The Correlation Between Fibroscan and APRI Score in Non Alcoholic Fatty Liver Disease Patients for Assessing Liver Fibrosis Degree : A Literature Review

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Abstract

NAFLD or non alcoholic fatty liver disease is increasingly known as one of the main causes of chronic liver disease globally, growing rapidly linear with the increase of obesity, type 2 diabetes and metabolic syndromes. Liver fibrosis is key factor to predict the adverse reaction that caused by NAFLD. Liver biopsy is known for a long time to be the golden standard to diagnose liver fibrosis, but its high cost, and risky procedure is limiting its own benefit, therefore other diagnostic methods is developed. Transient elastography Fibroscan is the most accurate way to diagnose because the accuracy is similar with liver biopsy. Using ultrasound emiting probe to determine the stages of liver fibrosis. Simple diagnostic test using laboratory result is also developed, APRI score or AST/Platelet Ratio is a method that diagnose the existence and degree of liver fibrosis using result from simple blood tests. Significant positive correlations is found between Fibroscan and APRI result to diagnose the degrees of liver fibrosis on NAFLD patients from several study that conducted from different countries. Using them as a combination could avoid the needs to use liver biopsy to reduce cost and risk.

Keywords: NAFLD, Fibroscan, Transient Elastography, APRI, Liver Fibrosis

1. Introduction

Non alcoholic fatty liver disease or NAFLD is increasingly known as one of the main causes of chronic liver disease. Associated with other chronic disease such as type 2 diabetes mellitus, dyslipidemia, obesity and metabolic syndromes, that's also an problem that concerningly increased globally.(Fallatah et al., 2016) Mild form of this disease is comes in form of excessive fat accumulated in the patients liver, on small population inflammation could occurred and damaged the liver, this condition is called non alcoholic steatohepatitis. (al Nadaf et al., 2022)

NAFLD is affecting 17-46% of adult populations globally, and 5-31% in India (Kolhe et al., 2019).

Estimated among iranians the prevalence is 33,9%. (Amernia B, et al, 2021) The spectrum of this disease is wide variable, from mild symptoms to inflammation with NASH, until severe decompensation of liver function such as cirrhosis and liver failure. (Fallatah et al., 2016)

Diagnosis for NAFLD is clinical based, and the finding of liver steatosis and fibrosis with exclusion of other causes such as viral hepatitis and alcohol consumption. Liver biopsy is the golden standard to diagnose the existence and the degree of the liver fibrosis, also if its already progressing to a cirrhosis. Liver biopsy also had a lot of limitation such as sampling error, high cost of usage, and the risk of further damages on the patients liver because it is an invasive diagnostic tools. (Maurice & Manousou, 2018)

Therefore other methods to diagnose liver fibrosis needed to be considered. Transient elastography or fibroscan is the most accurate way to diagnose liver fibrosis and cirrhosis, the accuracy is similar to liver biopsy. Its measured the liver stiffness by using ultrasound. There's other alternatives to diagnose this condition, one of the method is APRI score. (al Nadaf et al., 2022; Fallatah et al., 2016; Seipalla et al., 2019; Tovo et al., 2019)

APRI score is a method that developed by Wai et al in 2003. Calculated as such : [AST (IU/L) / ULN] / Platelet Count x 100. Multiple studies have shown its positive result to diagnose the existence and degree of liver fibrosis and cirrhosis. In a study that conducted with meta analysis with a cut off >1,0, APRI score had 76 % of sensitivity and 72% of specificity in predicting cirrhosis, and with a cut off >0,7 APRI score had a 77% sensitivity and 72% specificity in predicting significant fibrosis. (al Nadaf et al., 2022; Alhankawi et al., n.d.; Kolhe et al., 2019; Pathik et al., 2015; Seipalla et al., 2019)

Based on the explanation above this article is reviewing the correlation between Fibroscan and APRI score on NAFLD patients to assess the degree of liver fibrosis.

2. Methods

Researcher search the literature using the keyword of that used separately and in combination included : "NAFLD", "APRI score", "Fibroscan", "Correlation", "Liver fibrosis". Using the Google scholar and PubMed as primary database.

3. Discussion

NAFLD is a condition that occurred when macrovesiculer steatosis is present in >5% of hepatocytes, when other causes is excluded such as alcohol and viral cause. This disease spectrum ranges from non alcoholic fatty liver to non alcoholic steatohepatitis which happened when inflammation is happened simultaneously, liver fibrosis and cirrhosis. (Maurice & Manousou, 2018) The disease is now one of the main causes of chronic liver disease globally, but the people understanding towards this disease is still limited, however in liver disease research its one of the fastest growing topic. Prevalence of the NAFLD globally is about 25%, which specifically

on certain areas such as 13% in Africa, 23% in Europe, and 32% in the Middle Ease. (al Nadaf et al., 2022; Maurice & Manousou, 2018) There's also strong correlation between NAFLD and certain disease, central obesity, dyslipidemia, type 2 diabetes, and metabolic syndromes which had a high prevalence between the populations of NAFLD patient. The burden of NAFLD is increasing parallel with the obesity rates. (Maurice & Manousou, 2018)

Presence of the liver fibrosis is the most important predictor towards adverse reaction that caused by NAFLD, because the mortality rate is increasing even at the very early stages of fibrosis, which rises linearly with the progression of fibrosis stages. The other risk factor for increase of mortality is obesity, age and diabetes. The complications of chronic liver disease only occurred on a very small amount of populations, about 4-8% that dying because of liver cirrhosis, and 1-5% because of hepatocellular carcinoma. (Maurice & Manousou, 2018; Tovo et al., 2019)

Diagnosis for NAFLD is consist of identifying steatosis with exclusion of other causes, then assess the risk of the patients suffered from NASH and liver fibrosis. Steatosis is assessed with the use of ultrasound. Transient elastography or fibroscan could also be used to determine the presence of steatosis, but doesn't significantly usefull to determine the stages of steatosis. Because liver fibrosis is one of the key to predict the prognostic outcome of NAFLD patient, therefore its important to assess this condition at the earliest stage. Various serological tests is already developed to assess liver fibrosis such as FIB-4, APRI, and NAFLD fibrosis score. TE or transient elastography is also used to determine the stage of liver fibrosis, from one meta analysis research found that TE performance to determine fibrosis stage F3 is adequate which its sensitivity and specifity is 0,82 and 0,84 respectively. (Lee et al., 2021; Maurice & Manousou, 2018b; Pathik et al., 2015; Seipalla et al., 2019)

Transient elastography (TE) Fibrosican is a technology that originally used in the food industry to measure the maturity of cheese. Using probe that emits ultrasound wave to rapidly measure the liver stiffness. Then its measure the velocity of the wave, that directly related with liver's tissue stiffened in other word fibrosis. Identification of the disease severity could also be measured by TE because the liver fibrosis mechanism. TE is a fast and simple procedure, the process will be done in 5-10 minute, the only preparation is for the patients to fast 2-3 hour prior the examination to prevent liver stiffness increasing due too postprandial blood flow. TE performance to assess significant fibrosis on NAFLD patient is adequeate, reaching sensitivity of 76%, specificity 80% with PPV of 75%, NPV 78% and AUROC value of 0,84. To assess F2 and F4 fibrosis stage of NAFLD patient, TE have a AUROC of 0.90 and 0.99 respectively. (Ornelas et al., 2020; Papadopoulos et al., 2019a; Patel & Wilder, 2014; Tovo et al., 2019)

Wai et al. originally presented the Aspartate Aminotransferase (AST)/Platelet Ratio Index (APRI) in

2003 to predict the level of severe fibrosis or cirrhosis in hepatitis C patients. The APRI score's key benefit over other non-invasive tests is that it is simple to apply and simply needs the results of a blood test. The APRI score is calculated as follows: APRI = [(AST/ULN)/Platelet count] 100 (ULN stands for upper limit of normal; for women, it is 34 U/L and for men, it is 36 U/L) (Mendes et al., 2016; Papadopoulos et al., 2019b)

A cross-sectional study on NAFLD patients in Saudi Arabia conducted in 2016 discovered a significant positive correlation between the Fibroscan result and the APRI score, which measures the stage of liver fibrosis. APRI is the most viable replacement for Fibroscan, according to a similar study conducted in Iran that demonstrated strong positive correlations between APRI and Fibroscan results from analyzing the stages of fibrosis. According to research conducted in Indonesia using Pearson correlation tests to examine the relationship between APRI and Fibroscan in patients with NAFLD, APRI and Fibroscan are significantly positively correlated. In order to prevent patients from developing cirrhosis and substantial fibrosis, it is also advised to use the APRI score in conjunction with Fibroscan to predict significant fibrosis and presence of cirrhosis to avoid the patients from doing liver biopsy, because of the found positive correlations between fibrosis stages and APRI. (al Nadaf et al., 2022; Alhankawi et al., n.d.; Amernia et al., 2021; Fallatah et al., 2016; Papadopoulos et al., 2019a; Pathik et al., 2015; Seipalla et al., 2019)

4. Conclusion

Significant positive correlations was founded between Fibroscan and APRI to assess the stage of liver fibrosis on NAFLD patients. Therefore the combinations of both methods should be suggested to avoid the need of liver biopsy

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References

al Nadaf, L., Hussein Kamareddine, M., Fayad, E., Hussain, A., & Farhat, S. (2022). Correlation between Fibroscan and laboratory tests in non-alcoholic fatty liver disease/non-alcoholic steatohepatitis patients for assessing liver fibrosis. World Journal of Hepatology, 14(4), 744–753. https://doi.org/10.4254/wjh.v14.i4.744

Alhankawi, D., Hunjung, K., Sharma, S., Weinberger, J., & Park, J. (n.d.). Abstracts S556 988 Transient Elastography (Fibroscan) Compared to FIB-4, APRI, and AST/ALT Ratio for Assessment of Liver Significant Fibrosis in Patients With Nonalcoholic Fatty Liver Disease. www.nature.com/ajg

Amernia, B., Moosavy, S. H., Banookh, F., & Zoghi, G. (2021). FIB-4, APRI, and AST/ALT ratio compared to FibroScan for the assessment of hepatic fibrosis in patients with non-alcoholic fatty liver disease in Bandar Abbas, Iran. BMC Gastroenterology, 21(1), 453. https://doi.org/10.1186/s12876-021-02038-3

Fallatah, H. I., Akbar, H. O., & Fallatah, A. M. (2016). Fibroscan Compared to FIB-4, APRI, and AST/ALT Ratio for Assessment of Liver Fibrosis in Saudi Patients With Nonalcoholic Fatty Liver Disease. Hepatitis Monthly, 16(7). https://doi.org/10.5812/hepatmon.38346

Kolhe, K. M., Amarapurkar, A., Parikh, P., Chaubal, A., Chauhan, S., Khairnar, H., Walke, S., Ingle, M., Pandey, V., & Shukla, A. (2019). Aspartate transaminase to platelet ratio index (APRI) but not FIB-5 or FIB-4 is accurate in ruling out significant fibrosis in patients with non-alcoholic fatty liver disease (NAFLD) in an urban slum-dwelling population. BMJ Open Gastroenterology, 6(1), e000288. https://doi.org/10.1136/bmjgast-2019-000288

Lee, J., Vali, Y., Boursier, J., Spijker, R., Anstee, Q. M., Bossuyt, P. M., & Zafarmand, M. H. (2021). Prognostic accuracy of FIB-4, NAFLD fibrosis score and APRI for NAFLD-related events: A systematic review. Liver International, 41(2), 261–270. https://doi.org/10.1111/liv.14669

Maurice, J., & Manousou, P. (2018a). Non-alcoholic fatty liver disease. Clinical Medicine, 18(3), 245–250. https://doi.org/10.7861/clinmedicine.18-3-245

Maurice, J., & Manousou, P. (2018b). Non-alcoholic fatty liver disease. Clinical Medicine, 18(3), 245–250. https://doi.org/10.7861/clinmedicine.18-3-245

Mendes, L. C., Ferreira, P. A., Miotto, N., Zanaga, L., Gonçales, E., Lazarini, M. S., Gonçales Júnior, F. L., Stucchi, R. S. B., & Vigani, A. G. (2016). Transient elastography and APRI score: looking at false positives and false negatives. Diagnostic performance and association to fibrosis staging in chronic hepatitis C. Brazilian Journal of Medical and Biological Research, 49(9). https://doi.org/10.1590/1414-431x20165432

Ornelas, R., Pan, D., & Chak, E. (2020). S3264 The Accuracy of Fibroscan: A Real World Study. American Journal of Gastroenterology, 115(1), S1706–S1706. https://doi.org/10.14309/01.ajg.0000715104.71776.3d

Papadopoulos, N., Vasileiadi, S., Papavdi, M., Sveroni, E., Antonakaki, P., Dellaporta, E., Koutli, E., Michalea, S., Manolakopoulos, S., Koskinas, J., & Deutsch, M. (2019a). Liver fibrosis staging with combination of APRI and FIB-4 scoring systems in chronic hepatitis C as an alternative to transient elastography. Annals of Gastroenterology, 32(5), 498–503. https://doi.org/10.20524/aog.2019.0406

Papadopoulos, N., Vasileiadi, S., Papavdi, M., Sveroni, E., Antonakaki, P., Dellaporta, E., Koutli, E., Michalea, S., Manolakopoulos, S., Koskinas, J., & Deutsch, M. (2019b). Liver fibrosis staging with combination of APRI and FIB-4 scoring systems in chronic hepatitis C as an alternative to transient elastography. Annals of Gastroenterology, 32(5), 498–503. https://doi.org/10.20524/aog.2019.0406

Patel, K., & Wilder, J. (2014). The clinical utility of FibroScan® as a noninvasive diagnostic test for liver disease. Medical Devices: Evidence and Research, 107. https://doi.org/10.2147/MDER.S46943

Pathik, P., Ravindra, S., Ajay, C., Prasad, B., Jatin, P., & Prabha, S. (2015). Fibroscan versus simple noninvasive screening tools in predicting fibrosis in high-risk nonalcoholic fatty liver disease patients from Western India. Annals of Gastroenterology, 28(2), 281–286. http://www.ncbi.nlm.nih.gov/pubmed/25830783

Seipalla, G. E., Nurahmi, N., & Samad, I. A. (2019). THE DEGREE OF LIVER FIBROSIS ANALYSIS WITH APRI SCORE AND FIB4 INDEX ON PATIENTS WITH NON-ALCOHOLIC FATTY LIVER. INDONESIAN JOURNAL OF CLINICAL PATHOLOGY AND MEDICAL LABORATORY, 26(2). https://doi.org/10.24293/ijcpml.v26i2.1414

Tovo, C. v., Villela-Nogueira, C. A., Leite, N. C., Panke, C. L., Port, G. Z., Fernandes, S., Buss, C., Coral, G. P., Cardoso, A. C., Cravo, C. M., Calçado, F. L., Rezende, G. F. M., Ferreira, F. C., Araujo-Neto, J. M., Perez, R. de M., Moraes-Coelho, H. S., & de Mattos, A. A. (2019). Transient hepatic elastography has the best performance to evaluate liver fibrosis in non-alcoholic fatty liver disease (NAFLD). Annals of

Hepatology, 18(3), 445–449. https://doi.org/10.1016/j.aohep.2018.09.003