

Evaluation of extent and severity of coronary artery disease in patients with type II diabetes mellitus using SYNTAX score

Mohamed.A.Abdallah, H.K.Rasheed, B.M.Abdelhamid and H.I.Allam
cardiovascular medicine Dept., Faculty of medicine. Benha University

E-mail: drmohamedarfa@gmail.com

Abstract

Your study aimed to investigate the extent who presented non-diabetic individuals. Based on the results, it was found that SYNTAX score (SS), a scoring system used to predict the prognosis and need for revascularization in CAD patients. Key findings and conclusions: High Prevalence of CAD in T2DM: The study recognizes the high prevalence of CAD in patients with T2DM, which is often characterized by severe disease. This aligns with existing literature that highlights the increased risk of CAD in diabetic populations. Regional Wall Motion Abnormalities (RSWMA): The study also found a statistically significant difference in RSWMA between the groups, indicating that the impact of CAD extended beyond the coronary arteries, potentially affecting myocardial function. These findings underscore the importance of recognizing the increased risk and severity of CAD in patients with T2DM, particularly those with stable angina. It highlights the clinical significance of assessing CAD severity using tools like the SYNTAX score to guide treatment decisions and predict prognosis in this high-risk population. While your study provides valuable insights into the relationship between T2DM and CAD severity, further research and larger multicenter studies may be needed to confirm and expand upon these findings. Additionally, assessing long-term outcomes and the impact of CAD severity on clinical management could contribute to a better understanding of the implications for patient care.

Keywords: coronary artery disease, type II diabetes mellitus, SYNTAX score

1. Introduction

Your provided information emphasizes the increased risk and complexity of coronary artery disease (CAD) in patients with type 2 diabetes mellitus (T2DM). Here are the key points highlighted in your text: **Adverse Outcomes After PCI:** Patients with T2DM who undergo percutaneous coronary intervention (PCI) face a significantly higher risk of recurrent cardiac events. These events include target lesion revascularization (repeat PCI or bypass surgery), rehospitalization, myocardial infarction (MI), and in-stent restenosis. This emphasizes the need for close monitoring and advanced management strategies in this patient population.

The information provided underscores the importance of early detection, risk assessment, and comprehensive management of CAD in individuals with T2DM. These patients often require tailored treatment strategies to address their unique risk factors and the increased likelihood of adverse cardiovascular events.

The introduction of drug-eluting stents (DES) has indeed led to significant improvements in the outcomes of percutaneous coronary intervention (PCI), especially in patient subsets associated with high rates of restenosis, such as those with diabetes. This advancement in stent technology has contributed to reduced rates of repeat revascularization procedures and improved long-term outcomes for these patients.

Your study aims to investigate the extent and severity of CAD, as assessed by the SYNTAX score, in patients with Type 2 Diabetes Mellitus (T2DM) who have stable angina pectoris (SAP) in comparison to non-diabetic patients. This research is

important as diabetes is a well-established risk factor for coronary artery disease, and understanding the extent of CAD and how it correlates with the SYNTAX score in diabetic and non-diabetic populations can help guide treatment decisions and improve patient outcomes. The findings of this study may provide insights into whether diabetic patients with SAP may have more extensive CAD and therefore require different revascularization strategies compared to non-diabetic patients with similar clinical presentations.

2. Patients And Methods

It seems like you're providing information about a medical study conducted at the cardiac catheterization unit at Benha University Hospital from February 2022 to March 2023. The study included 150 patients who underwent either referred or elective coronary angiography.

I.Method

Thank you for providing more details about the study. It appears to be a comprehensive and well-structured study conducted at the cardiac catheterization unit at Benha University Hospital. Here are some key points from the information you've provided:

1. Study Inclusion: The study included 150 patients who underwent coronary angiography. These patients could be either referred or elective cases.
2. Patient Assessment: The patients went through a thorough assessment, including informed consent, complete history taking (personal, complaint, present history, drug sensitivity, medical history, surgical history), evaluation of risk factors for coronary artery disease (CAD),

physical examinations, laboratory investigations, and echocardiography.

3. Patient Preparation and Procedures: The study likely had established protocols for patient preparation, access and catheterization, angiography, image acquisition, quantitative analysis, and lesion characteristic assessment.
4. Ethical Considerations: The study ensured patient confidentiality, and participants were not identified by name in any reports or publications. Informed consent was obtained from all participants after explaining the purpose, nature of the study, and associated risks and benefits.

This information provides a clear outline of the study's methodology and ethical considerations,

3.Results

which are essential elements of a research study, especially in the medical field.

II.Statistical Analysis

In your description, there are specific comparisons made using the Chi-square test with associated p-values.

You've also noted that $p \leq 0.001$ is considered statistically highly significant, which means that results with p-values less than or equal to 0.001 are of particular importance.

These statistical tests and results help determine whether there are significant associations or differences between various groups or variables in the study, which is essential for drawing meaningful conclusions from the data.

Table (1) Comparison between the studied groups regarding demographic data

Parameter	Diabetic patients with stable CAD	Non-diabetic patients with stable P CAD	P
	Mean \pm SD	Mean \pm SD	
Age(year)	60.24 \pm 9.47	63.88 \pm 8.5	0.135
Gender:			
Female	22 (44%)	10(20%)	0.688
Male	28 (56%)	40(80%)	

Table (2) Comparison between the studied groups regarding risk factors

Parameter	Diabetic patients with stable CAD	Non-diabetic patients with stable CAD	P
	Mean \pm SD	Mean \pm SD	
Hypertensio:			
Absent	26(52%)	26(52%)	0.18
Present	24(48%)	24(48%)	
Smoking:			
Absent	34(68%)	20(40%)	0.015*
Present	16(32%)	30(60%)	
Dyslipidemia:			
Absent	26(52%)	24(48%)	0.247
Present	24(48%)	26(52%)	

Table (3) Comparison between the studied groups regarding laboratory data

Parameter	Diabetic patients		Non-diabetic patients		P
	Mean \pm SD	\pm	Mean \pm SD	\pm	
HbA1c (%)	8.7 \pm 0.7		6.82 \pm 0.39		<0.001**
Creatinine (mg/dl)	0.88 \pm 0.15		0.91 \pm 0.19		0.518
T. cholesterol (mg/dl)	213.12 \pm 45.86		177.07 \pm 18.12		0.006*
LDL cholesterol(mg/dl)	109.55 \pm 54.21		86.1 \pm 25.34		0.013*

HDL cholesterol(mg/dl)	60.28 ± 16.49	66.0 ± 16.72	0.184
Triglycerides(mg/dl)	245.5 ± 106.29	227.23 ± 86.68	0.322

Table (4) Comparison between the studied groups regarding ECG and ECHO data

Parameter	Diabetic patients with stable CAD Mean ± SD	Non-diabetic patients with stable CAD Mean ± SD	P
RSWMA:			
Negative	44(88%)	50(100%)	<0.001**
Positive	6 (12%)	0 (0%)	
EF (%)	64.94 ± 5.74	64.7 ± 4.44	0.973

Table (5) Comparison between the studied groups regarding syntax score

Parameter	Diabetic patients with stable CAD Mean ± SD	Non-diabetic patients Mean ± SD	P
Syntax score	19.8 ± 4.34	17.08 ± 2.44	0.015

4. Discussion

You attribute the disagreement between Mossmann et al.'s results and your own to the fact that their study was conducted over a five-year period, suggesting that the difference may be related to the study's time frame.

It's not uncommon to see variations in study results, as they can be influenced by various factors, including sample size, methodology, patient demographics, and the duration of the study. The fact that Mossmann et al. conducted a time-based study over five years might have introduced additional variables that influenced their results compared to your study and Saraste et al.'s study, which may have had different study designs or data collection periods.

Overall, it's essential to consider the context and limitations of each study when interpreting their results and to acknowledge that some differences in findings can occur due to various factors in scientific research.

It appears that your study focused on comparing various factors between diabetic (DM) patients with stable coronary artery disease (CAD) and non-diabetic patients with stable CAD. Here's a summary of the findings and their agreement with other studies:

Your study appears to have investigated several aspects of coronary artery disease (CAD) in patients with and without diabetes (DM) and made comparisons with other relevant research. Here's a summary of your findings and their agreement or disagreement with other studies:

1. ECG Ischemic Changes and RSWMA:

- Your study found a statistically significant difference between DM patients with stable CAD and non-DM patients with stable CAD regarding ECG ischemic changes and RSWMA by echocardiography.

- Saraste et al.'s study also found statistically significant differences in ECG ischemic changes and RSWMA between diabetic CAD patients and non-diabetic CAD patients, which aligns with your findings.

2. SYNTAX Score:

- In your study, there was a significant difference in SYNTAX score between diabetic patients with stable CAD and non-diabetic patients with stable CAD, with the diabetic group having a higher mean SYNTAX score.
- Srinivasan et al. found a significant difference in SYNTAX score between diabetic patients (more than 5 years) and non-diabetic patients, with the diabetic group having a higher SYNTAX score.

3. SYNTAX Score and HbA1c Control:

- In your study, there was no significant difference in SYNTAX score between stable CAD patients with controlled HbA1c and those with uncontrolled HbA1c.
- Dar et al. found a significant difference in the severity of coronary artery disease between DM and non-DM groups, with higher severity in uncontrolled DM patients.

Your findings generally align with the results of Saraste et al. and Srinivasan et al., suggesting that DM patients may have more severe CAD, as indicated by SYNTAX score, and exhibit differences in ECG ischemic changes and RSWMA compared to non-DM patients.

However, there is a discrepancy regarding the influence of HbA1c control on SYNTAX score between your study and Dar et al. It's important to consider that these discrepancies could be due to differences in study populations, criteria for HbA1c control, or other factors that were not mentioned.

Interpreting and applying these results in a clinical context requires a thorough understanding of the methodologies and patient populations of these studies and should consider the specific clinical questions being addressed.

5. Conclusion

Your study suggests that when using angiographic scores to assess the severity of coronary artery disease (CAD) in patients with stable CAD, there is no significant difference between those with type 2 diabetes (T2DM) and those without diabetes (Non-DM). However, your findings indicate that angiographic scores may not fully capture the higher cardiovascular risk profile of T2DM patients with stable CAD compared to Non-DM patients. This higher risk in T2DM patients appears to be more associated with a vulnerable plaque phenotype rather than the extent of CAD.

You also propose that intravascular imaging techniques may be necessary to better assess this high-risk plaque phenotype in T2DM patients with stable CAD. As a result, you caution against relying solely on angiographic scores to evaluate the future cardiovascular risk in patients with stable CAD and T2DM.

This conclusion highlights the limitations of angiographic scores in capturing the full complexity of CAD, especially in the context of diabetes. It underscores the need for more advanced imaging techniques to assess the underlying factors contributing to the higher risk profile in diabetic patients. Healthcare professionals should consider these findings when evaluating and managing cardiovascular risk in T2DM patients with stable CAD.

6. Limitation

It's important to acknowledge the limitations of your study, as doing so can provide a more comprehensive understanding of the results and their implications. The limitations you mentioned are as follows:

1. **Small Sample Size:** A small sample size can limit the generalizability of the study's findings. Larger sample sizes often provide more statistically robust results.
2. **Need for Further Tests and Techniques:** Your study identified a need for additional tests and techniques, which suggests that the current methods employed may not have provided a complete picture of the issues being investigated. Expanding the range of tests and techniques can enhance the study's accuracy and depth.
3. **Long Time for Follow-Up:** Long follow-up periods can be challenging in terms of patient retention and resource requirements. Nevertheless, they can be essential for understanding the long-term outcomes of conditions and treatments.

4. **Single Measurement of Baseline HbA1c:** Relying on a single baseline measurement of HbA1c may not reflect changes in glycemic control over time. Multiple measurements throughout the study could provide a more accurate picture of glycemic control.
5. **Undetermined Duration of T2DM:** Not knowing the duration of type 2 diabetes (T2DM) among patients can impact the analysis, as the progression and impact of the disease may differ depending on its duration.
6. **Influence of Medical Treatments and Other Risk Factors:** The effects of medical treatments and other risk factors on the prevalence and course of coronary artery disease were not fully explored in your study. Understanding these influences can be crucial for a more comprehensive assessment of the results.

By acknowledging these limitations, you provide transparency about the study's constraints and areas for improvement. Researchers and readers should consider these limitations when interpreting and applying the study's findings, and future research may seek to address these shortcomings to build upon your work.

7. Recommendation

Your recommendations for further studies and improvements in healthcare are valuable for advancing the understanding and management of patients with coronary artery disease (CAD), especially those with type 2 diabetes (T2DM). Here's a summary of your recommendations:

1. **Larger Sample Size and Longer Follow-Up:** Conducting future studies with larger sample sizes and longer follow-up periods can provide more robust and generalizable results, allowing for a deeper understanding of the outcomes and risk factors in patients with CAD, particularly those with T2DM.
2. **Confirmation of Primary Results:** Future research should aim to confirm the primary results obtained in your study, ensuring the reliability and validity of the findings.
3. **Identification of Risk Factors:** Investigating and identifying specific risk factors associated with poor outcomes in CAD patients, particularly those with T2DM, is important for targeted interventions and improved patient care.
4. **Improved Quality of Healthcare:** Recommending improvements in the quality of healthcare provided to patients underscores the importance of optimizing patient care. Enhanced healthcare services can lead to better outcomes and patient well-being.
5. **Continuous Record Checking:** Continuous monitoring and checking of patient records can help identify trends, track progress, and make timely adjustments to treatment plans, ultimately improving patient care and outcomes.

6. Long-Term Follow-Up: Sustained long-term follow-up of patients is essential for understanding the evolving course of CAD and T2DM, as well as the effects of interventions and treatments over time.

Your recommendations emphasize the need for ongoing research and quality healthcare services to better address the complex issues surrounding CAD and T2DM. They can guide future studies and healthcare initiatives to improve patient outcomes and the quality of care provided to individuals with these conditions.

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