Coronaries.

6. Conclusion

1) The present study demonstrated that the severity and extent of coronary artery disease and triple/multiple vessel disease were significantly high in long-standing diabetics and those with high HbA1C levels. The severity of Coronary Artery disease (CAD), was also found to be directly related to the quality of glucose control in Diabetic patients.
2) Patients with poor glycemic control with elevated levels of HbA1c had a diffuse (Type C) pattern of atherosclerotic disease. With good control of HbA1c, there was only a type A, type B pattern of atherosclerotic disease seen.
3) Our data suggest that HbA1c level is a significant and independent maker for the severity of angiographic lesion in ACS patients, irrespective of other cardiovascular risk factors, age, and gender, smoking, alcoholism. HbA1c values can be a predictor of the prevalence of complex coronary artery lesions.
4) It may be used as a cardiac marker in the risk stratification of patients presenting with acute coronary syndrome and is indicated for coronary angiography.

References

[1] Stratton IM, Adler AI, Neil HAW, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ.2*000; 321 (7258): 405–412. doi: 10.1136/bmj.321.7258.405
[2] Choi SH, Park Y, Baek JY, et al. Hemoglobin A1c is associated with the complexity of coronary artery disease in diabetic patients with acute coronary syndrome. *Diabetes Metab J.2*012; 36 (5): 349–354. doi: 10.4093/dmj.2012.36.5.349
[3] Wiviott SD, Raz I, Bonaca MP, et al. Dapagliflozin and cardiovascular outcomes in type 2 diabetes. *N Engl J Med.2*019; 380 (4): 347–357. doi: 10.1056/NEJMoa1812389
[4] Haffner SM, Lehto S, Rönnemaa T, Pyörälä K, Laakso M. Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction. *N Engl J Med.1*998; 339 (4): 229–234. doi: 10.1056/NEJM199807233390404
[5] Park GM, Cho YR, Kim CJ, et al. Impact of hemoglobin A1c on angiographic severity and long-term clinical outcomes in patients with acute myocardial infarction and diabetes mellitus. *Korean Circ J.2*011; 41 (6): 370–376. doi: 10.4070/kcj.2011.41.6.370
[6] WHO. GLOBAL REPORT ON DIABETES. world health organisation. [internet).2016. [cited 24 April 2019]
[7] Girdhar R, Kothari Y, Kamat A, Raj R, Koithara B. Coronary Angiographic (CAG) Findings between Diabetic and non-diabetic Patients in Coronary artery disease: A Comparative Study. J Med Sci Clin Res.2018; 6 (8): 753-9.
[8] Hegde SS, Mallesh P, Yeli SM, Gadad VM, M GP. Comparitive angiographic profile in diabetic and non-diabetic patients with acute coronary syndrome. J Clin Diagn Res.2014; 8 (9): MC07-10.
[9] Ravipati G, Aronow WS, Ahn C, Sujata K, Saulle LN, Weiss MB. Association of hemoglobin A (1c) level with the severity of coronary artery disease in patients with diabetes mellitus. Am J Cardiol.2006; 97 (7): 968-9.
[10] Sousa JM, Herrman JL, Teodoro M, Diogo S, Terceiro BB, Paola AA, et al. [Comparison of coronary angiography findings in diabetic and nondiabetic women with non-ST-segment-elevation acute coronary syndrome]. Arq Bras Cardiol.2006; 86 (2): 150-5.