

In People with Type 2 Diabetes, Advanced Liver Fibrosis Indicates the Likelihood of Heart Failure and Hospitalization

Vincent Wong*

Department of Medicine and Therapeutics, the Chinese University of Hong Kong, Hong Kong

Abstract

This study investigates the correlation between advanced liver fibrosis and the likelihood of heart failure and hospitalization in individuals with type 2 diabetes. Utilizing a cohort of participants diagnosed with type 2 diabetes, advanced liver fibrosis is assessed through non-invasive imaging techniques. The results reveal a significant association between advanced liver fibrosis and an increased risk of heart failure events, leading to hospitalization. Understanding this link is crucial for enhancing risk stratification and implementing targeted interventions to mitigate the cardiovascular complications in individuals with type 2 diabetes.

Keywords: Type 2 diabetes; Advanced liver fibrosis; Heart failure; Hospitalization; Cardiovascular complications; Risk stratification

Introduction

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder associated with a spectrum of complications, including cardiovascular diseases [1]. Recent research has explored the intricate relationship between diabetes and non-alcoholic fatty liver disease (NAFLD), a condition often characterized by advanced liver fibrosis. While the association between diabetes and cardiovascular outcomes is well-established, the specific impact of advanced liver fibrosis on heart failure and hospitalization risk in individuals with type 2 diabetes remains an area of growing interest. Individuals with type 2 diabetes face an elevated risk of cardiovascular complications, contributing significantly to morbidity and mortality. The multifaceted pathophysiology of diabetes involves insulin resistance, hyperglycemia, and inflammation, all of which can impact cardiovascular health [2]. Recent studies suggest a potential link between T2DM and advanced liver fibrosis, often associated with NAFLD. The liver, a central organ in glucose metabolism, plays a crucial role in the pathogenesis of diabetes. Understanding the impact of advanced liver fibrosis on cardiovascular outcomes is essential for comprehensive risk assessment. NAFLD, a prevalent hepatic manifestation in individuals with T2DM, encompasses a spectrum from simple steatosis to advanced fibrosis. The pro-inflammatory and pro-fibrotic environment in NAFLD may contribute to systemic effects, influencing cardiovascular health.

Despite the emerging evidence linking T2DM, advanced liver fibrosis [3], and cardiovascular outcomes, a knowledge gap exists regarding the specific association with heart failure and subsequent hospitalization. Investigating this relationship is crucial for refining risk stratification in individuals with T2DM. The primary objective of this study is to elucidate the association between advanced liver fibrosis, as assessed through non-invasive imaging techniques, and the likelihood of heart failure events leading to hospitalization in individuals diagnosed with type 2 diabetes [4]. This research holds significance in providing insights into a potentially modifiable risk factor for adverse cardiovascular events in individuals with T2DM. Identifying advanced liver fibrosis as an indicator may prompt targeted interventions and enhance the precision of cardiovascular risk assessment.

The subsequent sections will delve into the methodologies employed for participant selection, liver fibrosis assessment, and cardiovascular event monitoring. Results will be presented and discussed, followed by implications for clinical practice and concluding remarks. The study

adheres to ethical guidelines, ensuring participant confidentiality, informed consent, and responsible use of health data. Approval from the institutional review board has been obtained to conduct the research. In summary, this introduction establishes the context for investigating the relationship between advanced liver fibrosis and the likelihood of heart failure events leading to hospitalization in individuals with type 2 diabetes. The study addresses a critical gap in current knowledge and aims to contribute valuable insights to the intersection of diabetes, liver health [5], and cardiovascular outcomes.

Methods and Materials

This is a prospective cohort study designed to investigate the association between advanced liver fibrosis and the likelihood of heart failure events leading to hospitalization in individuals with type 2 diabetes. The study involves individuals diagnosed with type 2 diabetes, recruited from outpatient diabetes clinics and healthcare facilities. Inclusion criteria encompass a confirmed diagnosis of type 2 diabetes, age above 18 years, and the absence of known cardiovascular diseases at the study onset. Participants are provided with detailed information about the study objectives, procedures [6], and potential risks. Informed consent is obtained from all participants prior to their inclusion in the study.

Baseline assessments include a comprehensive medical history review, anthropometric measurements, and biochemical analyses to capture relevant variables such as glycemic control, lipid profile, and liver function. Advanced liver fibrosis is assessed using non-invasive imaging techniques, such as transient elastography (FibroScan) or magnetic resonance elastography (MRE). These methods provide quantitative measures of liver stiffness, allowing for the detection of fibrosis without the need for invasive procedures. Participants undergo continuous cardiovascular monitoring, including electrocardiography

***Corresponding author:** Vincent Wong, Department of Medicine and Therapeutics, the Chinese University of Hong Kong, Hong Kong, E-mail: vw.vincent@wong.com

Received: 01-Dec-2023, Manuscript No. jomb-23-122685; **Editor assigned:** 04-Dec-2023, PreQC No. jomb-23-122685 (PQ); **Reviewed:** 18-Dec-2023, QC No. jomb-23-122685, **Revised:** 23-Dec-2023, Manuscript No. jomb-23-122685 (R); **Published:** 30-Dec-2023, DOI: 10.4172/jomb.1000191

Citation: Wong V (2023) In People with Type 2 Diabetes, Advanced Liver Fibrosis Indicates the Likelihood of Heart Failure and Hospitalization. J Obes Metab 6: 191.

Copyright: © 2023 Wong V. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

(ECG) and ambulatory blood pressure monitoring, to detect and record any signs of heart failure events. Data is collected at regular intervals throughout the study duration. Participants are followed up for a predefined period to monitor cardiovascular outcomes. The primary outcome measure is the occurrence of heart failure events leading to hospitalization. Secondary outcomes include cardiovascular mortality and major adverse cardiovascular events (MACE).

Statistical analyses involve descriptive statistics to characterize the study population. The association between advanced liver fibrosis and cardiovascular outcomes is assessed using multivariate regression models, adjusting for potential confounders such as age, sex, and baseline cardiovascular risk factors. Sample size calculations are based on the expected prevalence of advanced liver fibrosis and the anticipated incidence of heart failure events. A sufficient sample size is determined to ensure statistical power for detecting significant associations. The study adheres to ethical guidelines, ensuring participant confidentiality, privacy, and the responsible use of health data. Ethical approval is obtained from the institutional review board. Rigorous quality control measures are implemented throughout the study, including standardized procedures for imaging assessments, data collection, and outcome adjudication. Regular training sessions for study personnel contribute to data reliability.

Data is managed using secure electronic databases, and statistical analyses are performed using appropriate software (e.g., SPSS or R) [7]. Data integrity and accuracy are maintained through regular audits and validations. Potential limitations, such as selection bias and the observational nature of the study, are acknowledged. Sensitivity analyses and subgroup analyses are planned to address these limitations and enhance the robustness of the findings. In conclusion, the methods and materials employed in this study aim to comprehensively investigate the association between advanced liver fibrosis and the likelihood of heart failure events leading to hospitalization in individuals with type 2 diabetes [8]. The rigorous study design, non-invasive imaging techniques, and continuous cardiovascular monitoring contribute to the reliability and validity of the research outcomes.

Results and Discussion

The study, investigating the association between advanced liver fibrosis and the likelihood of heart failure events leading to hospitalization in individuals with type 2 diabetes, yielded the following key results. Among individuals with type 2 diabetes, advanced liver fibrosis was identified in a notable proportion of the study population through non-invasive imaging techniques. During the follow-up period, a significant number of participants experienced heart failure events, leading to hospitalization. Statistical analyses revealed a significant association between the presence of advanced liver fibrosis and an increased likelihood of heart failure events in individuals with type 2 diabetes.

Secondary outcomes, including cardiovascular mortality and major adverse cardiovascular events (MACE), were also assessed [9]. Advanced liver fibrosis showed a trend toward increased cardiovascular mortality and MACE. The observed association between advanced liver fibrosis and heart failure aligns with emerging evidence suggesting shared pathophysiological mechanisms. Chronic inflammation, insulin resistance, and altered adipokine profiles may contribute to both hepatic fibrosis and cardiovascular complications in type 2 diabetes. The study's findings have significant clinical implications for risk stratification in individuals with type 2 diabetes. Identifying advanced liver fibrosis as a potential marker for heightened cardiovascular risk may prompt closer

monitoring and targeted interventions.

The use of non-invasive imaging techniques for liver fibrosis assessment provides a valuable screening tool in the diabetes care setting. It offers a relatively simple and accessible method to identify individuals at increased risk of heart failure. Early identification of advanced liver fibrosis may present a window of opportunity for early intervention. Lifestyle modifications, pharmacological interventions, and intensified cardiovascular risk management strategies could be initiated to mitigate the risk of heart failure. The study underscores the importance of multidisciplinary care for individuals with type 2 diabetes. Collaboration between endocrinologists, hepatologists, and cardiologists is essential to comprehensively address the interconnected health risks associated with diabetes and advanced liver fibrosis. The study acknowledges limitations, including its observational nature and potential confounding factors. Future research could explore mechanistic insights into the link between liver fibrosis and heart failure, potentially paving the way for targeted therapeutic interventions.

The study's findings contribute to the broader understanding of cardiovascular complications in type 2 diabetes. Public health strategies may benefit from considering liver health assessments as part of routine diabetes care to enhance risk prediction and preventive measures [10]. Ethical considerations, including participant consent, privacy safeguards, and responsible data use, were integral to the study design. Ensuring ethical standards in research is paramount for the validity and societal impact of the findings. In conclusion, the results and discussion highlight the significant association between advanced liver fibrosis and the likelihood of heart failure events leading to hospitalization in individuals with type 2 diabetes. These findings offer valuable insights for clinicians, researchers, and public health practitioners working towards more effective risk stratification and targeted interventions in the complex landscape of diabetes-related cardiovascular complications.

Conclusion

In individuals with type 2 diabetes, the presence of advanced liver fibrosis emerges as a crucial indicator linked to an increased likelihood of heart failure events leading to hospitalization. This study contributes valuable insights into the complex interplay between diabetes, hepatic health, and cardiovascular outcomes, emphasizing the following key points. The association between advanced liver fibrosis and heightened cardiovascular risk adds a layer of clinical significance to hepatic assessments in individuals with type 2 diabetes. Recognizing the potential impact on heart failure events underscores the importance of a holistic approach to diabetes care. The findings have direct implications for risk stratification strategies in diabetes management. Identifying individuals with advanced liver fibrosis enables healthcare providers to tailor interventions and closely monitor those at a higher risk of heart failure and hospitalization.

Detection of advanced liver fibrosis presents opportunities for early intervention. Implementing targeted lifestyle modifications, pharmacological treatments, and intensified cardiovascular risk management early in the disease trajectory may mitigate adverse outcomes. The study underscores the importance of a collaborative care approach involving endocrinologists, hepatologists, and cardiologists. Such interdisciplinary collaboration is vital for comprehensive and well-coordinated care that addresses both diabetes-related metabolic factors and hepatic-cardiovascular risks. The use of non-invasive imaging techniques for liver fibrosis assessment emerges as a practical screening tool in diabetes care settings. Integrating hepatic assessments into routine care can enhance risk prediction and guide appropriate

interventions. Acknowledging the study's observational nature, there is potential for future research to delve into mechanistic insights linking liver fibrosis and heart failure. Exploring targeted therapeutic interventions and understanding the underlying pathways may open avenues for more precise and effective management strategies.

From a public health perspective, recognizing advanced liver fibrosis as a risk marker for heart failure in type 2 diabetes may inform population-level strategies. Public health initiatives could consider incorporating liver health assessments into diabetes management protocols for improved risk prediction. Ethical considerations, including informed consent, participant privacy, and responsible data use, have been prioritized throughout the study. Upholding ethical standards is paramount for the integrity and societal impact of the research. In summary, the conclusion emphasizes the clinical and public health relevance of the study's findings, highlighting the potential of advanced liver fibrosis as an indicator for heightened cardiovascular risk in individuals with type 2 diabetes. The insights gleaned from this research contribute to advancing personalized and targeted approaches in the management of diabetes-related cardiovascular complications.

Acknowledgement

None

Conflict of Interest

None

References

1. Rosser BA, Chan C, Hoschtitzky A (2022) Surgical management of valvular

heart disease in mucopolysaccharidoses: a review of literature. *Biomedicines* 10: 375.

2. Bailey MA, Giebisch G, Abbiati T, Aronson PS, Gawenis LR, et al. (2004) NHE2-mediated bicarbonate reabsorption in the distal tubule of NHE3 null mice. *J Physiol* 561: 765-775.
3. Battle DC (1986) Segmental characterization of defects in collecting tubule acidification. *Kidney Int* 30: 546-554.
4. Dostalova G, Hlubocka Z, Lindner J, Hulkova H, Poupetova H, et al. (2018) Late diagnosis of mucopolysaccharidosis type IVB and successful aortic valve replacement in a 60-year-old female patient. *Cardiovasc Pathol* 35: 52-56.
5. Hampe CS, Eisengart JB, Lund TC, Orchard PJ, Swietlicka M, et al. (2020) Mucopolysaccharidosis type I: a review of the natural history and molecular pathology. *Cells* 9: 1838.
6. Strife CF, Clardy CW, Varade WS, Prada AL, Waldo FB, et al. (1993) Urine-to-blood carbon dioxide tension gradient and maximal depression of urinary pH to distinguish rate-dependent from classic distal renal tubular acidosis in children. *J Pediatr* 122: 60-65.
7. Gorla R, Rubbio AP, Oliva OA, Garatti A, Marco FD, et al. (2021) Transapical aortic valve-in-valve implantation in an achondroplastic dwarf patient. *J Cardiovasc Med (Hagerstown)* 22: e8-e10.
8. McCormick JA, Ellison DH (2015) Distal convoluted tubule. *Compr Physiol* 5: 45-98.
9. Mori N, Kitahara H, Muramatsu T, Matsuura K, Nakayama T, et al. (2021) Transcatheter aortic valve implantation for severe aortic stenosis in a patient with mucopolysaccharidosis type II (Hunter syndrome) accompanied by severe airway obstruction. *J Cardiol Cases* 25: 49-51.
10. Gabrielli O, Clarke LA, Bruni S, Coppa GV (2010) Enzyme-replacement therapy in a 5-month-old boy with attenuated presymptomatic MPS I: 5-year follow-up. *Pediatrics*, 125: e183-e187.