Original Article

The need for gastroscopy in early cirrhotics – a retrospective analytical study

Jessica Coppini, Nicholas-Paul Delicata, James Pocock

Abstract

The aim of this study was to predict which Child-A cirrhotic patients would not have oesophageal varices at endoscopy.

This is a retrospective study that reviewed 59 Child-A cirrhotic patients under the care of a gastroenterology firm. All gastroscopy reports (97 episodes in total) undergone by these patients were analysed. Patients were classified into 3 groups namely absent varices (AV) group: no oesophageal varices seen at endoscopy, small varices (SV) group: small oesophageal varices seen, banded varices (BV) group: moderate/large oesophageal varices requiring banding. In this study the varices were graded as per UK guidelines that is small varices being ones which collapse to inflation of the oesophagus with air, moderate varices do not collapse and large varices occlude the lumen.[1] Patient demographics, a platelet count and spleen size on imaging at the time of endoscopy were also noted. Statistical differences between the 3 groups were then analysed using ANOVA.

Our results showed that most of the patients were middle aged males. Furthermore, there was a statistically significant difference in platelet count and spleen size between the three groups (*p* values: 0.008 and 0.035 respectively). A noteworthy finding was that none of the patients who required banding had a normal spleen size (spleen < 12 cm). Having said this, due to considerable overlap between the three groups, further recommendations could not be proposed.

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Background

Despite recent advances, oesophageal variceal bleeding in cirrhosis is still associated with 10-20% mortality at 6 weeks.[1] Furthermore, in 35-90% of patients rebleeding occurs after spontaneous haemostasis (approximately 40% of rebleeding episodes occurring within the first 5 days).[2] Once cirrhosis is diagnosed a gastroscopy is recommended to check for oesophageal varices in most cases.[3] If oesophageal varices are present, treatment is required to prevent variceal bleeding (primary prophylaxis of variceal haemorrhage).[4] The recommended treatment is with non-selective beta blockers (NSBB) for patients with small varices and either NSBB or variceal banding if medium to large varices are present.[1] Splenomegaly and consumptive thrombocytopenia are recognized complications of significant portal hypertension secondary to cirrhosis[5] and potential indices for indirect diagnosis of oesophageal varices.[6]

Aim

Oesophageal varices are a major complication of portal hypertension and occur in 30-70% of cirrhotics.[7] Is it possible to predict which cirrhotic patients will have oesophageal varices requiring treatment before performing a gastroscopy?

Method

This is a retrospective study looking at all the gastroscopy reports of Child-A cirrhotic patients under the care of a single gastroenterology/hepatology firm performed in 2015 (see table 1 for population demographics). The diagnosis of cirrhosis was in most cases based on imaging studies as shear wave elastography has only recently been introduced locally. The aetiology of liver cirrhosis included autoimmune liver conditions, alcoholic liver disease, chronic viral

hepatitis and non-alcoholic steatohepatitis. Once a patient was recruited their previous endoscopies were also retrieved and matched with their Child-

Pugh score at the time (see table 2). Platelet counts and spleen size as measured on imaging (US/CT/MRI) within three months of endoscopy were also recorded. For the purposes of the study a normal sized spleen is one which is less than 12 cm. During data collection whenever splenomegaly was noted on imaging but no precise measurement was given, a spleen size of 12 cm was allocated. Conversely a normal spleen with no precise measurement was given a value of 11 cm.[8] The gastroscopy report was used to determine whether varices were present. If present and banding was performed this was also recorded. Once oesophageal banding was performed further endoscopies to control variceal size were excluded from the study since the question of prediction is no longer relevant in these patients. Patients with a previous splenectomy or who were suffering from myeloproliferative conditions (which often effects spleen size and platelet counts) were excluded from the study. Patients with early hepatocellular carcinoma (within the Milan transplant criteria)[9] were not excluded from the study as it was felt that early cancer would not contribute significantly to portal hypertension. ANOVA statistical analysis was used to measure significant differences between groups regarding platelet count and spleen size.

Results

A total number of 59 patients undergoing 97 gastroscopies (episodes) between 2008 and 2015 were included in the study. The cases were divided into 3 groups; absent varices (AV) group: no varices seen at endoscopy, small varices (SV) group: small varices not requiring banding and banded varices (BV) group: medium–large varices requiring banding at endoscopy. Figure 1 illustrates the number of episodes in each group.

Age Distribution

75.3% (*n*=73) of episodes were in patients between 50 -69 years of age (Figure 2)

Gender distribution

71.1% (*n*=69) of episodes studied involved males (figure 3). This gender distribution was similar throughout the three groups.

Table 1: *Population Demographics*

VARIABLE	MEAN (± SD) OR NUMBER (%)
Age (years)	60.8±9.3
Gender (male)	69 (71.1%)
Gender (female)	28 (28.9%)
Aetiology of cirrhosis	
AICAH	2 (2.1%)
AIH	1 (1.0%)
ALD	25 (25.8%)
Cryptogenic	10 (10.3%)
HBV	8 (8.2%)
HCV	15 (15.5%)
HCV/HBV	1 (1.0%)
NASH	28 (28.9%)
PBC	1 (1.0%)
PCLD	2 (2.1%)
PSC	2 (2.1%)
Schistosomiasis	1 (1.0%)
Wilson's	1 (1.0%)
No varices on endoscopy	42 (43.3%)
Varices on endoscopy	55 (56.7%)
Grade of varices	
Small varices	29 (52.7%)
Moderate varices	21 (38.2%)
Large varices	5 (9.1%)
Treatment of varices	
Varices not banded	28 (50.9%)
Varices banded x1	24 (43.6%)
Varices banded x2	3 (5.5%)
Spleen size (cm)	13.3±2.3
Splenomegaly	87 (89.6%)
Child score 5	83 (85.6%)
Child score 6	14 (14.4%)
Platelet count x10^9/L	147.8±65.5
Platelet count <150 x10^9/L	48 (50.5%)
HCC comorbid patients	12 (12.4%)

Table 2: *Child-Pugh classification used in the study*

CHILD SCORE	1	2	3
Encephalopathy	Absent	Mild (1,2)	Severe (3,4)
Ascites	Absent	Easy to Rx	Difficult to Rx
Bilirubin	<4	34-51	>51
Albumin	>35	28-35	<28
INR	<1.3	1.3-1.5	>1.5

CHILD GRADE
Child A: 5-6
Child B: 7-9
Child C: 10-15

Figure 1: *The 97 episodes were divided into 3 groups depending on gastroscopy findings- absent varices (AV) group, small varices (SV) group and banded varices (BV) group*

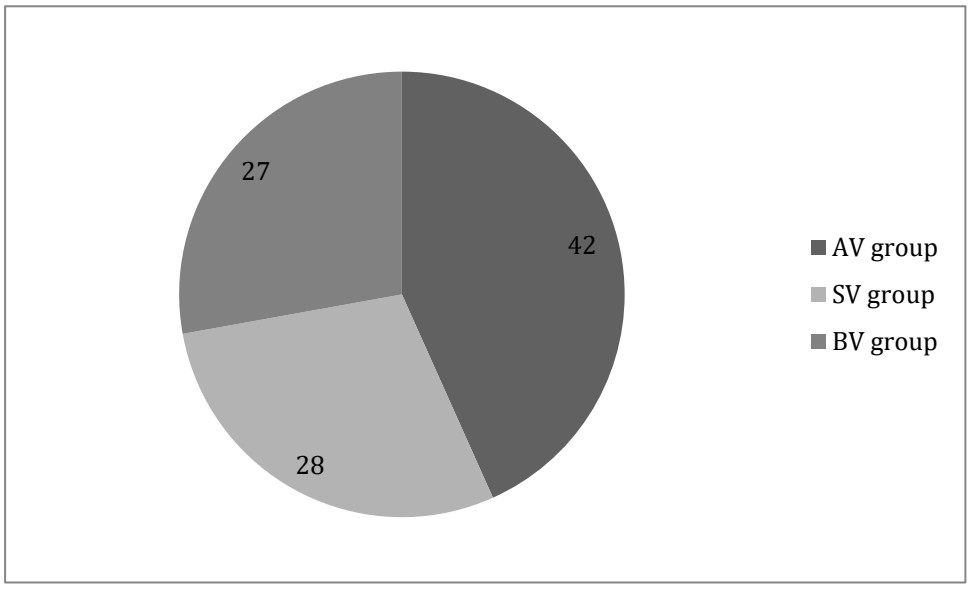

Figure 2: *Age distribution. N=97*

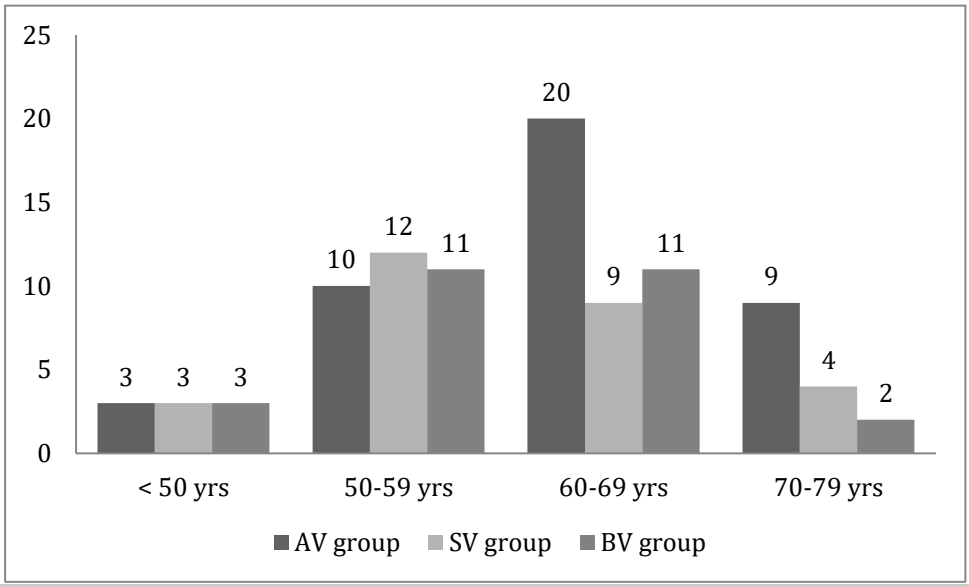

Figure 3: *Gender distribution. N=97*

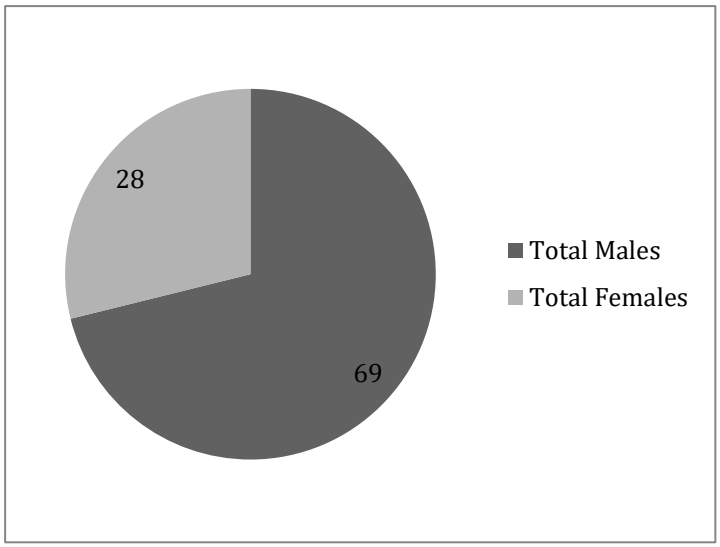

Figure 4: *Proportion of the total population with spleen size <12cm vs proportion with splenomegaly. N= 97*

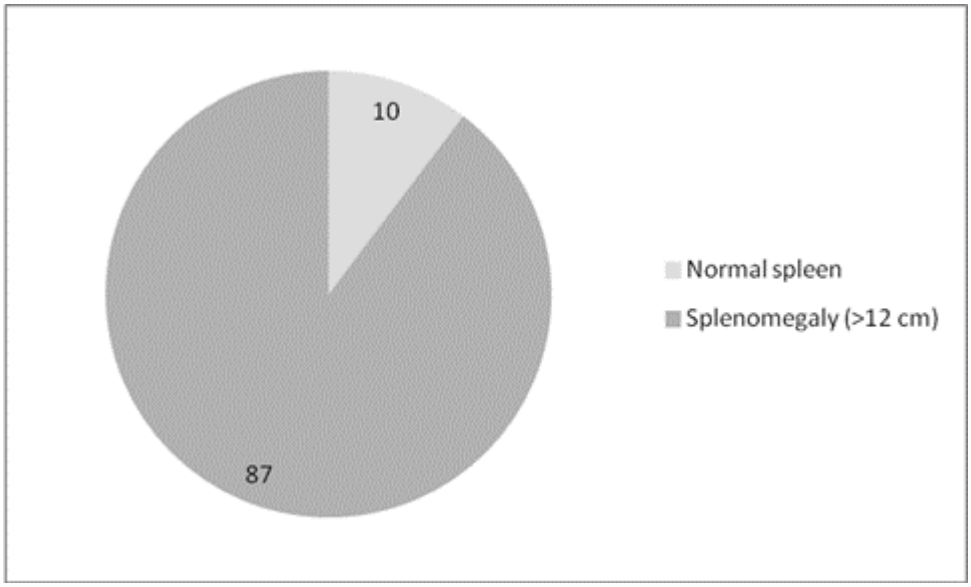

Table 3: *Spleen size across the three groups; absent varices (AV) group, small varices (SV) group and banded varices (BV) group*

GROUP	Normal Spleen	Spleen >12cm	% Splenomegaly
AV group	2	40	95.2%
SV group	8	20	71.4%
BV group	0	27	100%

Table 4: *ANOVA results comparing spleen size between the groups*

	AV group	SV group	BV group
Mean	12.8	12.9	14.2
95% confidence interval for Mean	12.09-13.48	12.06-13.76	13.31-15.04
Standard deviation	1.64	2.85	2.4
High	16.5	19	20.2
Low	8	4.4	12
Median	12	12	13
Absolute Average deviation from Median	1.05	2.02	1.99

Table 5: *Platelet count across the three groups*

GROUP	Platelets (10^9/L) <150	Platelets (10^9/L) >150	% with thrombocytopenia
AV	16	26	38.1%
SV	13	15	46.4%
BV	18	9	66.7%

Table 6: *ANOVA results comparing platelet count across the three groups*

	AV group	SV group	BV group
Mean	169	143	120
95% confidence interval for Mean	150-188	119-167	96-144
Standard deviation	72	58	52
High	380	321	243
Low	70	37	48
Median	158	141	119
Absolute Average deviation from Median	47.4	43.5	45

Spleen size (cm)

89.6% (*n*=87) of the population studied had a spleen size >12cm as seen in figure 4. Interestingly 23.8% (*n*=10) of AV group patients had spleens larger than 14 cm. On the other hand, none of the patients in BV group had a normal sized spleen (<12 cm) (table 3).

Statistical analysis using ANOVA showed that spleen size difference between the 3 groups was statistically significant (*p*= 0.035) (table 4).

Platelet count: Units x10^9/L

In BV group, 66.7% (*n*=18) of patients had a platelet count <150 x10^9/L whereas in AV group 61.9% (*n*=26) of patients had a platelet count > 150 x10^9/L (table 5).

Statistical analysis using ANOVA showed that platelet count differences between the 3 groups was statistically significant (*p*=0.008) (table 6).

Discussion

Several recent studies have explored possible non-invasive predictors of the presence and/or severity of oesophageal varices in cirrhotics including such indices as spleen size, platelet count, spleen stiffness, liver stiffness, liver volume and

serum albumin level.[10-11,5] Spleen size and platelet count are indices which are readily available after initial workup of patients with chronic liver disease and were thus selected in this study for further evaluation. Studies have shown that as cirrhosis progresses spleen size tends to increase and platelet count tends to decrease.[6] The aim of this study was to assess whether one could predict which patients would have oesophageal varices requiring treatment before performing endoscopy and therefore which patients can safely avoid such invasive monitoring.

In this study 66.7% of BV group had platelet counts below 150 $x10^9$/L as opposed to 38.1% of AV group patients and this result was statistically significant. There was still however considerable overlap between the 2 groups such that 33.3% (*n*=9) of BV group patients had platelet counts above 150 $x10^9$/L. Platelet counts on their own therefore cannot be used to predict the presence of varices in cirrhotic patients. In the case of spleen size the differences between groups were again statistically different and the overlap between the groups was less marked. A possible inference from the results obtained would be that with spleen size of <12 cm varices requiring banding would not be found. However, only 10.3% (*n*=10) of the population studied had a spleen size within normal limits, and out of these, 8 episodes had small oesophageal varices (SV group) which would still require treatment with non-selective beta blockers.

In recently published guidelines [2] recommendations were made for which cirrhotic patients could safely avoid screening at endoscopy. These guidelines stated that patients with a liver stiffness <20 kPa and with a platelet count >150 $x10^9$/L have a very low risk of having varices requiring treatment, and can avoid screening endoscopy. Liver stiffness measurement was not considered in this study as this modality has only recently been introduced in Malta and is subject to numerous variables such as obesity, elevated ALT levels and liver venous or biliary congestion.[12]

The main limitation of our study was that the diagnosis of cirrhosis was based on imaging studies rather than liver biopsies. Liver biopsies are considered invasive and often avoided clinically. In future, similar studies should also include liver stiffness measurements in the diagnosis of cirrhosis. Another limitation of our study was that patients with different aetiologies of cirrhosis were recruited. Considering cirrhotic patients with a single aetiology may produce more robust conclusions. Furthermore, when collecting data on spleen size US, CT and MRI modalities were referenced depending on which imaging study was performed closest to the date of endoscopy. More accurate measurements would have been obtained had all spleen size measurements been calculated using MRI[13] however since data was collected retrospectively this was not possible. At the start of the study several inclusion and exclusion criteria were laid out before selecting the population to be studied to improve validity of the results obtained. One limitation of the study however was that not all variables that may affect spleen size and platelet count were taken into consideration.

In conclusion, despite the relatively small size of our study the results were statistically significant and it is unlikely that more patients would have resulted in a different outcome. Having said this, the study did not yield any new recommendations to alter existing clinical practice.

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