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Clinicalapplication of Computed Tomography Venography before Percutaneus Transhepatic Venus Empolization in Estimating Gastroesophageal Varices Status

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Abstract:

Objective: To retrospectively compare the accuracybetween computedtomography venography (CTV) and Digital Subtraction Angiography (DSA) in the assessment of portal vein hypertention and Gastrosophageal varices patients treated by percutanus transhepatic venus embolization(PTVE).

Materials and Methods: From September 2009 to March 2014modified percutaneous transhepatic variceal embolization(PTVE)was performed in 69 patients with cirrhosis,tumor or PH who had an episode of gastroesophageal varicealbleeding in our hospital. CTV was performed in 48 patients before PTVE procedure, and comparison between CTV and DSA in PTVE procedure was performed.Including median counts of varices,varices diameter,and portal vein diameter.

Results: Of the all 48 patients, CTV showed median Counts of varices (n=1, 1-3), median Varices diameter 5.57mm(2.12-21.12) ,median Portal vein diameter (14.92mm)and DSA showed median Counts of varices (n=1,1-3),median Varices diameter 5.61mm(1.12-20.28) and median Portal vein diameter (14.72m) before percutaneous transhepatic variceal embolization .

A comparison was made for detecting the varices sizes, portal vein size on CTV and DSA based on Wilcoxon Signed Ranks Test andthe p valueswere 0 .436 and 0 .723 respectively,another comparison was made for detecting the counts of varices based on Marginal Homogeneity test and the p value was 0.102, and there were no significants difference .

Conclusion:Computed tomography venography (CTV) is an accurate and reliable noninvasive examination in portal hypertension with gastroesophageal varices andcould be used in the assessment beforethe treatment of PTVE procedure.

Keywords: *liver cirrhosis, Portal hypertension, Esophageal varices,hemorrhage, percutanus transhepatic empolization,coils embolization.*

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I. Introduction

In our study, 48 patients diagnosed by Computed tomography venography[1]and digital subtraction angiography [2]in which Gastroesohageal varices(GEV) and portal vein hypertention(PVH) were estimated then treated by PTVE. Liver cirrhosis, tumor or portal vein occlusion might result in Gastroesophageal varices(GEV) , Portal hypertention(PHT) may causes massive hemorrhage of the upper gastrointestinal tract (UGIT)[1] .Computer tomography venography (CTV) and digital subtraction angiography(DSA), can display gastroesophageal varices (GEV) and related bypass circuits because of the better spatial resolutions and thinner slices of the Copmuted tomography (CT scan) [1,2,3] and direct angiography by contrast agent ,respectively , then the treatment by PTVE only or PTV+PSE .

The aim of our study is to evaluate the effectivenessof CTV in comparison with DSAas a diagnosis and guidance to treatthe patients with GEV and PVH by PTVE.

II. Materials and Methods

2.1subjects:

From September 2009 to March 2014modifiedPTVEwith coils was performed in 69 patientswith hepatitis,tumor,portal vein occlusion, ascites or splenectomy who had an episode of gastric varicealbleeding in

our hospital. The inclusion criteriawere acute gastric variceal bleeding or a historyof gastric variceal bleeding within 6 monthsbefore hospital admission. The exclusion criteriawere as follows: serum bilirubin level of morethan 100 mg/L, serum creatinine value of greaterthan 2 mg/dL, platelet count of less than 20,000/mm3, complete obstruction of the portal vein dueto thrombosis, hepatic encephalopathy greaterthan stage II, hepatorenal syndrome, orcardio respiratory failure.

The clinical characteristics of the 69 patients were estimated inthe study group—including age, sex, causes,therapy,patient with ascites, patients underwent splenectomyand site of puncture —are shown in table 1, chart1.

The left portal vein puncture frequency(n=25),right portal vein puncture frequency(n=22)and splenic vein puncture frequency(n=1),The most common cause of varices was HBV(41 PATIENTS),THEN HCC and thrombus 11,11,respectively,HCV and Thrombus tumor5,5 respectively,ACA was 1 patient.4 patients with acites and 4 patients undewent splenectomy. in 19 patients treated by PTVE and the presence of distinct and large gastric varicesas the source of the bleeding with esophagealvarices in 48 patientsunderwent percutaneous transhepatic variceal embolization, 19 of them by PTVE and 29 treated by PTVE+PSE.The procedure was successful in the remaining48 patients Diagnosed by CTV and DSAThis study was the information was obtained from each patient and approved by the local ethics committee

Table 1: Patients sex, age, therapy, hepatitis, tumor, portal vein occlusion, ascites or splenectomy

Contents	subdivesion	Frequency	Percentage
Sex	Male Female	36 12	75 25
Therapy	PTVE PTVE+PSA	19 29	39.6 60.4
Site.of puncture	Left PV Right PV Splenic vein	25 22 1	52.1 45.8 2.1
Hepatitis	HBV HCV	41 5	85.4 10.4
Tumor	HCC ACA	11 1	22.9 2.1
Portal vein occlusion	Tumor thrombus	5 1	10.4 2.1
Acites		11	22.9
Splenectomy		4	8.3

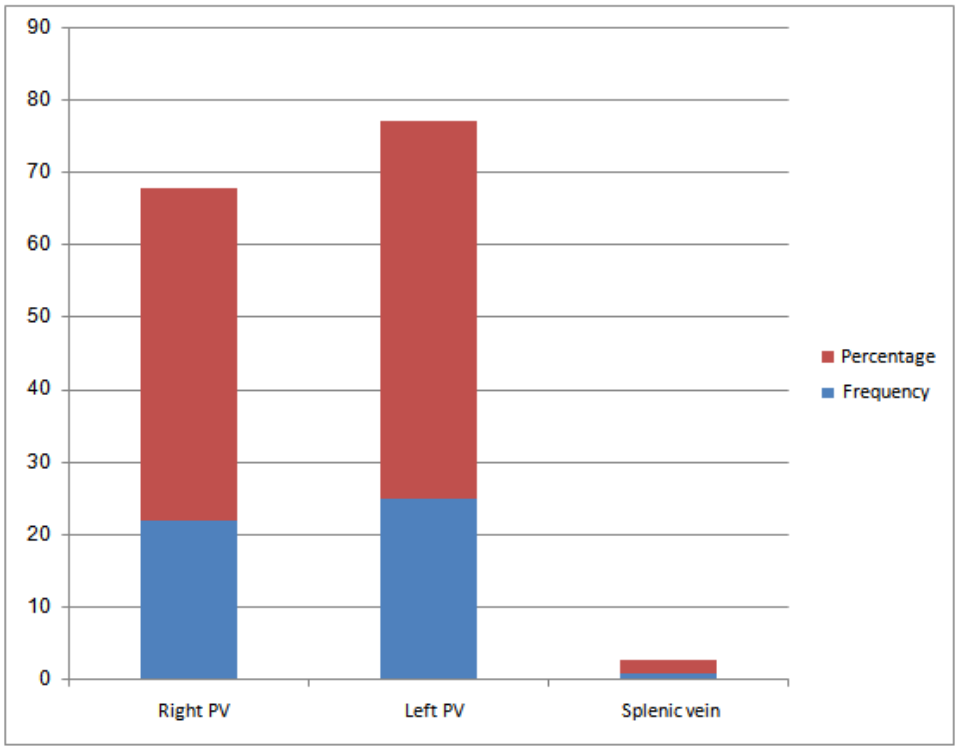


Chart 1: frequency and percentage of liver puncture site.

2.2 CTV TECHNIQUE:

The Siemens Somatom Definition AS+ is a 128-slice CT scanner was applied to make non-enhanced, vein enhanced scans , arterial and portal vein phase in all patients. ON233 milliapere and 120kilovolt.The scanning range was from two cm above the tracheal bifurcation to the lower edge of the kidney. 100 mm of non-ionic contrast medium (Omnipaque 350, Nycomed Inc., and Princeton, NJ, USA) was injected at a rate of 4.0 mL/s. The arterial phase scanning started about 11 secound after the beginning of injection, and and an additional 23 secound after the first acquisition for the portal venous phase.

The reconstitution is B31F. The slices thickness SW 8.00 and SW 1.5. The CTA source images, both thick and thinmultiplanar reformations (coronal, sagittal, and rotational), and3-D volumerendered images were performed and were availablefor review.

2.3 PTVE and DSAtechnique:

Before the modified PTVE procedure, CTV was performed to observe whetherthe portal vein was smooth and to determinethe puncture route, the gastricvarices, count of varices, diameter of varice and PV, the feeding and draining veins ofthe varices could be evaluated.

Modified PTVE was performed with the patient under Ultrasound, local anesthesia 21G Chiba needle, inject contrast, 0.018'' guidewire, 5-French sheath, 0.035'' guidwire, Yashiro, cobra or vert catheter, and venography. Using fluoroscopic guidance with digital subtraction angiography (DSA), a 5-French sheath was introduced into the portal vein. A 5FrenchCobra catheter was inserted into the SV, and splenoportography(SPG) was performed to evaluate the gastric varices, and the draining veins. Then, the main feeding vein with the 5-French Cobra catheter, and venography was performed to access the velocity of blood flow the gastric varices and portal vein, the puncture route of GV and PV , count of varices diameter of varice and PV and draining veins of the varices could be evaluated.Ethanol injection for the destruction of varices. On the basis of these data, the coils were performed.

Once coils had been inserted into all the gastric varices, re-venography.

Finally, the 5-French sheath system was withdrawn and the puncture track was embolized with microcoils.

2.4 Image analysis:

CTV images were processed on definition 128.gastric varices(GV) and collateral circulation in all cases were analyzed using multi-planner reformation, maximum-intensity projection and digital subtruction angiography(DSA) images were performed.

2.5 Statistical Analysis:

All results are expressed as medians (min.-max.).we use Wilcoxon Signed Ranks test andMarginal Homogeneity Test. Statistical computation was performed using statistics software (SPSS version 13.0, SPSS)and A p value of < 0.05 was considered as a significant difference.

III. Results

Of the all 48 patients in age group between(14-82), CTV showed median Counts of varices (n=1, 1-3), median Varices diameter 5.57mm(2.12-21.12) ,median Portal vein diameter (14.92mm)and DSA showed median Counts of varices (n=1,1-3),median Varices diameter 5.61mm(1.12-20.28) and median Portal vein diameter (14.72m) before PTVE .(see table2,chart2).

A comparison was made for detectingthe varices and portal veinsizes on CTV and DSA based on positive ranks and Wilcoxon Signed Ranks Test. We founded that the varices size (z=-.779) and portal vein size (z=-.354), but the p values(2-tailed) based on Wilcoxon Signed Ranks Test were0.436, 0.723, respectively in varices size and portal vein size respectively on CTV and DSA. (table3). (fig.2, 3, 4, 5). There was no significant difference between the diameter of portal vein and varices on CTV and DSA (p=0.287) .

A comparison was also made for detectingthe number of trunks in varices on CTV and the DSA based on theMarginal Homogeneity test. Thestatistical analyses were performed to calculate the Distinct Values(n=3), Off-Diagonal Cases (n=3), Observed MH Statistic is (4.333), Mean MH Statistic is (6.000),Std. Deviation of MH Statistic is (1.225), Std. MH Statistic is(-1.633), p value (2-tailed) was 0.102.(table4), (fig.1,2,3,4,5). There were no significant difference between the number of varices on CTV and DSA (p=0.287).

Table2 Baseline characteristic of the patients

Contents	Median(mininum-maximum)
Age(y)	54.5(14-82)
Counts of varices in CTA	*1(1-3)*
Varices diameter in CTA(mm)	*5.57(2.12-21.12)*
Portal vein diameter in CTA(mm)	*14.92(9.21-26.29)*
Counts of varices in DSA	*1(1-3)*

Varices diameter in DSA(mm)	*5.61(1.12-20.28)*
Portal vein diameter in DSA(mm)	*14.72(8.35-24.97)*

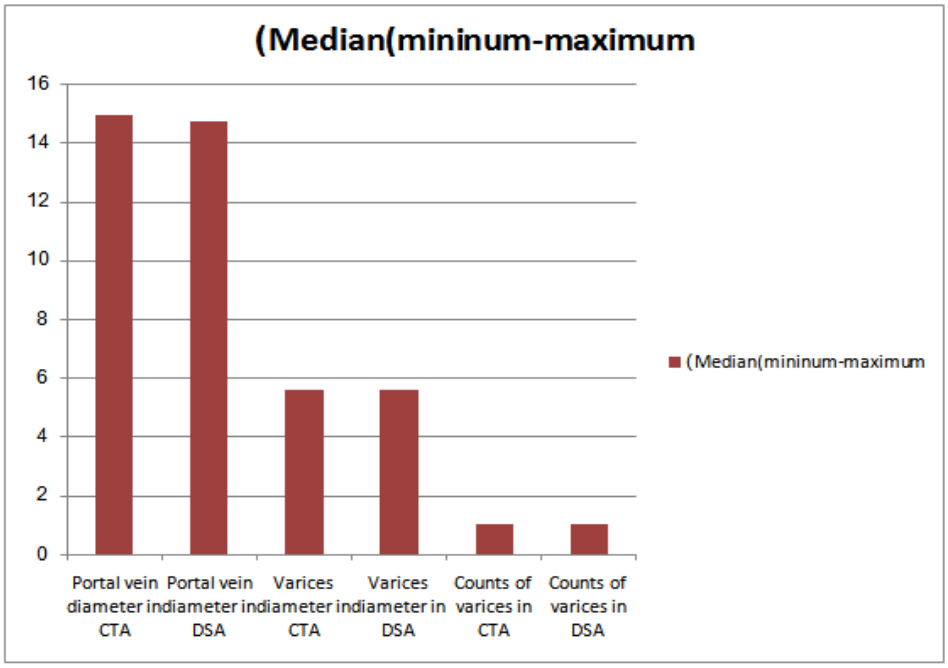


Chart 2: shows medinan size of PV and EV in CTV and DSA also median counts of EV in CTV and DSA.

Table 3: Test Statistics[b]

Contents	VARICES SIZE IN DSA - VARICES SIZE IN CT	PV SIZE IN DSA - PV SIZE IN CT
Z	-.779[a]	-.354[a]
Asymp. Sig. (2-tailed)	.436	.723

a. Based on positive ranks.
b. Wilcoxon Signed Ranks Test

Table 4: Marginal Homogeneity Test

Contents	NO. OF TRUNKS IN CT & NO. OF TRUNKS IN DSA
Distinct Values	3
Off-Diagonal Cases	3
Observed MH Statistic	4.000
Mean MH Statistic	6.000
Std. Deviation of MH Statistic	1.225
Std. MH Statistic	-1.633
Asymp. Sig. (2-tailed)	.102

***FIGURE1**: Axial CTV of gastroesophageal varices*

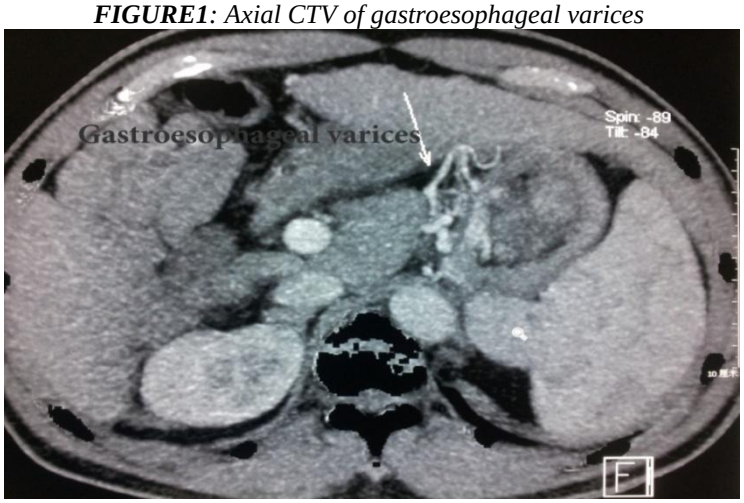


***Figure 2**: Axial CTV of portal vein hypertention.*

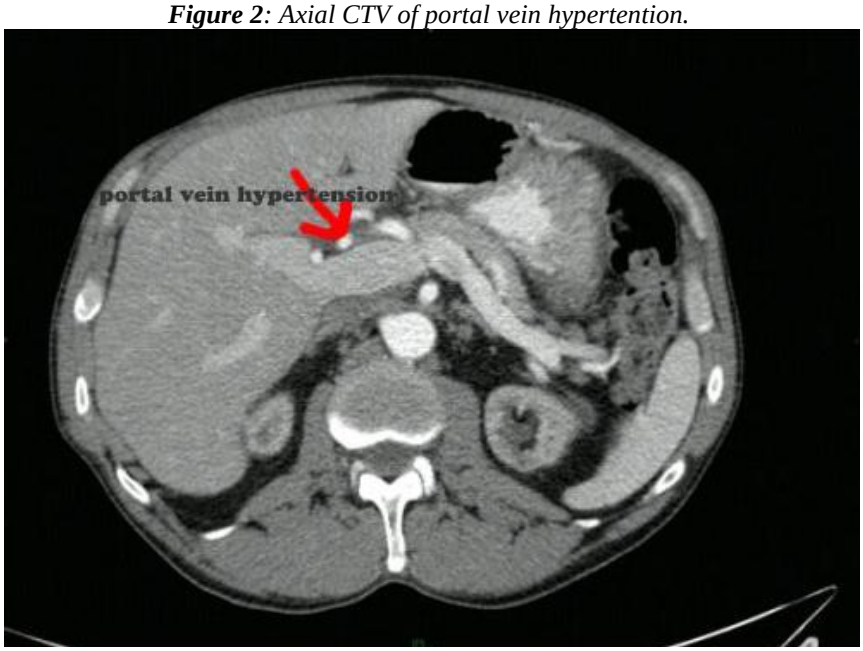


***Figure3**: Coronal CTVof gastroesophageal varices and portal vein hypertention.*

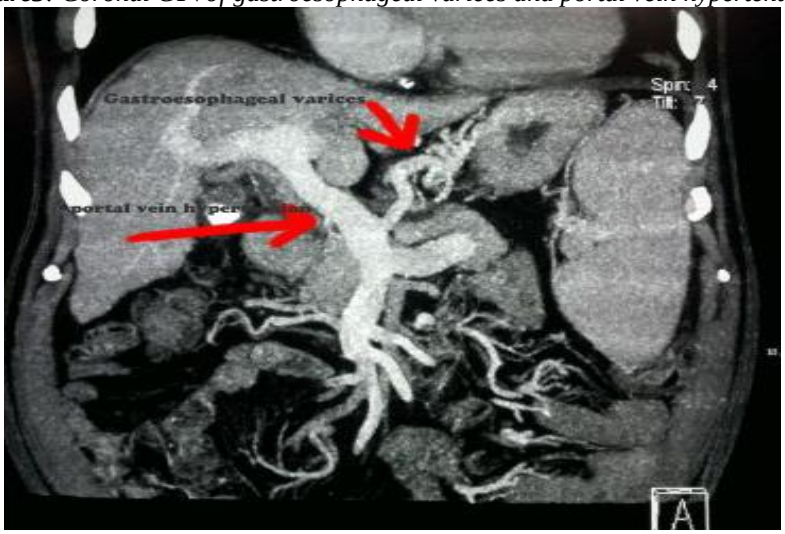


***Figure 4**: DSA of portal vein hypertention.*

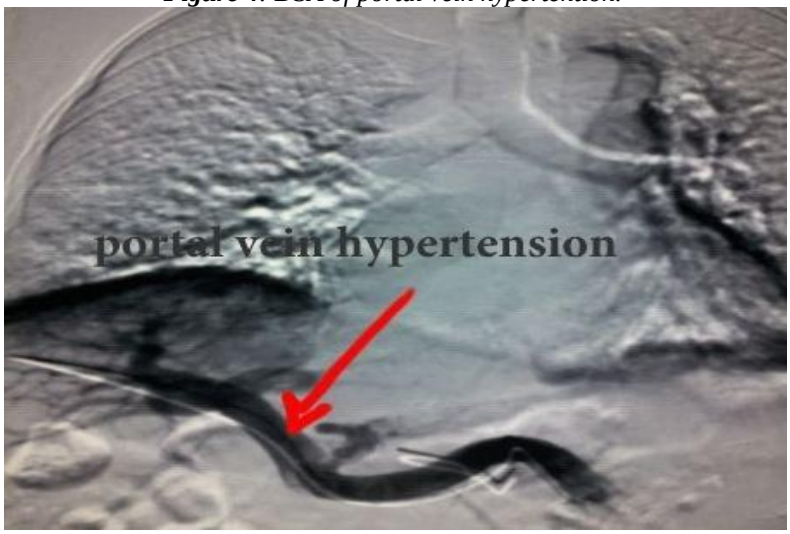
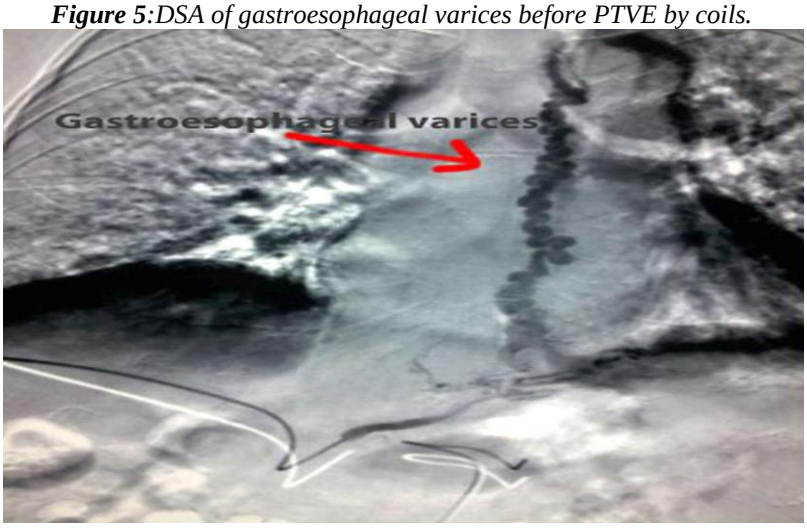


Figure 5*:DSA of gastroesophageal varices before PTVE by coils.*



IV. Discussion

Management of acute bleeding

The optimal management of acute bleedingrequires a multifactorial approach, including evaluation and resuscitation, blood transfusion, use of vasoactive drugs, performance of early diagnostic and therapeutic endoscopy (less than 12 h after admission), administration of prophylactic antibiotics, and consideration of placement of a covered transjugular intrahepatic portosystemic shunt (TIPS) in case of failure of endoscopic treatment. However, this step-by-step approach is not usually possible in an acutely bleeding patient who is decompensated and most, if not all, of these steps must be considered or performed almost simultaneously to succeed.

Evaluation and resuscitation

The first step is evaluation and resuscitation, which should take place in an intensive care unit by a multidisciplinary team, including trained hepatogastroenterologists/endoscopists, intensivists, and nurses [4]. However, in real life, patients are treated first in the emergency department, while procedures for admission in an intensive care unit are undertaken. This means that the team that receives and treats these acutely ill patients must be well trained in all the emergency procedures involved in variceal haemorrhage, always including a hepatogastroenterologist from the start.

When these patients are admitted to the hospital, one of the most important steps is to try to establish if the patient has cirrhosis, either from the history and clinical data, or from laboratory tests, showing thrombocytopenia, altered coagulation, or abnormal liver tests. The suspicion of bleeding varices places the patient in a high-risk group and makes it mandatory to perform immediate procedures, as explained later.

Airway protection must be considered, but there are no strong data in the literature to recommend prophylactic endotracheal intubation, as it has not been shown to decrease the incidence of cardiovascular events, aspiration pneumonia, or mortality [5,6,7,8]. Experts advise that endotracheal intubation should be performed before endoscopy in patients with ongoing haematemesis, haemodynamic instability in spite of volume loading, agitation with the absence of cooperation during the exam, or Glasgow Coma Scale less than 8 [9].

Peripheral venous access must be provided and the placement of a venous central line must be considered. Volume replacement should be given in order to obtain a systemic blood pressure greater than 100 mmHg [10]. This must be done with caution to obtain haemodynamic stability and not to overload these patients, as it might lead to failure of bleeding control and rebleeding [10].

Blood transfusion is given in order to obtain a haemoglobin level between 7 and 8 g/dl [11]. A restrictive blood transfusion is associated with a reduction in further bleeding and rebleeding, a reduction in complication rate, and increased survival [11]. This has received consensus in the Baveno V conference [12] and has been demonstrated again in a recently published study [13].

Correction of coagulopathy and thrombocytopenia, which are usually present in variceal bleeding in patients with cirrhosis, are not indicated by experts, as discussed in the Baveno V meeting [12]. Overtransfusion with fresh frozen plasma and platelets causes an increase in portal pressure and may lead to continued bleeding and rebleeding.

Vasoactive therapy

Vasoactive drugs should be administered immediately, ideally during transport to the hospital or on admission, before endoscopy, if variceal bleeding is suspected [14,12] [15], and should be continued for 5 days [14]. This is one of the most important procedures to diminish mortality and it achieves haemostasis in 80% of patients [16].

Vasoactive drugs include vasopressin (not used anymore for variceal bleeding due to its many side effects), terlipressin, octreotide, somatostatin, and vapreotide, with different availability among countries. In the USA, the only drug approved for variceal bleeding is octreotide. Vasoactive drugs cause splanchnic vasoconstriction, thereby decreasing portal pressure and reducing or stopping variceal bleeding.

Terlipressin is a synthetic vasopressin analogue with a longer half life and fewer side effects. Similarly to vasopressin, it may cause ischaemic complications and dysrhythmias in patients with ischaemic heart disease or peripheral vascular disease [17]. Several studies have shown that terlipressin is effective in bleeding control and it was the only vasoactive drug that diminished mortality in these patients [18; 19]. It is given at a dose of 2 mg intravenously every 4 h during the first 48 h, reducing to 1 mg every 4 h for another 3 days, if the bleeding is controlled [20].

Somatostatin causes splanchnic vasoconstriction and it inhibits the postprandial increase in portal blood flow and portal pressure[2] [21]. It is given as an initial bolus of 250 μg followed by 250–500 μg/h in continuous infusion. Octreotide is a synthetic analogue of somatostatin with a longer half life, which is not reflected by longer haemodynamic effects, which may be caused by rapid desensitization or tachyphylaxis [22]. It is administered as an initial bolus of 50 μg followed by a continuous infusion of 50 μg/h [23]. Vapreotide (another somatostatine analogue) is given as a 50 μg bolus followed by an infusion of 50 μg/h [24] .

A Cochrane review of 21 trials involving 2588 patients with active variceal haemorrhage found no difference in mortality rate or risk of rebleeding with somatostatin and its derivatives (e.g. octreotide) [25] and a recent study comparing terlipressin, somatostatin, and octreotide in the control of acute esophageal variceal haemorrhage showed no difference in the haemostatic efficacy between these drugs [26]. Furthermore, the same study showed that the mortality rate does not differ significantly between these three drugs in the setting of combination therapy with endoscopic treatment. Therefore, any of these drugs may be used in combination with endoscopic therapy to control bleeding from esophageal varices.

Antibiotic prophylaxis.

For the past two decades it has been widely known that patients with cirrhosis with variceal haemorrhage have a high risk of bacterial infections, which relates to early rebleeding rates and to a high mortality [27,28], mainly in more decompensated patients with cirrhosis, Child–Pugh B and C [29]. However, bacterial infections, early rebleeding and mortality are reduced when patients are given prophylactic antibiotics, which are nowadays a part of the standard of care of these patients [30]. The recommended antibiotic is norfloxacin, in a dose of 400 mg orally twice a day [31], or ciprofloxacine 200 mg intravenously twice a day if the oral route is not possible. In patients with advanced cirrhosis, Child–Pugh B or C, ceftriaxone proved to be more effective than oral norfloxacine [32].

A review of 12 trials involving 1241 patients with variceal haemorrhage found that broad-spectrum antibiotics (e.g. ceftriaxone, norfloxacin, ciprofloxacin) reduced overall mortality [relative risk (RR) = 0.79] and risk of rebleeding (RR = 0.53) [33].

Endoscopic treatment

Upper gastrointestinal endoscopy should be performed early, in the first 12 h after admission, and endoscopic therapy should be performed at once if there is a diagnosis of variceal bleeding [34], which is made using the following criteria: active bleeding from a varix; presence of a ‘white nipple’ fibrin clot overlying a varix; a clot on a varix; the presence of varices without other potential source of bleeding; and fresh blood in the stomach [35].

Endoscopy should ideally be performed on an empty stomach. Nasogastric lavage is usually performed to that purpose, but it is associated with complications and is not efficient in half of cases. The use of erythromycin at a dose of 250 μg intravenously over 5 min, 20 min before endoscopy, acting as a motilin agonist, has been shown to result in an empty stomach, decreasing the time of endoscopy [36].

Regarding endoscopic therapy, endoscopic band ligation is preferred as it provides better bleeding and rebleeding control and has fewer adverse events compared with sclerotherapy. The most frequent complications of band ligation are superficial ulcerations, oesophageal strictures, and delayed bleeding after falling of the rubber rings [37]. Sclerotherapy is used when band ligation is technically difficult (for example, when there is too much blood for good visibility) or not available [38;39; 40]. Sclerotherapy is less expensive than band ligation.

Combined therapy (vasoactive drugs and endoscopic therapy) is more effective than either treatment alone, as has been showed by several randomized controlled trials and meta-analysis of these trials [41; 42].

Failure of bleeding control or rebleeding

Failure to control bleeding or rebleeding implicates a change in treatment. For oesophageal varices, a second therapeutic endoscopy is indicated if the patient is stable[2].For gastric varices, only one endoscopic treatment is allowed and if the patient rebleeds or continues to bleed, then another treatment must be performed [43]. Vasoactive medication should be given at maximum doses. If endoscopic treatment and vasoactive drugs fail, then other steps must be taken.

If the patient has unstable disease, a balloon tamponade (Sengstaken-Blackemore for oesophageal varices or Linton for both oesophageal and gastric varices) is indicated in order to control the bleeding and while the team prepares a more definitive therapy [44]. Balloon tamponade is effective in bleeding control in about 80% of patients, but they will rebleed in about half of cases after balloon deflation. There are several frequent complications, such as aspiration, migration, necrosis and perforation of the oesophagus, and a high mortality. To reduce those complications, the balloon should only stay in place for 24 h [45]. Balloon tamponade is a bridge therapy, usually while arranging for TIPS.

Another type of therapy is the placement of covered oesophageal stents, which has been studied in several reports [46; 47; 48]. Those stents seem to have fewer complications than balloon tamponade, but there are no recommendations from the Baveno V consensus meeting [49].

Covered TIPS can be used as a salvage therapy if the oesophageal or gastric variceal bleeding is not controlled with conventional endoscopic and medical therapy, when oesophageal variceal bleeding recurs despite two endoscopic treatments associated with medical therapy and if gastric variceal bleeding occurs after a single failure endoscopy [50; 51]. Placement of TIPS in these patients is sometimes performed too late, when patients have become more decompensated and survival is poor. The same is true for a late shunt surgery [52; 53].Transplant should be considered in selected patients as soon as possible during the bleeding episode [54].

Importance of early TIPS in selected patients

Recent studies have identified a group of high-risk patients in whom the early placement of covered TIPS, within 72 h of admission, was associated with a better prognosis [55, 56]. These high-risk patients include patients with Child B cirrhosis and active bleeding at endoscopy and patients with Child C cirrhosis with less than 14 points, after medical and endoscopic treatment has been administered. A follow-up study published in 2013 has confirmed that the use of early covered TIPS in these high-risk patients is associated with a much lower risk of failure to control bleeding and of rebleeding, and also with a significant lower mortality [57]. The importance of these studies cannot be overstressed and professionals in charge of these patients should organize referral to specialized centres.

Gastric variceal bleeding

Bleeding from gastric varices is less frequent than from oesophageal varices, accounting for about 3% of variceal bleeds. However, bleeding from gastric varices is usually more severe and difficult to control and the mortality is higher [58]. There are four types of gastric varices. Type one varices are an extension of oesophageal varices along the lesser curvature and can be treated as oesophageal varices [59]The other gastric varices should be treated by obliteration with a tissue adhesive, such as cyanoacrylate [60; 61].

PTVE withcyanoacrylates are a family of compounds that have been used as haemostatic agents. Over the past 30 years, the use of cyanoacrylate injection has been established in many parts of the world to achieve gastric varix obliteration. In the meantime, several comparative studies have emerged. A randomized, controlled trial with cyanoacrylate (enbucrilate mixed 1:1 with lipiodol) *versus* band ligation has demonstrated a 27% rebleed rate in the cyanoacrylate group *versus* 63% rebleeding in the ligation group, with no difference in long-term survival [62]. Another randomized trial has found that cyanoacrylate injection was more effective than β-blocker treatment for the prevention of gastric variceal rebleeding, with a lower mortality rate (3% *versus* 25%) [63]. in a cohort study, comparing cyanoacrylate (enbucrilate mixed with lipiodol 1:1.5) with TIPS, similar rebleeding rates with a slight (nonsignificant) advantage to a TIPS have been shown, as well as a 50% cost reduction in the cyanoacrylate group [64]. However, if the injection of cyanoacrylate is too difficult due to obscured view from excessive bleeding or if it fails, then the patient should be referred for TIPS, which has been proved highly effective, stopping the bleeding in about 90% of patients [65]. A Linton balloon can be placed as a bridge before more definitive therapy [66].

Secondary prophylaxis

As stated above, patients who stop bleeding from varices have a risk of rebleeding of about 60% within 1–2 years if left untreated, with a mortality of 33% [67]. Therefore, the second step of a successful treatment of variceal bleeding is prevention of recurrence and it should be started prior to discharge from hospital.

The consensus is to treat these patients with a combination of pharmacological therapy and endoscopic therapy [68]. The efficacy of this combined therapy has been demonstrated in two randomized studies [69; 70].

Regarding pharmacological therapy, patients can be treated with a nonselective β blocker (e.g. nadolol and propranolol) alone or in combination with mononitrate issossorbide. A combination of these two drugs has been shown to be more effective but without reaching statistical significance [71]. The median rebleeding rate of patients treated with this combination therapy is around 33–35% [72; 73], lower than with a nonselective β blocker alone [74]. The problem with pharmacological combined therapy is the higher incidence of side effects compared with a nonselective β blocker [75; 76], leading to suspension of therapy and to treatment with a nonselective β blocker alone.

Pharmacological therapy should be used in combination with endoscopic therapy, usually endoscopic variceal ligation, which has been shown to be effective and have fewer side effects than sclerotherapy [77]. Ligation sessions are performed at 7–14-day intervals until variceal obliteration. Once eradicated, patients should be submitted to upper gastrointestinal endoscopy every 3–6 months to evaluate for variceal recurrence and need to repeat treatment. Complications of variceal ligation include transient dysphagia, chest discomfort, and ulcers at the site of ligation, which sometimes bleed[2] [78]. A small randomized study comparing pantoprazole and placebo showed smaller ulcers in the pantoprazole-treated patients and bleeding ulcers only in the placebo-treated group. Although the results of this study did not have statistical significance [79], they support the use of pantoprazole in patients treated with endoscopic variceal ligation.

Ideally HVPG measurements should be used to evaluate response to pharmacological therapy. Patients with a reduction in HVPG to less than 12 mmHg or a reduction in HVPG by more than 20% have the lowest rate of variceal rebleeding, about 10% [80; 81]. It has been suggested that such patients could be treated with pharmacological treatment alone without endoscopic variceal ligation until eradication [82; 83]. However, HVPG measurements are made only in referral centres and cannot be used for clinical practice.

Other treatments for prevention of variceal bleeding include the placement of covered TIPS, shunt surgery, and hepatic transplant. The placement of covered TIPS should be used as a rescue therapy for patients whose condition has failed to respond to pharmacological plus endoscopic treatment, as survival is identical, although rebleeding is less frequent in patients treated with TIPS [84].

Surgery

In patients undergo procedure frequently lead to development of hepatic encephalopathy due to hyperammonemia [41, 42, 43]. As an alternative to shunting, Hassab [85] and Sugiura *et* [86,87] developed a method of GE decongestion for the treatment of varices.

Liver resection and transplantation:

Liver resection and liver transplantation are two major curative treatments for HCC patients .hepatocellular carcinoma (HCC) is a leadingcause of cancer related death in Asia, and its incidence is increasing in the Western countries. [88,89]It is estimated that 8500 to 11,500 new cases of HCCoccur annually in the United States, whereas theincidence of Hepatocellular carcinoma in China has been reported to bemore than 50 per 100,000. [90, 91].

A study was mentioned that there is no marked difference in the overall survival and recurrence-free survival rates between liver transplantation and resection for patients with very early HCC and portal hypertension. Liver resection should be considered as the first line choice for patients with very early HCC and portal hypertension.

BRTO andtransportal gasteroesophageal obliteration:

The cumulative risk for hemorrhage from gastric fundal varices has been reported to be 16%, 36% and 44% at 1, 3 and 5 years, respectively [96]. Ruptured gastric varices are also associated with high rates of rebleeding and mortality (45%-55%) [93,94]. Therefore, ruptured gastric varices must be treated as quickly as possible.

BRTO obliteration**:** BRTO was performed in 1996 by Kanagawa et al. in Japan when no definitive treatment for gastric varices was available. This method was first reported by Olson et al. in 1984[95] but did not becomepopular, presumably because of its limited efficacy and the adverse effects of ethanol. Kanagawa et al. used, instead of ethanol, 5% EO, which had already been used successfully in the embolization of esophageal varices in1996; Chikamori et al. reported an approach through the jugular vein3 which has the advantage ofallowing a catheter to be inserted deeply into a shunt. Similarly, they used ethanol to obliterate the other blood-draining routes of varices.

It is an aternative routes for transvenous obliteration are often sought in the management of gastric varices, as well as in the management of other nongastric varices (ectopic varices) such as duodenal and mesenteric varices. These alternative routes can be classified into portal venous access routes and systemic venous access routes.

Anecdotally, alternative routes are more commonly required with duodenal and mesenteric varices compared with gastric varices. Twelve percent (2–19%) of patients with gastric varices require alternative/adjunctive variceal access routes. The most common alternative route described for transvenous obliteration of gastric varices is the percutaneous transhepatic route, which is commonly referred to in the Japanese literature as percutaneous transhepatic obliteration (PTO). The percutaneous transhepatic obliteration route can be performed alone or in combination with the more traditional balloon-occluded retrograde transvenous obliteration (BRTO) transrenal route. Percutaneous transhepatic obliteration by itself is successful in 44–100% of cases for obliterating gastric varices and is rarely unsuccessful when it is combined with BRTO. Other alternative routes are less commonly described and

as a result, their clinical outcomes are relatively anecdotal. However, they are technically more challenging and are less commonly successful. These routes include, but are not confined to transphrenic, transileocolic, trans-TIPS (transvenous intrahepatic portosystemic shunt), transgonadal, transazygous, and transrenal capsular vein approaches.

V. Trans-Tips or Percutaneous Transhepaticballoon-Occluded Transvenous Obliteration

Once the portal venous branches leading to the varices in question are identified occlusion of these branches are planned for. If there are multiple veins (for example for a gastric varix), the largest of these portal venousbranches is left for the balloon-occlusion catheter. The smaller veins are coil embolized or occluded utilizing Amplatzer vascular plugs. Once the ‘‘debranching’’ of the gastric varix is performed, the major (largest) portal venous branch is occluded utilizing the balloon-occlusion catheter. If the access to the portal circulation is via an established TIPS, two balloon-occlusion catheters can be passed through the TIPS and occlude the two major portal venous branches (if any). After the varix has been ‘‘trapped’’ by coil embolizing, smaller portal venous branches (debranching) andballoon occlusion of the main portal venous branch with or without balloon occlusion of the shunt from the renal vein (traditional BRTO), the sclerosant is instilled .Coaxially placed microcatheters to instill the sclerosant deeper with the varix are less commonly required, especially if the varix is ‘‘trapped’’ from the portal venous side(BATO) and from the systemic venous side (BRTO) with occlusion balloons. Usually, balloons placed at boththe portal and systemic venous sides enable adequate sclerosant distribution without the need for additional microcatheter extensions.[96].

Percutanus transhepatic embolization

Percutaneous transhepatic embolization by itself is successful in 44–100% of cases. Transhepatic catheterization of the portal vein and selective obliteration of the coronary vein have been used as an adjuvant in the management of patients bleeding from esophageal varices [97-98-99]. Various embolic and sclerosing agents have been used to obstruct flow in the coronary vein and esophageal varices. These include modified autologous clot, Gelfoam, sclerosing agents, balloon occlusion, and tissue adhesives [100,101].Balloon-occluded retrograde transvenous obliteration has become the standard treatment of gastric varices in Japan [100-101-102].Of the materials available for obliteration of the coronary vein, the tissue adhesives seem to be the most effective. Unfortunately, these materials are not yet approved for general use [103]. Gelfoam and other embolic materials (such as autologous clot), while readily available, have been shown to have limited value since recanalization occurs within few weeks [104]. The steel coil is a permanent occluding device that is readily available [105].

In our study we used Coils to sufficiently obliterate the gastroesophageal varices,The procedure can now be performed morereadily using the newer smaller coils. The catheter is inserted into the portal vein(PV),for portography, in which a balloon catheter is inserted and inflated selectively into the inflow site of the feeding veins for the varices, the balloon is, and a test dose of a contrast medium is injected. to obliterate the feeding vein we inject 5% EOI, and the obliteration by coils [96].The initial cessation of flow in the varices andimmediate control of bleeding.See figure 6

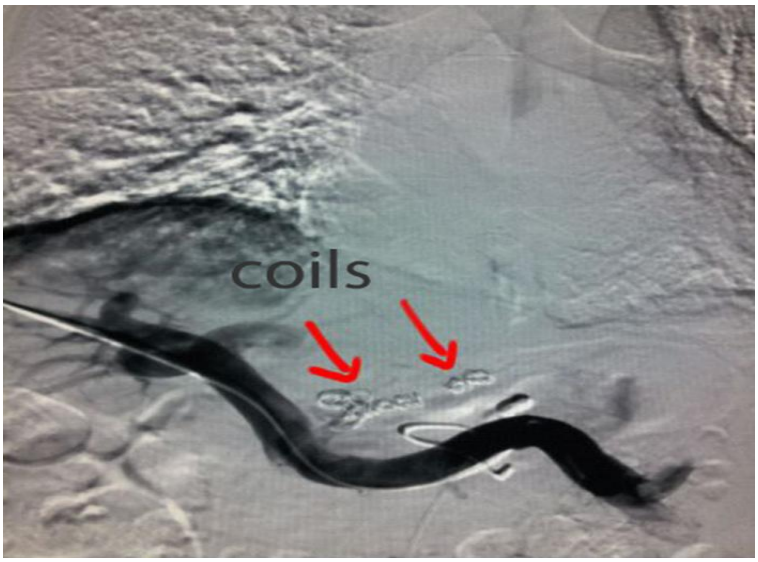


Figure6*: DSA of gastroesophageal embolization after PTVE by coils.*

CT and MRI, and ultrasound studies [106-107-108] have all been proposed as methods by which to study physiological aspects of portal blood flow in patients with portal hypertention,however, many patients were treated and assessed in angiography suites using x-ray image guidance and diagnostic information provided by a C-arm unit. A DSA based portal vein perfusion or physiological measurement that can be done in the angiogram suite would be highly beneficial for evaluation of the procedure. DSA also is used to evaluate the structural aspects rather than the physiological aspects of vascular disease.

PTVE with coils is effective and safe method for preventing rebleeding of esophageal varices (EVs) .
CTV has an important role in diagnosis of the emergency cases of hematemeseis due to PTV either from cirrhosis or splenorenal shunt and to detect the EVs(numbers and diameters) , PV(diameter) before PTVE,BRTO,TIPS,or other intravenous access.

In our study we used CTV in48 patients with portal hypertention and EVs in liver cirrhosis before PTVE procedure to accurate CTV as diagnosis and before PTVE procedureas shown in table 3 and table4.
The outcomes are good; the clear data showing that percutanus embolization could be an effective method. The CTV images verified the feeding vessels.

CTVallows visualization of the abnormal vessels of the peri-esophageal varices that are attached to the muscularis externa of the esophagus to the surrounding tissue [$_{109,101}$]. CTV also allows for the descuver of perigastric [$_{111,112}$].. EVs are usually connected with para-EVs in the distal esophagus [$_{113,114}$]. Previous studies have shown that large paraesophageal collateral veins (> 5 millimeter) [115,116], and the high risk of bleeding also combined with large perforating veins [117,118].

When we compared the diameter of portal vein and varices on CTV and DSA, we founded that there was no significant difference between the diameter of portal vein and varices on CTV and DSA(p=0.287) .
There was no significant difference in the ability of CTV to detect the size and number of trunks in varices and portal hypertention. Because no difference was found, the authors chose to include the CTV cases in the analysis
In summary**:**

is a nice diagnostic method in patients undergoing PTVE because it is noninvasive techniqual method that could find the size and the number of varices and portalvein hypertention to clarify the diagnosis then we use PTVE for treatment.

The efficiency of PTVE>>we found varices diameter and size to choose coil size and to calculate the cost of procedure. CTV has become a good role for diagnose portal vein hypertention(PVH)and gastroesophageal varices(GEVs) .

5. Limitations

Firstly, it is limited principally by its retrospective nature. Further prospective works are warranted to confirm these findings. Secondly, the DSA images were all acquired as part of a therapeutic intervention and only the clinically relevant segments were imaged. Furthermore, the injections given by hand used in the antegrade studies could not be standardized. However, all the DSA images included in the analysis were of high quality and represent the true extent of the disease.

VI. Conclusion

This study to compare the accuracy between computed tomography venography(CTV) and Digital Subtraction Angiography (DSA) in the diagnosis of esophageal varices (GEV) and portal vein hypertention(PVH) patients treated by percutanus transhepatic venus embolization(PTVE).

A comparison was made for detecting the varices diameters, portal vein diameter on CTV and DSA

Another comparison was made for detecting the counts of varices on CTV and DSA

There is no significant difference between the diameter of portal vein and varices on CTV and DSA

And there is no significant difference between the number of varices on CTV and DSA

CTV is an accurate and reliable noninvasive alternative method to conventional DSA in the assessment of portal and varices number and size before treatment of patient by PTVE procedure

To our knowledge this is the first study detecting the accuracy between computed.tomography venography(CTV) and Digital Subtraction Angiography (DSA) in the assessment of portal vein hypertention (PVH)and Gastrosophageal varices (GEV)patients treated by percutanus transhepatic venus embolization(PTVE).

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