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Analysis of the Relationship Between APRI Score and the Degree of Esophageal Varices in Liver Cirrhosis Patients at RSUD Prof. Dr. Margono Soekarjo

Kamal Agung Wijayana[1*], Fadhly Nino Putra[2], Wahyu Djatmiko[3], Wahyu Siswandari[4], Nisaul Magfiroh[5]

[1]Department of Surgary, Faculty of Medicine, Jenderal Soedirman University, Indonesia
[2] Faculty of Medicine, Jenderal Soedirman University, Indonesia
[3]Department of Internal Medicine, Faculty of Medicine, Jenderal Soedirman University, Indonesia
[4]Department of Clinic Phatology, Faculty of Medicine, Jenderal Soedirman University, Indonesia
[5]Department of Bioethics and Humanities, Faculty of Medicine, Jenderal Soedirman University, Indonesia

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ABSTRAK

Varises esofagus merupakan salah satu komplikasi yang sering terjadi pada pasien dengan sirosis hati dan dapat menyebabkan perdarahan yang berisiko tinggi. Penelitian ini bertujuan untuk menganalisis hubungan antara skor APRI (Aspartate Aminotransferase-to-Platelet Ratio Index) dan derajat varises esofagus pada pasien sirosis hati di RSUD Prof. Dr. Margono Soekarjo. Penelitian ini menggunakan desain analitik observasional dengan pendekatan cross-sectional terhadap 89 pasien yang memenuhi kriteria inklusi. Hasil analisis menunjukkan adanya korelasi positif yang signifikan antara skor APRI dengan derajat varises esofagus (p=0,039, r=0,220), yang berarti semakin tinggi derajat varises esofagus, semakin tinggi pula skor APRI. Temuan ini menunjukkan bahwa skor APRI dapat digunakan sebagai alat bantu non-invasif untuk mendeteksi derajat varises esofagus pada pasien sirosis hati, dengan potensi sebagai metode diagnostik yang lebih praktis dan murah.

ABSTRACT

Esophageal varices are one of the most common complications in patients with liver cirrhosis and can lead to high-risk bleeding. This study aims to analyze the relationship between the APRI (Aspartate Aminotransferase-to-Platelet Ratio Index) score and the degree of esophageal varices in liver cirrhosis patients at RSUD Prof. Dr. Margono Soekarjo. This research used an observational analytic design with a cross-sectional approach, involving 89 patients who met the inclusion criteria. The analysis revealed a significant positive correlation between the APRI score and the degree of esophageal varices (p=0.039, r=0.220), indicating that the higher the degree of esophageal varices, the higher the APRI score. These findings suggest that the APRI score can be used as a non-invasive tool to detect the degree of esophageal varices in liver cirrhosis patients, with potential as a more practical and cost-effective diagnostic method.

1. INTRODUCTION

Esophageal varices are one of the most common complications of liver cirrhosis and can lead to life-threatening bleeding, significantly increasing patient morbidity and mortality (de Mattos, 2013). Bleeding from esophageal varices is a serious condition that can escalate mortality rates if not properly managed (Vidyani et al., 2011). Patients who have experienced variceal bleeding are at a high risk of recurrent bleeding, which further reduces survival rates compared

*Corresponding author
E-mail addresses: agungkamal2@gmail.com (Kamal Agung Wijayana)

to those experiencing their first bleeding episode (Widjaja & Karjadi, 2011). The higher the grade of esophageal varices, the greater the likelihood of bleeding (Kusumobroto et al., 2007).

Approximately 50% of patients with liver cirrhosis develop gastroesophageal varices, with esophageal varices being more common than gastric varices, occurring in about 30-70% of cases (World Gastroenterology Organization, 2013). About 30% of patients with esophageal varices will experience bleeding within the first year after diagnosis. The risk of initial variceal bleeding within a year is estimated at 12%, while the recurrence rate reaches approximately 60% within the same period (Widjaja & Karjadi, 2011).

Esophagogastroduodenoscopy (EGD) is the gold standard for detecting esophageal varices and determining their severity (World Gastroenterology Organization, 2013). This procedure is routinely performed in patients with liver cirrhosis to monitor the progression of esophageal varices (de Mattos, 2013). However, EGD is an invasive procedure that can cause discomfort to patients, is costly, time-consuming, and often requires sedation. Therefore, an alternative non-invasive method with high sensitivity and specificity is needed to detect esophageal varices.

Several studies have indicated that the Aspartate Aminotransferase-to-Platelet Ratio Index (APRI), initially developed for liver fibrosis assessment, can also serve as a non-invasive method for detecting esophageal varices and their severity at a lower cost while providing better patient comfort (de Mattos, 2013). Based on this background, this study aims to analyze the relationship between APRI score and the severity of esophageal varices in patients with liver cirrhosis at RSUD Prof. Dr. Margono Soekarjo.

2. METHOD

Population and Sample

The research design used in this study is an observational analytical study with a cross-sectional approach, where data is collected at a single point in time without follow-up on the study samples. Data collection is conducted retrospectively using secondary data in the form of medical records. The sampling technique used is non-probability sampling with a consecutive sampling approach. The target population of this study consists of patients diagnosed with liver cirrhosis complicated by esophageal varices at RSUD Prof. Dr. Margono Soekarjo.

Data Analysis

Univariate analysis is used to describe the dependent and independent variables in this study. This analysis involves measures of central tendency and data dispersion. If the data is normally distributed, the mean will be used as the measure of central tendency, and standard deviation (SD) will be used as the measure of data dispersion. If the data is not normally distributed, median and the range of minimum-maximum values will be presented. Univariate analysis will also be presented as frequency distributions based on age groups, APRI score classes, and the degree of esophageal varices.

Bivariate Analysis

To assess the correlation between the APRI score and the degree of esophageal varices, Spearman's correlation test will be used. The correlation test is considered statistically significant if the p value is < 0.05.

Diagnostic Performance Test Analysis

The diagnostic performance test analysis is used to determine the cut-off APRI score for the degree of esophageal varices. Once the APRI cut-off score is determined, diagnostic performance tests such as sensitivity, specificity, positive predictive value, and negative predictive value will be performed.

3. RESULT AND DISCUSSION

Result

The data for this study were obtained from the medical records of 89 patients with liver cirrhosis and esophageal varices at RSUD Prof. Dr. Margono Soekarjo from January 2017 to January 2019, who met the inclusion criteria and did not meet the exclusion criteria. The characteristics of the study subjects are shown in Table 1.

Table 1: Characteristics of Study Subjects

Variabel	**Total Pts (n=89)**	**FI (Kecil) (n=12)**	**FII-FIII (Sedang-Besar) (n=77)**	***p-value***	***r-value***
Jenis kelamin (laki-laki/ perempuan)	65/24	10/2	55/22	0,501	-
Usia (tahun)	53,29 ± 9,69	55,42 ± 10,55	52,96 ± 9,58	0,431	-0,085
AST (U/L)	58 (15-493)	43 (16-110)	65 (15-493)	0,032	0,228
Platelet count (10^9/L)	104 (30-386)	129 (51-285)	103 (30-386)	0,938	-0,008
Skor APRI	1,6 (0,15-5,60)	1,07 (0,15-1,91)	1,63 (0,26-5,60)	0,039	0,220
Varises, n (%)				-	-
Kecil (I)	12 (13,5)	12 (100)	0 (0)		
Sedang (II)	38 (42,7)	0 (0)	38 (49,4)		
Besar (III)	39 (43,8)	0 (0)	39 (50,6)		

Diagnostic Performance Test of APRI Score in Predicting Medium-Large Esophageal Varices

The analysis using the ROC curve revealed that the area under the curve (AUC) was 71.4% (95% CI: 57.1%-85.7%). The ROC curve can be seen in Figure 4.3.

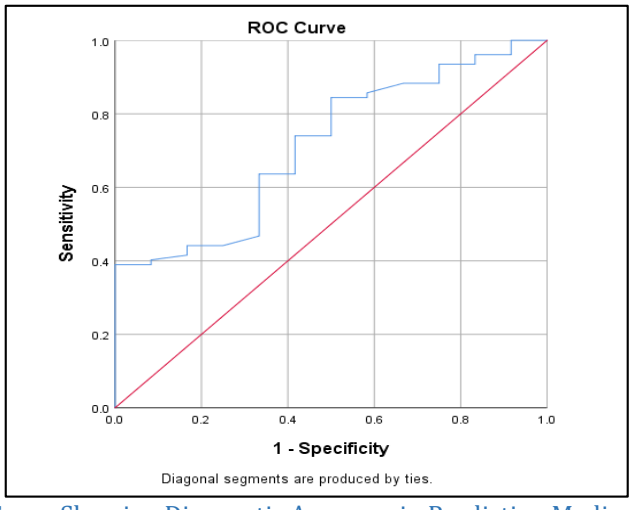

Figure 1: ROC Curve Showing Diagnostic Accuracy in Predicting Medium-Large Varices

In this study, the APRI score demonstrated good ability to predict the size of esophageal varices (p=0.018). The researcher presented three optimal cut-off values for the APRI score in predicting medium-large varices (Grade II-III), namely ≥0.970, ≥1.190, and ≥1.925. Based on these

cut-offs, sensitivity, specificity, positive predictive value, and negative predictive value are displayed in Table 4.2.

Table 2: Comparison of ROC Analysis for APRI Score in Predicting Medium-Large Esophageal Varices

Variabel	AUC (%)	*Cut-off*	Sen (%)	Spe (%)	PPV	NPV	P
Skor APRI	71,4	≥0,970	84,4	50	91,5	33,3	0,018
		≥1,190	74,0	58,3	91,9	25,9	
		≥1,925	39,0	100	100	20,3	

Discussion

Esophageal varices are one of the most frequent complications of liver cirrhosis (de Mattos, 2013). They are highly dangerous as they can lead to bleeding, which increases morbidity and mortality in patients with liver cirrhosis (Vidyani et al., 2011). Once a patient has experienced bleeding, the likelihood of recurrent bleeding becomes very high. Moreover, the risk of death is always present with each bleeding episode, and survival rates are lower in patients with recurrent bleeding compared to those who have experienced only a single episode (Widjaja & Karjadi, 2011). Therefore, early detection of esophageal varices in liver cirrhosis patients is crucial. Esophagogastroduodenoscopy (EGD) is the gold standard for diagnosing esophageal varices (World Gastroenterology Organization, 2013), but it is invasive, can cause discomfort for the patient, is costly, time-consuming, and often requires sedation. Therefore, an alternative non-invasive method that is sensitive and specific for patients is needed. One potential non-invasive marker for detecting the degree of esophageal varices is the APRI score (de Mattos, 2013), which has been validated for identifying liver fibrosis (Prechachaisurat et al., 2012). The potential of the APRI score to detect the degree of esophageal varices is related to the significant association between liver fibrosis, portal hypertension, and esophageal varices (de Mattos, 2013).

This study used secondary data from medical records of 89 patients with liver cirrhosis and esophageal varices at RSUD Prof. Dr. Margono Soekarjo between January 2017 and January 2019, who met the inclusion criteria and not the exclusion criteria. In the analysis of the study subjects' characteristics, moderate to large esophageal varices (II-III) were grouped together, as clinical guidelines for managing portal hypertension bleeding in cirrhosis by the American Association for the Study of Liver Disease (AASLD) in 2016 suggest similar management strategies for both degrees.

The results of this study show that the number of male patients exceeds that of female patients. This is consistent with findings from Meseeha & Attia (2019) and Suprianto et al. (2016), which reported that men are more often exposed to risk factors for liver cirrhosis, such as alcohol consumption and hepatitis virus infection (Karina, 2007). Additionally, estrogen hormones in women, especially estradiol, have a protective effect against oxidative stress, fat accumulation in organs, and fibrogenesis in the liver (Suzuki & Abdelmalek, 2009; Lee et al., 2019).

The majority of study subjects were between 29 and 75 years old, with a mean age of 53.29 ± 9.69 years. This study indicates that the incidence of liver cirrhosis with esophageal varices tends to increase with age. Other studies have also confirmed that the incidence of fibrosis leading to cirrhosis increases with age, regardless of its etiology. This occurs because, with aging, changes in inflammatory responses in hepatocytes occur, triggering the activation of hepatic stellate cells (HSCs), which play a role in liver fibrosis development (Yorgov et al., 2011).

The number of female patients started increasing at age ≥41, related to changes in estrogen levels, especially estradiol, which significantly decrease after menopause (Lee et al., 2019). This decrease in estrogen causes the loss of liver protection from fibrosis that is usually provided by the hormon. Analysis results show that Aspartate Aminotransferase (AST) has a significant positive correlation with the degree of esophageal varices ($p=0.032$, $r=0.228$). The higher the degree of esophageal varices, the higher the AST levels in patients. This is related to the increased portal vein pressure due to blood flow resistance leading to the formation of esophageal

varices (Widjaja & Karjadi, 2011) and hepatocyte damage, resulting in the release of AST into the bloodstream (Bilshop et al., 2010).

This study also showed that although platelet count did not show a significant correlation with the degree of esophageal varices, most subjects experienced thrombocytopenia (platelet count below normal). This is related to reduced thrombopoietin production in cirrhotic patients, which in turn reduces platelet production (Hayashi et al., 2014). The APRI score, calculated using the formula [(AST level : Upper Normal Limit) : platelet count (109/L)] x 100, showed a significant positive correlation with the degree of esophageal varices (p=0.039, r=0.220). This indicates that the higher the degree of esophageal varices, the higher the APRI score. Previous studies have also shown that the APRI score has a significant correlation with the degree of esophageal varices (Tafarel et al., 2011; Suprianto et al., 2016).

Diagnostic performance testing was performed using ROC analysis, which showed that the area under the curve (AUC) of the APRI score in predicting moderate-large esophageal varices was 71.4% (95% CI: 57.1%-85.7%). Based on these results, the best cut-off value is ≥1.190, with sensitivity 74% and specificity 58.3%. This AUC value indicates moderate ability of the APRI score in predicting the size of esophageal varices, and thus, the APRI score can be used as a fairly reliable diagnostic tool in clinical practice.

4. CONCLUSION

The APRI score in this study shows a significant positive correlation with the degree of esophageal varices (p=0.039, r=0.220). This indicates that the higher the degree of esophageal varices, the higher the APRI score. The increase in the APRI score occurs because of the higher AST levels and lower platelet count in patients as the degree of esophageal varices increases, thus resulting in an elevated ratio of these two parameters.

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