

Study of Right Lobe of Liver Diameter to Albumin Ratio as a Non-Invasive Predictor of Oesophageal Varices in Patients with Liver Cirrhosis

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I. Background

One of the most dreaded complications of liver cirrhosis is oesophageal varices which is a result of portal hypertension. It carries a very high risk of mortality (20 to 35%). The risk of developing oesophageal varices in cirrhotic patients over their life time amounts to about 5 to 15 percent per year and the rate of progression from small to large varices amounts to 8 percent per year. Therefore early identification and grading of varices remains the foremost step for risk assessment and thereby prevention of mortality.

Upper gastrointestinal endoscopy remains the gold standard test for identification of varices. Endoscopy being invasive, costly, with increased risk of infection and bleeding there is a need for some reliable non invasive predictors for oesophageal varices which are cost effective, quick, simple and reproducible not adding burden to the patients. Many studies have been focussed on such non -invasive predictors like platelet count, spleen size, portal vein diameter etc., and many models have been proposed. This study focuses on a superior method of variceal prediction based on right lobe liver diameter albumin ratio.

The right lobe liver diameter is a very easy parameter that can be measured simply as a part of ultrasound abdomen and serum albumin levels are measured as routine biochemical investigation. Thus this method requires parameters which can be easily detected without any additional efforts and thereby carries increased compliance.

II. Objectives

- To study the value of biochemical and ultra sonographic parameters in prediction of presence and size of oesophageal varices.
- Right lobe of liver to albumin ratio can be used as a screening tool to suspect the presence of oesophageal varices

III. Materials And Methods

The study was conducted on 100 patients admitted in Government Rajaji Hospital & Madurai Medical College during the study period from March 2018 to August 2018.

Inclusion Criteria

- All patients aged 18 years and above diagnosed to have cirrhosis of liver admitted in Medicine Department and Medical Gastroenterology department

Exclusion Criteria

- Previous history of portal hypertensive bleeding, hepatocellular carcinoma, portal vein thrombosis
- Previous or current treatment with beta blockers, diuretics, or other vasoactive drugs
- Budd chiari syndrome or other non cirrhotic portal hypertension

DATA COLLECTION:

Informed consent will be obtained from all patients/attenders to be enrolled for the study. In all the patients relevant information will be collected in a predesigned proforma. The patients are selected based on clinical examinations and biochemical tests.

LABORATORY INVESTIGATIONS

- a) Complete Hemogram
- b) Liver function test
- c) Serum electrolyte
- d) Serum albumin, globulin
- e) Prothrombin time
- f) Viral markers

IMAGING STUDIES

- a) Ultra sonograph

DESIGN OF STUDY:

Prospective study

PERIOD OF STUDY:

6 MONTHS

COLLABORATING DEPARTMENTS:

DEPARTMENT OF PATHOLOGY and DEPARTMENT OF BIOCHEMISTRY and DEPARTMENT OF RADIODIAGNOSIS

ETHICAL CLEARANCE: Obtained

CONSENT: Individual written and informed consent.

ANALYSIS: The collected data will be entered in Microsoft Excel spreadsheet and analyzed using Statistical Package for Social Sciences (SPSS) version 17

CONFLICT OF INTEREST: NIL

FINANCIAL SUPPORT: SELF

IV. Results

TABLE 1: AGEWISE DISTRIBUTION

| AGE | NUMBER OF CASES |
|---------|-----------------|
| < 40 | 22 |
| 40 – 50 | 42 |
| > 50 | 36 |
| Total | 100 |

TABLE 2: GENDER WISE DISTRIBUTION

| SEX | NO OF CASES |
|--------|-------------|
| Male | 90 |
| Female | 10 |
| Total | 100 |

TABLE 3: DISTRIBUTION WITH RESPECT TO ETIOLOGY

| ETIOLOGY | NO.OF CASES |
|-------------|-------------|
| ALCOHOL | 56 |
| AUTOIMMUNE | 6 |
| CRYPTOGENIC | 2 |
| VIRAL | 32 |
| WILSON | 4 |
| Total | 100 |

TABLE 4: SERUM BILIRUBIN VALUES

| SERUM BILIRUBIN | NO OF CASES |
|-----------------|-------------|
| < 7 | 26 |
| 7 - 9 | 48 |
| > 9 | 26 |
| Total | 100 |

TABLE 5: SERUM ALBUMIN VALUES

| ALBUMIN | NO OF CASES |
|---------|-------------|
| < 3 | 30 |
| 3 - 4 | 38 |
| > 4 | 32 |
| Total | 100 |

TABLE 6: DISTRIBUTION BASED ON CHILD PUGH

| CHILD PUGH | NO OF CASES |
|------------|-------------|
| A | 30 |
| B | 38 |
| C | 32 |
| Total | 100 |

TABLE 7: DISTRIBUTION BASED ON RIGHT LOBE LIVER DIAMETER

| RIGHT LOBE OF LIVER | NO OF CASES |
|---------------------|-------------|
| < 9 | 22 |
| 9 - 11 | 44 |
| < 11 | 34 |
| Total | 100 |

TABLE 8: RATIO (F/H) INTERPRETATION

| RATIO(F/H) | NO OF CASES |
|------------|-------------|
| < 5 | 38 |
| < 7 | 20 |
| Total | 100 |

TABLE 9: VARICEAL GRADE WISE DISTRIBUTION

| VARICEAL GRADE | NO OF CASES |
|----------------|-------------|
| 0 | 21 |
| I | 25 |
| II | 40 |
| III | 14 |
| Total | 100 |

TABLE 10: VARICEAL GRADE VS RT LOBE LIVER DIAMETER

| VARICEAL GRADE VS RT LOBE LIVER | | | |
|---------------------------------|-------|------|----------|
| variceal grade vs rt lobe liver | Mean | SD | p' value |
| 0 | 10.54 | 1.15 | |
| I | 9.74 | 1.02 | |
| II | 10.32 | 1.22 | |
| III | 10.81 | 1.42 | 0.033 |

For those with grade 3 varices when compared with right lobe liver diameter the standard deviation obtained is 1.42 which corresponds to a p value of 0.033 which is significant. It proves that there is direct correlation between right lobe liver diameter and oesophageal varices.

TABLE 11: VARICEAL GRADE VS RATIO(F/H)

| VARICEAL GRADE VS RATIO(F/H) | | | |
|-------------------------------|------|------|----------|
| variceal grade vs Ratio (F/H) | Mean | SD | p' value |
| 0 | 2.98 | 0.52 | |
| I | 5.14 | 0.59 | |
| II | 6.28 | 1.05 | |
| III | 7.96 | 1.34 | <0.001 |

For those with grade 3 varices when compared to F/H ratio with a mean value of 7.96 the standard deviation obtained is 1.34 which corresponds to the p value of <0.001 which is significant.

TABLE 12: VARICEAL GRADE VS BILIRUBIN

| VARICEAL GRADE VS BILIRUBIN | | | |
|--------------------------------|------|------|-----------------|
| variceal grade vs sr bilirubin | Mean | SD | p' value |
| 0 | 7.35 | 2.27 | |
| I | 8.40 | 2.13 | |
| II | 8.45 | 1.86 | 0.164 |
| III | 7.76 | 1.55 | Not significant |

TABLE13: VARICEAL GRADE VS ALBUMIN

| VARICEAL GRADE VS ALBUMIN | | | |
|---------------------------|------|------|-----------------|
| variceal grade vs albumin | Mean | SD | p' value |
| 0 | 3.64 | 0.75 | |
| I | 3.54 | 0.93 | |
| II | 3.66 | 0.66 | 0.151 |
| III | 3.1 | 0.98 | Not significant |

TABLE 14: CORRELATION BETWEEN VARICEAL GRADE VS RATIO (F/H)

| CORRELATION BETWEEN VARICEAL GRADE VS RATIO (F/H) | | | |
|---|------|------|----------|
| variceal grade vs Ratio (F/H) | Mean | SD | p' value |
| 0 | 2.98 | 0.52 | |
| I | 5.14 | 0.59 | |
| II | 6.28 | 1.05 | |
| III | 7.96 | 1.34 | <0.001 |

LIMITATIONS

- It is a small scale study.
- Long term follow up is not done.
- Liver biopsy which is gold standard for diagnosis of cirrhosis has not been done.

V. Discussion

Among the study population of 100, about 42% belong to the age group of 40 to 50. Among 100, there were 90 male and 10 females. In this study, Alcoholism is the most common etiology contributing about 56% which is followed by viral 32%. The serum bilirubin values of most patients about 48% lie between 7-9 mg/dl. Serum albumin levels of most of the patients about 38% fall between 3-4 g/dl. About 38% fall under category B of Child Pugh classification. The right lobe liver diameter of about 44% of patients fall between 9-11cm.

The F/H ratio of about 42% of patients falls within 5-7. About 40% of the study population have been found to have grade 2 varices. The standard deviation of the study population of 42% whose values fall within F/H ratio of 5-7 is found to be 1.36. For those with grade 3 varices when compared with right lobe liver diameter the standard deviation obtained is 1.42 which corresponds to a p value of 0.033 which is significant.

It proves that there is direct correlation between right lobe liver diameter and oesophageal varices. For those with grade 3 varices when compared to F/H ratio with a mean value of 7.96 the standard deviation obtained is 1.34 which corresponds to the p value of <0.001 which is significant.

The correlation coefficient is found to be 0.86 which is a good correlation. The right lobe liver diameter is a very easy parameter that can be measured simply as a part of ultrasound abdomen and serum albumin levels are measured as routine biochemical investigation.

Thus this method requires parameters which can be easily detected without any additional efforts and thereby increases compliance.

VI. Conclusions

Higher grades of oesophageal varices was noted with higher right lobe of liver diameter to albumin ratios. Thus the Right lobe of liver to albumin ratio can be used as a screening tool to diagnose the presence of oesophageal varices. Hence, this can identify subset of patients who require prophylactic endoscopic management. Therefore, this reduces the economic burden on the patients and reduces the cost of management

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