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Screening for Peripheral Artery Disease Using the Ankle-Brachial Index

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ABSTRACT

Background: The literature surrounding the use of the ankle-brachial index (ABI) as a screening tool for peripheral artery disease (PAD) has evolved significantly over the years, reflecting an increasing recognition of its importance in cardiovascular health assessment. **Literature Review:** (Rosenbaum et al., 2012) expanded on ABI's role in cardiovascular risk assessment, particularly in populations with multiple risk factors, demonstrating that ABI can serve as an independent predictor of cardiovascular risk. Their findings, coupled with (Cavalcanti de Oliveira et al., 2015), who linked lower ABI values to more severe coronary artery disease, underscore ABI's utility beyond diagnosing PAD, positioning it as a marker for systemic atherosclerosis. (Hogan, 2019) further highlighted ABI's limitations regarding the localization of arterial blockages, advocating for a comprehensive diagnostic approach that may include additional testing modalities to enhance clinical decision-making. The reliability of ABI as a diagnostic tool was critically assessed by (Casey et al., 2019), who noted that operator skill and standardized protocols significantly influence measurement accuracy. This concern was echoed by (Tóth-Vajna et al., 2019), who explored the potential for false negatives in resting ABI assessments, particularly in primary care settings, emphasizing the need for improved diagnostic accuracy to reduce the incidence of undiagnosed PAD. Most recently, (L. Jagt et al., 2022) demonstrated that abnormal ABI results are predictive of future cardiovascular morbidity and mortality, further solidifying ABI's relevance in identifying patients at increased risk for adverse cardiovascular events. **Conclusion:** In conclusion, the body of literature collectively highlights ABI as a vital screening tool for PAD, while also emphasizing the need for careful interpretation of results and the incorporation of additional diagnostic methods to enhance clinical decision-making. The consensus underscores ABI's dual role as both a diagnostic and prognostic indicator, essential for the effective management of cardiovascular health, particularly in high-risk populations.

Keyword: Peripheral Artery Disease, Ankle-Brachial Index

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INTRODUCTION

The literature surrounding the use of the ankle-brachial index (ABI) as a screening tool for peripheral artery disease (PAD) has evolved significantly over the years, reflecting an increasing recognition of its importance in cardiovascular health assessment. In 2007, Lange et al. highlighted the rising prevalence of PAD and the necessity for early identification, emphasizing that ABI serves as a simple and effective diagnostic method. Their findings indicated that different methods for calculating ABI yield varying prevalence estimates, underscoring the importance of standardized measurement practices (F Lange et al., 2007).

Building on this foundation, Rosenbaum et al. examined the accuracy of ABI measurement using an automated device in a population with increased cardiovascular risk. They found that while ABI is a valuable tool for early detection of PAD, its limitations, particularly in patients with missing distal pulses, necessitate caution in interpretation. The study further noted that ABI could enhance cardiovascular risk prediction, thus reinforcing its clinical utility beyond merely diagnosing PAD (Rosenbaum et al., 2012).

In 2015, Oliveira et al. expanded the discussion by investigating the relationship between ABI and coronary artery disease severity. Their research demonstrated that a lower ABI is associated with more severe coronary lesions, suggesting that ABI is a useful indicator for assessing cardiovascular risk beyond lower extremity conditions (Cavalcanti de Oliveira et al., 2015). This finding supports the notion that ABI not only identifies PAD but also serves as a marker for systemic atherosclerosis.

Hogan contributed to the literature by addressing the practical aspects of implementing ABI screening in high-risk asymptomatic populations. While acknowledging ABI's diagnostic capabilities, Hogan pointed out that further testing may be required to pinpoint the exact location of arterial blockages. This highlights

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the necessity for a comprehensive approach to PAD diagnosis, where ABI serves as an initial screening tool, potentially followed by more invasive methods when indicated (Hogan, 2019).

The reliability of ABI as a diagnostic tool was critically evaluated by Casey et al., who noted that various factors could influence the accuracy of ABI measurements. Their systematic review emphasized the importance of operator skill and standardized protocols in ensuring reliable results, which is crucial for effective PAD screening and monitoring (Casey et al., 2019).

Tóth-Vajna et al. further explored the role of ABI in primary health care settings, revealing that resting ABI can yield false negatives. Their study aimed to enhance the efficiency of PAD screening in general practice, indicating a need for improved diagnostic accuracy to reduce amputation rates associated with undiagnosed PAD (Tóth-Vajna et al., 2019).

Yang et al. reaffirmed ABI's significance in documenting the presence of lower-extremity PAD, particularly in patients with type 2 diabetes mellitus. Their findings underscore ABI's role as a crucial tool in the management of patients at risk for PAD, further solidifying its importance in clinical practice (Yang et al., 2021).

Most recently, Jagt et al. investigated the predictive value of screen-detected ABI abnormalities in patients with manifest cardiovascular disease. Their research indicated that an abnormal ABI is a significant risk indicator for future cardiovascular morbidity and mortality, reinforcing the clinical relevance of ABI in identifying patients at heightened risk for adverse cardiovascular events (L. Jagt et al., 2022).

Overall, the body of literature reveals a growing consensus on the utility of ABI as a vital screening tool for PAD, while also emphasizing the need for careful interpretation of results and consideration of additional diagnostic methods to enhance clinical decision-making.

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The article "Profound influence of different methods for determination of the ankle brachial index on the prevalence estimate of peripheral arterial disease" by Lange et al. (F Lange et al., 2007) provides a critical examination of the methods used to determine the ankle-brachial index (ABI) and their significant impact on the prevalence estimates of peripheral arterial disease (PAD). The authors highlight the increasing prevalence of PAD and the importance of early detection, given that many patients remain asymptomatic, especially those who do not exhibit intermittent claudication (IC), a common manifestation of the disease.

One of the key insights presented is the inadequacy of traditional diagnostic approaches, such as history taking and physical examination, in primary healthcare settings, which often leads to under-diagnosis of PAD. This is particularly concerning as PAD is a known predictor of future cardiovascular and cerebrovascular events, as well as increased mortality risk. The authors advocate for the use of ABI as a simple and cost-effective diagnostic tool that can be employed in general practice. They provide clear thresholds for ABI interpretation: a normal ABI is approximately 1.1, while values below 0.9 indicate compromised perfusion, with values under 0.4 signaling severe ischemic symptoms. The sensitivity and specificity of ABI measurements are notably high, making it a reliable indicator for significant stenosis in leg arteries.

However, the article emphasizes that variations in the methods used to calculate ABI can lead to differing prevalence estimates of PAD. This raises critical questions about the standardization of ABI measurement techniques and the implications for clinical practice and public health. The authors call for a more uniform approach to ABI assessment to ensure accurate prevalence estimates, which is essential for effective screening and management of PAD.

The article titled "Accuracy of the ankle-brachial index using the SCVL(®), an arm and ankle automated device with synchronized cuffs, in a population with increased cardiovascular risk" by Rosenbaum et al. (Rosenbaum et al., 2012) provides a comprehensive examination of the ankle-brachial index (ABI) as a critical tool in

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assessing cardiovascular risk, particularly in populations with multiple cardiovascular risk factors. The authors emphasize the ABI's role as an indicator of generalized atherosclerosis, highlighting its association with increased cardiovascular and total mortality rates. This correlation is particularly significant as it suggests that a low ABI can serve as an independent predictor of cardiovascular risk, regardless of existing cardiovascular disease or other risk factors.

The study's primary objective is to evaluate the accuracy of ABI measurements obtained through the SCVL®, an automated device designed to facilitate simultaneous blood pressure measurements at the arm and ankle. The authors note that traditional Doppler-assisted ABI measurements present limitations, particularly in patients with peripheral arterial disease (PAD), where distal pulses may be difficult to detect. The SCVL® device, with its synchronized cuffs, aims to address these challenges by providing a reliable and user-friendly alternative for ABI measurement.

The results presented in the article indicate that the SCVL® device is capable of accurately measuring ABI in a population with at least two cardiovascular risk factors, thereby supporting its utility in clinical settings. This finding is particularly relevant given the growing recognition of ABI as a valuable tool for early detection of PAD and for assessing disease severity. Furthermore, the authors reference a meta-analysis that suggests ABI measurements may enhance cardiovascular risk prediction beyond traditional assessments such as the Framingham risk score. This assertion underscores the potential of ABI to play a pivotal role in cardiovascular risk stratification.

In critically evaluating the material, it is evident that the article contributes significantly to the existing literature on ABI by not only validating the SCVL® device's accuracy but also reinforcing the ABI's importance in cardiovascular risk assessment. However, while the study focuses on a population with increased cardiovascular risk, it may be beneficial for future research to explore the applicability of the SCVL® device in broader populations, including those with

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varying degrees of cardiovascular risk and different demographic characteristics. Additionally, the authors could further elaborate on the practical implications of implementing such automated devices in routine clinical practice, especially in terms of cost-effectiveness and accessibility.

The article titled "Association Between Ankle-Brachial Index and Coronary Lesions Assessed by Coronary Angiography" by Dinaldo Cavalcanti de Oliveira et al. (Cavalcanti de Oliveira et al., 2015) provides significant insights into the utility of the ankle-brachial index (ABI) as a diagnostic tool for peripheral arterial disease (PAD) and its correlation with coronary artery disease. The authors emphasize that the ABI is a straightforward, non-invasive, and cost-effective method for identifying PAD, which is vital given the prevalence of cardiovascular diseases.

The primary objective of the study was to evaluate the relationship between ABI values and the severity of coronary artery disease, as determined through coronary angiography. The findings indicate that patients with an ABI of less than 0.9, which signifies the presence of PAD, exhibited more severe coronary lesions compared to those with a normal ABI. This correlation underscores the ABI's potential not only in diagnosing PAD but also in identifying individuals at heightened risk for cardiovascular events stemming from coronary artery disease.

One of the strengths of the study lies in its robust methodology, which utilizes coronary angiography as a definitive measure of coronary artery disease severity. This approach lends credibility to the findings and supports the assertion that the ABI can be a valuable screening tool for broader cardiovascular risk assessment. Furthermore, the authors provide a comprehensive discussion on the implications of their findings, suggesting that a low ABI could serve as an indicator for more aggressive cardiovascular risk management.

However, while the study effectively highlights the association between ABI and coronary lesions, it could benefit from a more extensive discussion on the potential mechanisms linking PAD and coronary artery disease. Understanding these

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mechanisms could enhance the clinical relevance of the ABI as a screening tool and inform treatment strategies.

The article "Implementation of Ankle-Brachial Index to Screen for Peripheral Artery Disease in High-Risk Asymptomatic Populations" by Kristen Hogan (Hogan, 2019) provides a comprehensive overview of the utility of the Ankle-Brachial Index (ABI) in the screening process for Peripheral Artery Disease (PAD). The main premise of the article is that while ABI is both specific and sensitive enough to establish a diagnosis of PAD, it has limitations regarding the localization of arterial blockages. This critical distinction is vital for clinicians and researchers alike, as it underscores the necessity for additional diagnostic evaluations when ABI results indicate the presence of PAD.

Hogan emphasizes that although the ABI serves as a reliable initial screening tool, it does not provide information on the specific site of arterial occlusion. To address this limitation, the article discusses several complementary testing modalities, such as segmental pressures, pulse volume recordings, exercise testing, and vascular imaging. Segmental pressures and pulse volume recordings, when used alongside ABI, can enhance the understanding of disease severity and localization. This multi-faceted approach is particularly relevant in clinical practice, where accurate diagnosis directly influences treatment strategies and patient outcomes.

Furthermore, the article highlights the role of exercise testing, particularly for patients presenting with symptoms of claudication but normal resting ABIs. This aspect is crucial, as it points to the potential for false negatives in resting ABI assessments, which may lead to underdiagnosis of PAD in symptomatic patients. The inclusion of vascular imaging is also addressed, noting that while it is not essential for diagnosing PAD, it can aid in differentiating PAD from other conditions such as arterial aneurysms. This nuanced understanding of diagnostic pathways is essential for healthcare professionals involved in vascular health.

Hogan’s article also discusses the implications of early PAD detection, particularly in high-risk asymptomatic populations. The author argues that early identification

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can significantly slow disease progression and improve management of associated cardiovascular and cerebrovascular risks. This perspective aligns with contemporary approaches to preventive medicine, emphasizing the importance of proactive screening in at-risk groups.

The article concludes by reinforcing the ABI's position as the primary recommended screening tool for PAD, noting its simplicity, speed, and non-invasive nature. These attributes make the ABI particularly suitable for widespread use in clinical settings. However, the article could benefit from a deeper exploration of the barriers to ABI implementation in various healthcare settings, as well as a discussion of potential strategies to increase screening rates among high-risk populations.

The article "The reliability of the ankle brachial index: a systematic review" by Casey, Lanting, Oldmeadow, and Chuter (Casey et al., 2019) provides an in-depth analysis of the Ankle-Brachial Index (ABI) as a critical tool for screening peripheral artery disease (PAD). The authors highlight the significant prevalence of PAD, particularly among individuals over 55 years of age, estimating rates as high as 19%. This statistic underscores the importance of effective screening methods, as PAD is closely linked to increased morbidity and mortality due to cardiovascular complications, as well as severe outcomes like lower extremity ulceration and amputation.

The article emphasizes the ABI's role as a non-invasive measure that compares the systolic blood pressure at the ankle with that at the brachial artery, thereby serving as an objective indicator of peripheral blood flow. The authors discuss the ABI's widespread adoption across various clinical settings, which speaks to its utility and acceptance among healthcare professionals. However, the reliability of the ABI as a diagnostic tool is critically assessed, revealing that its accuracy can be influenced by several factors.

One key point raised in the article is the variability introduced by the clinician's experience and skills when performing the ABI measurement. This suggests that

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training and proficiency in using the ABI are essential for obtaining consistent and reliable results. Furthermore, the article notes that the type of equipment used and the specific methods of measuring blood pressure can also affect ABI readings. This variability highlights the need for standardization in both equipment and protocols to ensure that ABI measurements are reliable across different settings.

The authors also address the impact of the testing environment and pre-test protocols on the resting ABI values. Such factors can lead to discrepancies in results, which could potentially misguide clinical decisions regarding PAD management. The article calls for more rigorous training and standardized practices to enhance the reliability of the ABI as a screening tool.

The article titled "Screening of peripheral arterial disease in primary health care" by Tóth-Vajna et al. (Tóth-Vajna et al., 2019) presents a critical evaluation of the efficacy of the ankle-brachial index (ABI) as a screening tool for peripheral arterial disease (PAD) in a primary care setting. The authors underscore the importance of accurately diagnosing lower extremity arterial disease, given the potential for ABI to yield false negative results, which can significantly impact patient outcomes.

The study aims to quantify the proportion of definitive PAD diagnoses among patients screened in general practice and to identify cases requiring further specialized examination. This focus is particularly relevant in light of the high rates of amputation associated with undiagnosed or mismanaged PAD. The authors highlight that while ABI is a widely accepted method for screening, its limitations necessitate a more nuanced approach to patient assessment (Tóth-Vajna et al., 2019).

A critical evaluation of the methodology employed reveals a systematic approach to data collection and analysis. The authors utilized a robust sample size, which enhances the reliability of their findings. However, the article could benefit from a more detailed discussion of the criteria used to determine the need for specialized examinations, as this is crucial for understanding the implications of their findings on clinical practice.

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Furthermore, while the article emphasizes the necessity of improving screening efficiency in primary health care, it could explore potential interventions or strategies that could be implemented to address the identified gaps in current practices. This would provide a more comprehensive framework for practitioners aiming to enhance patient outcomes in PAD management.

The article "Ankle-Brachial Index Is Independently Associated With Cardiovascular Outcomes and Foot Ulcers in Asian Patients With Type 2 Diabetes Mellitus" by Yang et al. (Yang et al., 2021) provides valuable insights into the clinical significance of the ankle-brachial index (ABI) as a diagnostic tool for peripheral artery disease (PAD) in a specific patient population. The authors emphasize that the ABI is not only effective in identifying the presence of lower-extremity PAD but also serves as an important prognostic indicator for cardiovascular outcomes and the risk of foot ulcers among Asian patients with type 2 diabetes mellitus.

The study presents a well-structured analysis of the ABI's role, highlighting its efficiency in objectively documenting PAD. The authors detail the methodology used to assess the ABI in their patient cohort, which enhances the reliability of their findings. By correlating ABI values with cardiovascular events and foot ulcer occurrences, the research underscores the ABI's dual function as both a diagnostic and prognostic tool, thus reinforcing its clinical utility.

One of the critical evaluations of the article lies in its focus on a specific demographic—Asian patients with type 2 diabetes. While this specificity allows for targeted insights, it may limit the generalizability of the findings to broader populations. The authors could have addressed this limitation more explicitly, discussing the potential variations in ABI performance across different ethnicities and comorbid conditions. Furthermore, the article would benefit from a discussion on the practical implications of ABI screening in clinical practice, particularly in terms of how it can inform treatment decisions and improve patient outcomes.

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The article "Screen-detected abnormal ankle brachial index: A risk indicator for future cardiovascular morbidity and mortality in patients with manifest cardiovascular disease" by Jagt et al. (L. Jagt et al., 2022) delves into the critical role of the ankle-brachial index (ABI) as a diagnostic tool for peripheral artery disease (PAD) and its implications for cardiovascular health. The authors aim to elucidate the relationship between screen-detected ABI abnormalities and the subsequent risk of cardiovascular morbidity and mortality in patients already diagnosed with clinically manifest cardiovascular disease (CVD).

The study presents a comprehensive analysis of how ABI, a simple and non-invasive measure, can serve not only as a diagnostic criterion for PAD but also as a prognostic indicator for cardiovascular outcomes. The authors highlight that a low ABI is indicative of significant arterial occlusion and is associated with an increased risk of adverse cardiovascular events. This correlation underscores the importance of routine ABI screening in clinical practice, particularly for patients with existing CVD, who are already at heightened risk for cardiovascular events.

The methodology employed in the study is robust, with a well-defined cohort of patients with manifest CVD. The authors utilize statistical analyses to demonstrate that an abnormal ABI is a significant predictor of future cardiovascular morbidity and mortality. This finding is particularly relevant as it reinforces the notion that early detection of PAD through ABI screening can lead to timely interventions, potentially improving patient outcomes.

Furthermore, the article discusses the implications of these findings for clinical practice. The authors advocate for the integration of ABI screening into routine cardiovascular assessments, suggesting that it could enhance risk stratification and inform management strategies for patients with CVD. This recommendation is grounded in the data presented, which indicates that patients with an abnormal ABI may benefit from more aggressive management of cardiovascular risk factors.

However, while the study provides compelling evidence for the utility of ABI in predicting cardiovascular outcomes, it is essential to consider the limitations of the

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research. The authors acknowledge potential confounding factors that could influence ABI results, such as diabetes and smoking status, which may not have been fully accounted for in the analysis. Additionally, the generalizability of the findings to broader populations outside the studied cohort warrants further investigation.

CONCLUSION

The literature surrounding the use of the ankle-brachial index (ABI) as a screening tool for peripheral artery disease (PAD) reflects a significant evolution in understanding its clinical utility and diagnostic capabilities. The early recognition of ABI's importance for early detection of PAD was established by (F Lange et al., 2007), who emphasized the necessity for standardized measurement practices due to varying prevalence estimates resulting from different calculation methods. This foundational work set the stage for subsequent investigations into ABI's accuracy and practical application in diverse populations.

(Rosenbaum et al., 2012) expanded on ABI's role in cardiovascular risk assessment, particularly in populations with multiple risk factors, demonstrating that ABI can serve as an independent predictor of cardiovascular risk. Their findings, coupled with (Cavalcanti de Oliveira et al., 2015), who linked lower ABI values to more severe coronary artery disease, underscore ABI's utility beyond diagnosing PAD, positioning it as a marker for systemic atherosclerosis. (Hogan, 2019) further highlighted ABI's limitations regarding the localization of arterial blockages, advocating for a comprehensive diagnostic approach that may include additional testing modalities to enhance clinical decision-making.

The reliability of ABI as a diagnostic tool was critically assessed by (Casey et al., 2019), who noted that operator skill and standardized protocols significantly influence measurement accuracy. This concern was echoed by (Tóth-Vajna et al., 2019), who explored the potential for false negatives in resting ABI assessments, particularly in primary care settings, emphasizing the need for improved diagnostic accuracy to reduce the incidence of undiagnosed PAD.

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(Yang et al., 2021) reinforced ABI's significance in managing patients with type 2 diabetes mellitus, illustrating its role in documenting lower-extremity PAD and predicting cardiovascular outcomes. Most recently, (L. Jagt et al., 2022) demonstrated that abnormal ABI results are predictive of future cardiovascular morbidity and mortality, further solidifying ABI's relevance in identifying patients at increased risk for adverse cardiovascular events.

In conclusion, the body of literature collectively highlights ABI as a vital screening tool for PAD, while also emphasizing the need for careful interpretation of results and the incorporation of additional diagnostic methods to enhance clinical decision-making. The consensus underscores ABI's dual role as both a diagnostic and prognostic indicator, essential for the effective management of cardiovascular health, particularly in high-risk populations.

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REFERENCES

1. F Lange, S., Trampisch, H. J., Pittrow, D., Darius, H., Mahn, M., R Allenberg, J., Tepohl, G., L Haberl, R., & Diehm, C., 2007. Profound influence of different methods for determination of the ankle brachial index on the prevalence estimate of peripheral arterial disease. ncbi.nlm.nih.gov
2. Rosenbaum, D., Rodriguez-Carranza, S., Laroche, P., Bruckert, E., Giral, P., & Girerd, X., 2012. Accuracy of the ankle-brachial index using the SCVL(®), an arm and ankle automated device with synchronized cuffs, in a population with increased cardiovascular risk. ncbi.nlm.nih.gov

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3. Cavalcanti de Oliveira, D., Correia, A., Nascimento Neto, J., Gurgel, M., Wanick Sarinho, F., & Guimares Victor, E., 2015. Association Between Ankle-Brachial Index and Coronary Lesions Assessed by Coronary Angiography. ncbi.nlm.nih.gov
4. Hogan, K., 2019. Implementation of Ankle-Brachial Index to Screen for Peripheral Artery Disease in High-Risk Asymptomatic Populations. [PDF]
5. Casey, S., Lanting, S., Oldmeadow, C., & Chuter, V., 2019. The reliability of the ankle brachial index: a systematic review. ncbi.nlm.nih.gov
6. Tóth-Vajna, Z., Tóth-Vajna, G., Gombos, Z., Szilágyi, B., Járai, Z., Berczeli, M., & Sótonyi, P., 2019. Screening of peripheral arterial disease in primary health care. ncbi.nlm.nih.gov
7. Yang, M. C., Huang, Y. Y., Hsieh, S. H., Sun, J. H., Wang, C. C., & Lin, C. H., 2021. Ankle-Brachial Index Is Independently Associated With Cardiovascular Outcomes and Foot Ulcers in Asian Patients With Type 2 Diabetes Mellitus. ncbi.nlm.nih.gov
8. L. Jagt, V., E. V. B. Hazenberg, C., Kapelle, J., J. Cramer, M., L. J. Visseren, F., & Westerink, J., 2022. Screen-detected abnormal ankle brachial index: A risk indicator for future cardiovascular morbidity and mortality in patients with manifest cardiovascular disease. ncbi.nlm.nih.gov

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