

# Junctional varices as an important cause for recurrent variceal bleeding

## Abstract

**Background and study aims:** Bleeding from gastric varices is a life threatening complication of portal hypertension.

**Methods:** This work included 166 patients with gastric varices among 443 Egyptian patients with variceal bleeding, 88 (53%) patients with junctional varices and 89 (53.6%) patients with fundal varices and 11 patients had both types of varices. All patients were injected by cyanoacrylate and followed up for the recurrence of varices and the variceal rebleeding for a period of 6.5+1.2months.

**Results:** Thirty four out of 88 (38.6%) patients with junctional varices had rebleeding. Rebleeding occurred in 11 out of 89 (12.4%) patients with fundal varices. The total incidence of rebleeding of junctional varices was significantly higher than the incidence of rebleeding in fundal varices ( $P < 0.001$ ).

**Conclusion:** Junctional varices has a significantly high rate of rebleeding as they may be easily missed during endoscopic examination as they are usually multiple and are frequently mistaken for gastric folds especially if they are not actively bleeding.

**Keywords:** gastric varices, junctional varices, recurrent variceal bleeding, gastroesophageal varices

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**Abbreviations:** GOV1, gastroesophageal varices type 1; IGV, isolated gastric varices; GOV, gastroesophageal varices; GOV 2, gastroesophageal varices type 2; IGV 1, isolated gastric varices type 1; IGV 2, isolated gastric varices type 2; HCC, hepatocellular carcinoma, CA; cyanoacrylate

## Introduction

Although the outcome of variceal hemorrhage has improved over the past two decades, variceal hemorrhage is still the most serious complication of portal hypertension and chronic liver disease.<sup>1</sup> Although bleeding occurs less often from gastric varices than from esophageal varices, it has a poorer prognosis and is associated with more severe blood loss, a higher rebleeding rate, and a higher mortality rate.<sup>2,3</sup> The rebleeding rate of gastric varices after cyanoacrylate injection is variable and ranges from 10 to 42%.<sup>4</sup> This wide variation of rebleeding rate may be due to the type of gastric varices whether isolated fundal or junctional varices.

All varices distal to the squamocolumnar junction are technically "gastric". Several classifications of gastric varices have been proposed, based on the location, size, and endoscopic features. Hosking S and Johnson A proposed the following classification:

1. Type 1 varices are those which appear as an inferior extension of esophageal varices across squamocolumnar junction.
2. Type 2, are gastric varices (nearly always accompanied by esophageal varices) located in the fundus which appear to converge towards the cardia.
3. Type 3, are gastric varices located in the fundus or body in the absence of esophageal varices and which appear unconnected to the cardia.<sup>5</sup>

Another classification, the Sarin classification, based on the anatomic location of varices, their relationship with esophageal varices,

and their origin as primary present at the time of initial presentation or secondary presenting after the obliteration of esophageal varices.<sup>6</sup>

According to this classification, gastric varices are divided into two types, gastroesophageal varices (GOV) and isolated gastric varices (IGV). Gastroesophageal Varices: extend beyond the gastroesophageal junction and are always associated with esophageal varices.<sup>3</sup>

They are further subdivided into Type 1 (GOV 1): most common type 74.6% of all gastric varices in 99% (GOV1) were primary, in 1% they were secondary. These varices appear as continuation of esophageal varices and extend for 2 to 5 cm below the gastroesophageal junction along the lesser curvature of the stomach. These varices are more-or-less straight. Type 2 (GOV 2): were seen in 21 % of all gastric varices. These varices extend beyond the gastroesophageal junction towards the fundus of the stomach. They appear as long, tortuous, or nodular elevations at the cardia. Isolated Gastric Varices (IGV): Gastric varices in the absence of esophageal varices are termed isolated gastric varices. Depending on their location, they are subdivided into; Type 1 (IGV 1): These varices are located in the fundus of the stomach and fall short of the cardia by a few centimeters, Type 2 (IGV 2): These varices include isolated ectopic varices present anywhere in the stomach, such as in the antrum, pylorus, or body, or in the first part of the duodenum.<sup>3,7</sup>

Korula et al.<sup>8</sup> proposed a simple and practical classification of gastric varices. They identified two distinct types of gastric varices, varices that occur distal to gastroesophageal junction without extension into the fundus termed "junctional" varices and varices that are confined only to fundus termed "fundal" varices. We adopted this classification as it is simple informative as well as both GOV1 and GOV2 can be treated in the same way with Histoacryl with no much difference in morphology.

The aim of this study is to report on the characteristics of junctional varices especially its frequency, rate of recurrence and recurrent variceal bleeding in cirrhotic patients.

## Methods

This work included 443 Egyptian patients with variceal bleeding between December 2012 and December 2013 in the gastroenterology center of the Internal Medicine department of Cairo University, which is a tertiary care referral center in Egypt. 166 patients had gastric varices among the 443 patients.

History was obtained with special emphasis on hematemesis and/or melena, number of attacks, amount of bleeding and history of previous endoscopic treatment. Examination included the level of consciousness, vital signs, stigmata of chronic liver disease and portal hypertension. Hemoglobin %, liver function tests including liver enzymes, serum albumin, prothrombin time and concentration and serological markers for hepatitis B and C were done. Abdominal ultrasonography was also done to assess the size and texture of the liver, periportal fibrosis suggestive of Schistosomiasis, portal vein diameter, splenic size and the presence or absence of ascites. We excluded Patients discovered to have Hepatocellular carcinoma (HCC).

All patients were subjected to upper endoscopic examination. In patients with active bleeding, upper endoscopy was done on emergency basis once hemodynamic stability was achieved. Detailed report on varices was done with special attention to its type, shape, number and bleeding point whether ooze, spurter or clot. According to the endoscopic picture, gastric varices were classified into 2 types:

### A. Junctional varices (Group 1) which were present in 88 (53%) patients

Junctional varices were defined as varices distal to the gastroesophageal junction on the lesser curvature side with very rare extension to the gastric fundus. It usually accompanied by esophageal varices.

### B. Fundal varices (Group 2) that was present in 89 (53.6%) patients

Fundal varices were defined as gastric varices that are restricted to the region of the fundus on the greater curvature side and do not extend to the region of the cardia. It may be associated with esophageal varices or isolated with no accompanying esophageal varices.

Eleven patients had both junctional and fundal varices; one of them had duodenal varices in addition. The aim of the initial endoscopy is to control bleeding in emergency cases and secondary prevention in patients with past history of variceal bleeding. Junctional and fundal varices were managed by strict intravariceal injection of cyanoacrylate (CA) till complete solidification of the varices, using the standard protocol of CA and Lipiodol in 1:1 ratio, injecting with no more than mL at the varix each time.<sup>9</sup>

A further 1.0ml of distilled water was injected before withdrawal of the needle to wash Histoacryl out of the catheter. Esophageal varices were treated by band ligation. Spurting esophageal varices causing impairment of the field were injected by Histoacryl.

After the first session of gastric variceal injection, patients were subjected to another endoscopy after 5 days to ensure total filling of the injected varices with Histoacryl, any soft areas were further injected by additional ampoules of Histoacryl. Then all patients were subjected to follow up endoscopy 1, 3 and 6 months to ensure eradication of the varices and to observe its recurrence after obliteration. Re- injection was performed for recurrent varices. Accompanying esophageal varices were subjected to 2 weekly sessions of band ligation till

complete eradication of the varices was achieved. If bleeding recurred before eradication of varices, emergency variceal treatment was done and the patients completed the sessions as previously mentioned.

An informed consent was obtained from all subjects participating in this study and the review board of the Department of Internal Medicine approved The protocol of this study in accordance to the Declaration of Helsinki.

## Statistical methodology

Statistical Package for Social Science (SPSS) program version 16 was used for analysis of data. Data was summarized as mean  $\pm$  SD. P-value is considered significant if  $<0.05$  and  $>0.05$  is insignificant.

## Results

Among the 443 studied Egyptian patients with variceal bleeding, 166 patients had gastric varices with incidence of 37.5%. Ninety two patients (55%) presented with active bleeding while the other 74 patients (45 %) presented with history of bleeding before the presentation.

Eighty eight patients (19.9%) had junctional varices (group 1), 89 (20.1%) had fundal varices (group 2). Eleven patients (2.5%) had both junctional and fundal varices; one of them had duodenal varices in addition.

Among the 88 patients with junctional varices (group 1), all the patients had associated esophageal varices, 10 (11.4%) patients had associated fundal varices, and one (1.1%) patient had associated fundal and duodenal varices.

Among the 89 patients with fundal varices (group 2), 53 (59.5%) patients had associated esophageal varices, 10 (11.2%) patients had associated esophageal and junctional varices, one (1.1%) patients had associated esophageal, junal and duodenal varices while 25 (28.1%) patients had isolated fundal varices not accompanied by varices elsewhere (Table 1).

**Table 1** Distribution of varices in the studied patients (166)

Types of gastric varices (166)	No	%	P value
Junctional	76	45.8	
Junctional + Fundal	11	6.6	
Fundal	53	31.9	P <0.05
Isolated gastric	25	15	
Junctional, Fundal and duodenal	1	0.6	

Out of the 88 patients with junctional varices (group 1); 52 (59%) patients presented with active bleeding. Out of the 89 patients with fundal varices (group 2); 42 patients presented with active bleeding.

Junctional varices recurred in 47 out of 88 (53.4%) patients after a follow up period of  $6.5 \pm 1.2$  months. Thirty four out of 47 patients with recurrent junctional varices were actively bleeding. Fundal varices recurred in 47 out of 89 patients (52.8%), 4 of them (8.5%) were actively bleeding. The difference between the incidence of recurrence of esophageal, junctional and fundal varices was statistically insignificant while the incidence of bleeding in recurrent junctional varices was statistically highly significant compared to the incidence of bleeding in recurrent esophageal and fundal varices ( $p < 0.001$ ) (Table 2).

**Table 2** Incidence of rebleeding and recurrence among different types of varices. (N= 443)

	Incidence of varices	Recurrence of varices	Bleeding in recurrent varices (late)	Early rebleeding	Total incidence of rebleeding	P value
Esophageal	416(93.9%)	192 (46.1%)	28 (6.7%)	58 (13.9%)	86 (20.7%)	P <0.001
Junctional	88 (19.9%)	47(53.4%)	24 (27.2%)	10 (11.4%)	34 (38.6%)	
Fundal	89 (20.1%)	47(52.8%)	4(4.5%)	7(7.9%)	11 (12.4%)	

Thirty four out of 88 (38.6%) patients with junctional varices had rebleeding. Rebleeding occurred in 10 (11.3%) patients with junctional varices before variceal obliteration (within 2 to 7 days after the first injection) and it occurred due to recurrent junctional varices in 24 (27.2%) patients. Rebleeding occurred in 11 out of 89 (12.4%) patients with fundal varices. It was early in 7 (7.9%) patients while it occurred due to recurrent fundal varices in 4 (4.5%) patients. Rebleeding occurred in 86 out of 416 (20.7%) patients with esophageal varices. It was early in 58 (13.9%) patients while it occurred due to recurrent esophageal varices in 28 (6.7%) patients. We found no statistical significant difference among the different types of varices regarding early rebleeding while the total incidence of rebleeding of junctional varices (early rebleeding and bleeding in recurrent varices) was significantly higher than the incidence of rebleeding in esophageal and fundal varices (Table 2).

## Discussion

The prevalence of gastric varices in patients with portal hypertension has been reported to vary from 2% to 70%.<sup>2,10</sup> This substantial variability in the prevalence of gastric varices is probably related to the difference in the patient populations (poorly matched in terms of origin of portal hypertension, stage of cirrhosis, and bleeding status), the technique used for diagnosis and the classifications used for gastric varices. The incidence of gastric varices among the 443 patients included in this study was 40% while the incidence of esophageal varices was 94%.

In our study, junctional varices were the active source of bleeding in 27 out of 36 patients having junctional varices with incidence of 75%, while fundal varices were the active source of bleeding in 18 out of 21 patients having fundal varices with incidence of 85%. The overall incidence of bleeding from both types of gastric varices is 79%. Kind et al.<sup>11</sup> found the frequency of bleeding from gastroesophageal varices type 2 (GOV 2) and isolated gastric varices type 1 (IGV 1) to be 60.3%.

Korula et al.<sup>8</sup> stated that the incidence of rebleeding from fundal varices is higher than that of junctional varices (100% compared to 37% respectively,  $p < 0.001$ ). In our work we found a similar incidence of rebleeding from junctional varices (38.6%) but a much lower incidence of rebleeding from fundal varices (12.4%). This may be due to the injection of fundal varices by glue (cyanoacrylate) in our work while Korula and colleagues injected 1.5% Sodium tetradecyl sulfate in both junctional and fundal varices with high incidence of post-sclerotherapy ulcers and rebleeding in isolated fundal varices.

The incidence of rebleeding from junctional varices (GOV1) after cyanoacrylate injection was 26% (7/27) in the experience of,<sup>12</sup> while the incidence of rebleeding from GOV2 was 33% (3/9) and rebleeding from isolated fundal varices (IGV1) was only 8% (1/13). These results are similar to ours.

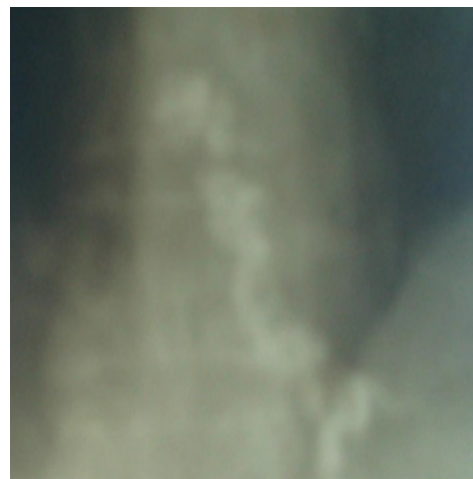
Sarin et al.<sup>13</sup> stated that sclerotherapy and band ligation yield significantly better results in the treatment of junctional varices

than fundal varices. In a non-randomized trial by Oho et al.<sup>14</sup> in Japan, hemostasis after cyanoacrylate injection was found to be equal to sclerotherapy in patients with gastroesophageal varices, but significantly better (and the mortality rate is significantly lower) in patients with fundal varices. This is also compatible to our data of junctional varices injection by cyanoacrylate.

Junctional varices may be easily missed during endoscopic examination as they are usually multiple and are frequently mistaken for gastric folds. This may explain the significantly higher incidence of rebleeding from junctional varices (38.6%) compared to fundal varices (12.4%) despite injecting both by glue (Figures 1-3).

## Conclusion

Junctional varices has a significantly high rate of rebleeding as they may be easily missed during endoscopic examination as they are usually multiple and are frequently mistaken for gastric folds especially if they are not actively bleeding. An important observation in our study that we found that varices that occur distal to gastroesophageal junction (classified as GOV1) are not in communication with esophageal varices we reached this conclusion by the observation that in the post injection X ray films, Histoacryl injection of the junctional varices (GOV1) below the Z line showed that the Histoacryl didn't go up above the Z line, while injection of the esophageal varix above the Z line fills the whole column of the varix (Figure 1).



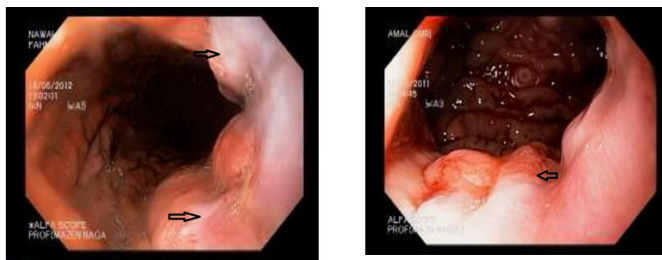
**Figure 1** Injection of the esophageal varix above the Z line fills the whole column of the varix.

McCormack et al. found that the blood flow at the Z line is bidirectional which indicate that GOV1 are not communicating with esophageal varices.<sup>15</sup> So, in our opinion that we have two distinct types of gastric varices, varices that occur distal to gastroesophageal junction without extension into the fundus termed junctional varices and varices that are confined only to fundus termed fundal varices. This is in concordance with the study done by Korula J et al.<sup>8</sup>

Furthermore, in the Sarin SK et al study treatment of GOV1 was needed after treating esophageal varices which indicate that GOV1 are not in communication with esophageal varices.<sup>3</sup>



**Figure 2** Post injection X ray films that Histoacryl injection of the junctional varices (GOV1) below the Z line showed that the Histoacryl didn't go to the esophageal varix.



**Figure 3** Junctional varices are seen below the Z line.

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## Conflicts of interest

All the authors declare that there are no conflicts of interest of any kind.

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