The aim of the study is the examination of the relative portal blood flow, by assessment of the hepatic perfusion index (HPI) in different degrees of hypo- 
dynamic alterations related to liver cirrhosis and some focal liver diseases. Hepatic radionuclide angiography (HRA) was performed with bolus injection of 740 MBq 99m-Tc-pertechnetate, during one minute (1 fotsec), using ROTA 
scintillation camera and Micro Delta computer (Siemens). HPI was estimated 
with Sarper’s method of slope analysis.

In 10 controls, HPI was 0.68 ± 0.06; it was significantly decreased (p < 0.01) in 5 patients with chronic active hepatitis (HAV, 0.57 ± 0.03), 13 with liver cirrhosis without (LC, X = 0.49 ± 0.13) and 18 with esophageal varices (LC+EV, X = 0.32 ± 0.19), as well as in 4 patients with LC and sclerosated esophageal varices (LC+SEV, X = 0.16 ± 0.11). Comparing to HAH and LC 
(HAH-LC, p > 0.05), HPI values were significantly lower in LC+EV (p < 0.01) and LCSEV (p < 0.05), while the values between the last two groups didn’t differ (p > 0.05).

In 22 patients with liver hemangiomias (LH, X = 0.64 ± 0.08) HPI values were physiological (LH-H, p > 0.05). However, in 4 patients with hepatocellular 
carcinoma (H-C), HPI values were increased, while in 8 patients with esophageal varices, while after sclerotherapy, HPI remains very low. Considering that in patients 
with hemangiomias, HPI values are normal, which is not the case in those with primary carcinomas and metastases, HRA is a useful method for the 
differential diagnosis of hemangiomias and primary liver carcinomas, together with ultrasonography and blood pool scintigraphy.

Endoscopic Aspects in Portal Hypertensive Gastropathy

Chr. Banciu, Tr. Banciu, D. Tuculesu, S. Cotul, Leila Šušan, Elena Potenz. 
IVth Dept. of Internal Medicine, University of Medicine and Pharmacy 
Timisoara, Romania

The object of the study is an assessment of the endoscopic aspects of the gastric mucosa in patients with portal hypertension (PHT) and hepatic 
cirrhoses (HC), together with an estimation of the underlying histological changes 
leading to these modifications, and also a comparison with the ul-
trasongraphic, laparoscopic and splenopортographic modifications.

Material and Methods: The study was carried out on 60 patients with 
PHT and HC in different etiological stages. Eso-gastro-duodenoscopy was per-
formed in all patients, and the modifications of the gastric mucosa were de-
termined. In some patients antral and fundic biopsies were taken. The endo-
scopic aspects were correlated with the Child-Pugh stages of HC and com-
pared with the ultrasonographic, laparoscopic and splenopортographic signs 
of PHT.

Results: Four types of endoscopic gastric mucosa modifications were noted: 
1) A scacria rash and superficial erythema in 10 cases (16.6%), with 
no significant histological changes. An inflammatory infiltration of the gastric 
mucosa was seen in six cases with alcoholic cirrhoses. 2) The mosaic pattern 
(snake skin), in 15 cases (25%), seen as a fine reticular pattern separating ar-
eas of erythematous edematous and normal mucosa, localised mostly in the 
antrum, but also in the fundic area of the stomach, and even on the duode-
num; histologically, there were no significant changes, but electron micro-
scopic findings revealed ecasic submucosal capillaries. 3) Cherry red spots 
and diffuse hemorrhagic gastritis in 12 cases (20%). Five of these patients 
had upper gastrointestinal bleedings. Histology revealed submucosal venous 
and capillary dilatation and submucosal inflammatory changes in eight cases. 4) 
Gastric cardiac varices (stages 1–3) in 14 cases (23.3%), often associated with 
esophageal ones. Three of the patients were bleeding from these varices. 
None of the patients (15%) had normal gastric mucosa, without any modifica-
tions.

The ultrasonography, laparoscopy and isotopic splenopортography (with 
119 In, and the determination of the spleno-porta-cardiac circulation time) 
confirmed the presence of elements of PHT in all patients with erythema and 
vacuoles at the gastric level. A good correlation with the evolutionary stages of HC 
has been noted.

Conclusions: The presence of a congestive gastrophy in patients with 
PHT and HC has been demonstrated. The gastric inflammatory infiltrate was present in 28% of the cases, in correlation with the alcoholic etiology of HC.

Doppler Ultrasonography (US) Examination of Portal 
Circulation After Transjugular Intrahepatic Portocentric Shunt (TIPS)

A. De Santis, O. Riggio, M. Merli, R. Servi, T. Stati, F. Montagnese, P. Rossi, L. 
Capocaccia. 2° Gastroenterol., Radiologi, Univ. "La Sapienza" di Roma, Italy

TIPS is a radiological method for treating upper gastrointestinal bleeding in cirrhotic patients. TIPS has been shown to decrease the portosystemic 
gradient by about 40%. Little is known of the effects of TIPS on portal hemo-
dynamics. We examined 15 patients (9 M, 6 F, age range 53–72 yrs) who 
underwent TIPS for variceal bleeding (13 pts) or intractable ascites (2 pts). A 
doppler US was performed before and after 48 hrs, 7 days, 1, 3 and 6 months after TIPS. The following parameters were measured: maximum (VMax) and aver-
age (VMean) velocity of blood flow (cm/sec) in the portal (PV), splenic (SV) 
superior mesenteric (SMV) and stent.

Results:

<table>
<thead>
<tr>
<th>Test</th>
<th>PV</th>
<th>SV</th>
<th>SMV</th>
<th>Stent</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMean basal</td>
<td>22 ± 9</td>
<td>19 ± 5</td>
<td>12 ± 5</td>
<td>*</td>
</tr>
<tr>
<td>VMean 48 hr</td>
<td>32 ± 14</td>
<td>28 ± 15</td>
<td>15 ± 5</td>
<td>88 ± 25</td>
</tr>
<tr>
<td>VMean 1 wk</td>
<td>40 ± 24</td>
<td>36 ± 15*</td>
<td>18 ± 9</td>
<td>103 ± 18</td>
</tr>
<tr>
<td>VMean 1 mo</td>
<td>44 ± 18*</td>
<td>32 ± 15*</td>
<td>23 ± 8*</td>
<td>102 ± 32</td>
</tr>
<tr>
<td>VMean 3 mos</td>
<td>40 ± 18*</td>
<td>35 ± 15*</td>
<td>22 ± 25</td>
<td>105 ± 26</td>
</tr>
<tr>
<td>VMean 6 mos</td>
<td>47 ± 20*</td>
<td>26 ± 14*</td>
<td>21 ± 12</td>
<td>72 ± 30</td>
</tr>
</tbody>
</table>

* p < 0.05 at least vs basal (paired T test)

The stent mean diameter was 6.9 ± 0.6 mm. After 3 months the VMax 
in the PV, SV and SMV increased by 104%, 86% and 90% respectively. In 4 patients (26%), after 48 hrs, a thrombosis of the left branch of the PV occurred 
which later disappeared. Conclusion: TIPS causes a major increase in blood flow 
velocity in portal vessels. The VMax maximum increase in the stent is reached at 
3 months, while a decrease is observed at 6 months. After TIPS a transient 
shunt thrombosis of the intrahepatic portal branch was observed in some 
cases.

Complications and Risks of Transjugular 
Intrahepatic Portosystemic Shunts in 28 
Consecutive Patients

University Hospital, Hradec Kralove, Czech Republic

Purpose: Transjugular intrahepatic portosystemic shunt (TIPS) is used as a 
safe and effective method for shunt placement in symptomatic portal hyper-
tension. However, there are significant risks of hepatic encephalopathy and 
the shunt stenosis. These risks and technical complications were reviewed.

Material and Methods: Twenty eight consecutive cirrhotic patients were treated with TIPS for variceal bleeding (78%) and intractable ascites 
(22%). In 11 patients, a follow-up ranging from 1 to 16 months (mean 8 months). Shunt 
patency was evaluated by doppler sonography. Shunt velocities below 25 cm/s 
dicated indicated stenosis. Results: Technical success was achieved in 100%. 30-
day mortality was 11%. Early (within 48 hours) thrombosis of the shunt occurred 
in 3 patients (11%). All these shunts were recanalised. Significant stenosis of 
the shunt was found in 31% (17 patients) and shunt occlusion occurred in 1 
patient within 3 to 14 months after TIPS. The stenotic shunts responded well 
to angioplasty and parallel shunt was performed in the patient with shunt oc- 
clusion. Progression of hepatic encephalopathy occurred in 4 patients (15%). 
The thrombus formation in portal vein during the procedure was observed in 
2 cases and was aspirated or lysed by local streptokinase infusion. The me-
diastinal hemotoma caused by the brachiocephalic vein injury occurred in 1 
patient. Conclusion: (1) Early shunt thrombosis or chronic shunt stenosis are amenable to recanalisation or balloon dilatation. (2) Doppler ultrasonography 
is accurate in noninvasively assessing shunt stenosis following TIPS. 3) At this 
time, TIPS placement without careful follow-up cannot be used as a long term 
treatment for symptomatic portal hypertension.

Nutritional Status, Energy Expenditure and 
Portal Hypertension

J.B. Kislakzy, J. Socha, M. Lyszowska. Child Health Centre, Warsaw, Poland

Estimation of energy expenditure and nutritional assessment may define en-
ergy requirements that are of importance in chronic disorder when energy 
needs differ from normal values. The method is to use the Dubois equation 
(Adding the standard deviation of body mass (b.m.) and BSA. Resting 
energy expenditure (REE); after overnight fast, indirect calorime-

Gut: first pub. as 10.1136/gut.35.4.Suppl.A177 on 1 January 1994. Downloaded from http://gut.bmj.com/ on October 20, 2023 by guest. Protected by copyright.
try) and nutritional status (AC) were evaluated in 15 healthy subjects — control group — (7 girls and 8 boys; age 13.33 ± 1.95 years; mean ± standard deviation) and 20 patients (10 girls and 10 boys) with portal hypertension (9 with portal vein occlusion, age 12.56 ± 3.10 years; 11 with liver cirrhosis, age 14.00 ± 3.26) and history of variceal bleeding. Under nutrition was diagnosed in 3 controls and in 12 patients (p < 0.05). REE (per kg b.m.) in controls and patients were: 121.87 ± 21.50 kJ and 142.50 ± 32.91 kJ respectively (p = 0.043). REE (per 1.73 m²) was: 64.43 ± 7.1 kJ and 74.64 ± 10.60 kJ resp. (p < 0.0023). Substrate utilization rate for controls and patients were: glycerone: 1.90 g/kg b.m. and 2.23 g/kg b.m. resp. (n.s.); fat: 1.55 and 2.01 g/kg b.m. resp. (p < 0.04); protein: 1.51 g/kg b.m. and 1.23 g/kg b.m. resp. (n.s.). Conclusions: Patients with portal hypertension and history of variceal bleeding are prone to be malnourished as revealed by AC. Increased REE with increased fat utilisation rate can explain that finding.

A Prospective, Randomized Trial of Injection Sclerotherapy vs. Banding Ligation in the Management of Bleeding Esophageal Varices


Aims: To compare the efficacy and complications between sclerotherapy and ligation in management of bleeding esophageal varices. Methods: 120 patients admitted to our hospital with acute esophageal variceal bleeding were randomized to receive sclerotherapy (EIS group) or band ligation (EVL group). All of them received treatment within 24 hrs of index bleeding. Sclerotherapy 1.5% Sotradecol and Steigmann-Goff ligator were used, respectively. Endoscopic treatment was repeated at an interval of 2-3 weeks until varices obliterated.

Results:

<table>
<thead>
<tr>
<th></th>
<th>EIS group (N = 59)</th>
<th>EVL group (N = 61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-hepatic cirrhosis</td>
<td>43 (73%)</td>
<td>41 (67%)</td>
</tr>
<tr>
<td>Pugh's grade A/B/C</td>
<td>12% (41/42%)</td>
<td>15% (86/54)%</td>
</tr>
<tr>
<td>Control of active bleeding</td>
<td>12% (15/12%)</td>
<td>17% (17/31%</td>
</tr>
<tr>
<td>Recurrent bleeding</td>
<td>26 (44%)</td>
<td>9 (15%)*</td>
</tr>
<tr>
<td>Esophageal varices bleeding</td>
<td>3% (2/57%)</td>
<td>8 (13%)</td>
</tr>
<tr>
<td>Obliteration</td>
<td>37 (62%)</td>
<td>45 (74%)</td>
</tr>
<tr>
<td>Sessions to obliteration</td>
<td>6.5 ± 0.12</td>
<td>3.8 ± 0.4*</td>
</tr>
<tr>
<td>Patients with complications</td>
<td>16 (27%)</td>
<td>3 (5%)*</td>
</tr>
<tr>
<td>Patients with mortality</td>
<td>19 (32%)</td>
<td>41 (16%)</td>
</tr>
</tbody>
</table>

*p < 0.001

Conclusions: Endoscopic variceal ligation causes significantly fewer complications than sclerotherapy. In addition, EVL prevents rebleeding from esophageal varices more effectively than EIS does. However, higher frequency of esophageal varices bleeding may be encountered by EVL.

The Impact of Endoscopic Variceal Ligation on the Pressure of the Portal System


Background: Endoscopic variceal ligation (EVL) is a viable substitute for endoscopic injection sclerotherapy. The complications of EVL have been proven to be fewer than those of sclerotherapy. It is still unknown how EVL may influence on the pressure of portal venous system.

Methods: 19 patients (18 males, one female, mean age, 60 ± 9 yrs) with history of esophageal varices bleeding and without ascites were enrolled. All were cirrhotic patients (63% were post-hepatic). EVL was performed at an interval of 2-3 weeks until varices were obliterated. Measurements of portal pressure: Portal-splenovenogram was performed before EV and after varices obliteration to assess venographic findings. The pressures of main portal vein (PVP), splenic vein (SPV) and superior mesenteric vein (SMV) were recorded.

Results: 16 patients completed the study. A mean of 4 sessions of EVL within the duration of 2 months was needed. 11 (69%) patients had an elevated pressure and 5 (31%) patients had a reduced pressure after EV. Mean portal venous pressure before and after EVL was 26.0 ± 4.4 mmHg and 27.9 ± 6.5 mm Hg, respectively (p < 0.05). Among patients with an elevated pressure change, PVP increased by a mean of 24%, SPV increased 18% and SMVP increased 14%. Among patients with a reduced pressure change, PVP decreased 24%, SPV decreased 26% and SMVP decreased 22%. Three patients had rebleeding, all belonged to those with an increased portal pressure change.

Conclusions: 1. EVL induced an increased portal pressure by 24% in 70% patients and reduced portal pressure by 24% in 30% patients. 2. Increased portal pressure induced by EVL may result in the occurrence of rebleeding.

Postprandial Portal Hyperemia in Cirrhotic Patients as a Marker of Liver Disease and Portal Hypertension

D. Ludwig, K. Schwarting, E.F. Stange. Medizinische Universität Lübeck, Klinik für Innere Medizin, Germany

Previous studies have shown an increase of portal pressure in cirrhotic patients during postprandial states. This increase is caused by an increase in hepatic blood flow, a phenomenon known as postprandial hyperemia. This study was designed to determine whether postprandial hyperemia might be an indicator of severity of liver disease and portal hypertension.

Materials and Methods: Portal flow was measured in 66 patients during fasting and 30 minutes after a standardized meal with an Acuson 128 Doppler system (Mountain View, CA). The degree of portal hyperensive gastroscopy and esophageal varices was evaluated by endoscopy.

Results: After the meal the increase in portal flow was significantly lower in patients with severe gastropathy (+23%) and esophageal varices (+26%) compared to patients without gastric lesions (+39%, p < 0.03) and those without esophageal varices (+45%, p < 0.01). Postprandial portal flow increase was diminished in patients with esophageal bleeding or red spots (+24%) compared to non-bleeders (+37%, p < 0.05). Patients taking vasodilatory drugs had a smaller increase of postprandial portal flow (+21%) than patients without this medication (+37%, p < 0.05). Concerning the CHILD score there was a smaller increase in mean portal flow (PF) and volume flow (VF) in patients with higher grading (CHILD A PF +46%, VP +45%; CHILD B PF +32%; VF +33%; CHILD C PF +25%, VF +25%, p < 0.005). In contrast to postprandial flow, fasting portal venous blood flow did not correlate with bleeding risk or clinical scoring.

Conclusions: The postprandial portal hyperemia measured by doppler ultrasound is inversely correlated with the severity of liver disease and portal hypertension. Small flow velocity increases may indicate a higher risk of variceal bleeding.

Clinical and Endoscopic Results in Cirrhotic Patients Submitted to the Transjugular Intra Hepatic Portosystemic Shunt (TIPS)

M. Merli, O. Riggio, R. Servi, A. De Santis, V. Rinaldi, A. Bolognese, V. Ziparo, P. Rossi, L. Capocaccia. 2° Gastroenterol., 1° Clinica Chirurgica, Radiologia Universita "La Sapienza" di Roma, Italy

This report describes clinical results in 20 cirrhotic patients (14 M and 6 F mean age 62 ± 6 yrs) undergoing TIPS for variceal bleeding (n 18) or intractable ascites (n 2). Liver disease was postviral in 85%. Child Class was A in 14 and B-C in 6 patients. At present the mean follow-up is 6.27 ± 4.7 months range 2-18 months in survivors. The mean portosystemic gradient decreased from 30 ± 5 to 11 ± 4 cm H2O. In 1 patient bleeding could not be stopped and the patient died after 24 hrs. Another patient died after 30 days due to hemoperitoneum. Varices were evaluated by endoscopy using the NICE score before, at 1 week and at 3 and 6 months after TIPS. A sharp decrease in the severity of esophageal varices was already observed after one week (basal score 3.88 ± 1.21 vs one week 1.36 ± 1.6 ± 0.0001) and was maintained at 6 months (score 1.5 ± 1.4) bleeding occurred in 1 patient af- ter 60 days from a small residual esophageal varices and was successfully treated with sclerotherapy. Congestive gastroscopy (CG) was observed in 8 patients before TIPS. After 3 months CG was unmodified but at 6 months an improvement in the degree of CG was observed in 5 patients. During follow- up 4 patients manifested a stent stenosis (2, 3, 7, 8 months post TIPS), evi- denced by doppler US as a reduction in blood velocity in the stent, which was treated with angioplastics (2 cases) or with a second stent implantation in 2 others. In conclusion TIPS is a feasible procedure for the treatment of variceal hemorrhage in cirrhotic patients, varices almost disappeared in the majority of patients, CG was ameliorated, only 1 bleeding episode was ob- served within 6 months. Doppler-US is useful in monitoring stent patency.

Somatostatin as an Adjuvant to Emergency Sclerotherapy of Bleeding Esophageal Varices

M. Moreto, M. Zaballa, L. Ruiz-Rebollo, A. Calderón, S. Ibáñez, E. Ojambreona, A. Barturen. Servicio de Hepato-Gastroenterología, Hospital de Cruces Baracaldo, Spain

Introduction. - Acute sclerotherapy (AS) is considered to be an useful and dif- ficult technique because of the critical situation of the patient and the un- optimal viewing condition. Somatostatin reduces splanchic blood flow and portal pressure. Our aim was to evaluate in a double-blind way the usefulness of the simultaneous injection of a bolus of somatostatin as an adjuvant to AS.

Material and Methods. - 63 patients with bleeding esophageal varices were admitted to the trial. 33 received a bolus of 250 mcg of somatostatin. The remaining 30 received a placebo. All of them were actively bleeding. AE was carried out by injecting ethanolamine oleate near to the bleeding point.
The following variables were recorded: liver function, amount of scolerasite, hemodynamic condition, hemorrhagic activity, duration of the procedure, units of transfused blood, hemorrhagic recurrence and mortality. An overall index of technical feasibility (ITF) was designed as the product: (number of injections required x viewing condition (1–3) x subjective feeling of technical difficulty (1–3)). Data were compared by t-student and chi-square tests.

**Results** - Both groups were similar on the following parameters: age, hemodynamic condition, degree of patient’s collaboration, activity of hemorrhage and liver function. Although not significantly more, more treated patients (14/33) had bled from gastric subcardiac varices than placebo patients did (7/30), (p = 0.1). Once the drug was administered, more treated patients ceased to bleed during the injection (21/33) than control patients (11/30) (p = 0.03). The amount of administered sclerosant was superior in the control group (2 ml vs 9.4 g) (p = 0.004). The ITF was significantly better in the treated group (3.5 vs 6.4, p = 0.03). On the contrary, no differences were registered in: units of transfused blood, recurrence of hemorrhage, mortality or time spent in the procedure.

**Conclusion** - The administration of a bolus of 25 mg of somatostatin results in an amelioration of the technical easiness of AS even though it does not seem to substantially change the final result of the procedure in skilled hands. This therapeutic complement could allow AS to be undertaken not only by highly skilled endoscopists, but also by gastroenterologists with a moderate expertise on therapeutic endoscopy.

### 1658 Congestive Gastropathy with Liver Cirrhosis

Noboru Nagoshi, Taenun Ozeki, Shigeyuki Kono, Shinich Sugano, Yoshiyuki Motojima, Tametsune Ohkawa, Yasuo Shimizu. The Department of Gastroenterology, Ohtemachi Hospital, Kitayokushin, Japan. 1 The 3rd Department of Internal Medicine, School of Medicine, University of Occupational and Environmental Health, Kitakyushu, Japan

We have had gastrofiberscope examinations of many patients with congestive gastropathy complicated to liver cirrhosis. However, reddening and edema of gastric mucosa were not found in cases with congestive gastropathy, but chronic gastritis, respectively. Therefore, the differential diagnosis as for the two diseases was considerably difficult. We tried to solve this problem and report a considerably successful diagnostic method using endoscopic toluidine blue dye-spraying technique for congestive gastropathy. [Materials and Methods] Endoscopic toluidine blue dye-spraying was carried out in 25 patients with congestive gastropathy complicated in liver cirrhosis and 30 patients with chronic gastritis. In gastrofiberscope, the change metachromasia of color after spraying to the mucosa with reddening was observed and biopsy specimens of the same gastric specimen were taken. Furthermore, gastric juice was collected by aspiration. Histological diagnosis was done by HE. Histological staining using toluidine blue before and after chondroitin AC digestion was carried out. The measurement of chondrin sulfate in gastric juice was carried out using chondritnase digestion method. [Results] In endoscopic findings, diffuse reddening of mucosa in the greater curvaturae of body was stronger in congestive gastropathy than in chronic gastri
tis, but chronic gastritis had edematous pattern, erythema, and macroscopic reddening and edema were often found in the greater curvature of body. As for spraying pattern in body of congestive gastropathy, mucosal blue colour pattern was 35% and the mixed pattern of blue and purple pattern was 60%. Histologica
tal staining of toluidine blue in specimens of chronic gastritis revealed stange metachromasia staining of goblet cells, but after chondroitin AC digestion, metachromasia staining pattern almost diminished. In congestive gastropathy, metachromasia of goblet cells was very weak. Furthermore the amount of chondrin sulfate A.B.C in gastric juice of congestive gastropathy was lower than that chronic gastritis (decrease to about 40%). [Discussion] Toluidine blue is famous for metachromasia staining for chondrin sulf
te. Patients with chronic gastritis more than 50 years old, have almost intes
tinal metastalia. Therefore, chondrin sulfate was secreted from goblet cells into gastric juice. However, in patients with congestive gastropathy the amount of chondrin in gastric juice is considerably less than congestive
gastropathy than chronic gastritis, because the production of chondrin sulfate might be inhibited by congestion. [Conclusion] It was strongly sugge
tive that the gastric production of chondrin sulfate in congestive gastrop
ty might be inhibited because of congestion. The fact was also certified using endoscopic toluidine blue spraying and useful for the diagnosis.


S. Sinigo, L. Bolondi, S. Sofia, G. DiFebo, M. Miglioli, L. Barbera. Istituto di Clinica Medica e Gastroenterologia, Bologna, Italy

40% of the first VB episodes in cirrhotics occur within the first 6 mths of observation [J. Hepatol. 18 (5) 1993]. This study was aimed to iden
tify the risk factors for early and late occurrence of the first VB episodes. We studied 155 consecutive cirrhotics with varices and without pre
vious VB. At entry and at six months intervals the severity of liver disease and the appearance of varices were assessed according to the Child-Campbell classification and the JRSIPH endoscopic rules. During a mean f-u period of 25.0 (±17.5) mths 24% of the patients had VB, 38% did so within 6 mths. The VB were rated at each 6 mths interval by life tables, Breslow (early differences) and Mantel-Cox test (overall differences). The table shows the following: variceal size (VS), cherry spot (CS), ascites, nutritional staus were associated with the early and overall occurrence of VB through the study period. During f-u VS changed in 28% of F1, in 27% of F2 and in 6% of F3 varices. The actual overall rate of VB for those that ultimately had F1, F2 and F3 was: 3%, 20%, 70%. The cumulative rate of early VB (<6 mths) was 50% in F3 varices present from entry and 16% in F3 varices developed

Before TIPS Child class was C in 2, B in 4 and A in 14 and no patient had a previous history of HE. All patients received lactulose therapy in the previous week and thereafter. The PSE index according to Conn was assessed before TIPS and after 7, 30, 90 days and then every 3 months. All episodes of HE which occurred at any time were assessed and recorded. 3 patients died be
to the first month, 17 completed 3 months and 13 completed 6 months of follow up. During the first 3 months after TIPS 13/20 patients (65%) had one or more episodes of HE. HE reached grade III–V in 5 patients. PSE index was higher than 0.25 in at least 2 consecutive evaluations in 17 patients (29%), indicating chronic HE. Several variables were tested but failed to correlate to the development of HE, these were age, etiology of liver disease, and the Child class, Conn index, ammonia levels, galactose elimination capacity and liver volume before TIPS, the stent diameter and the post-TIPS porto systemic gradient. The 2 m index was significantly correlated to the mean velocity of blood flow into the stent at 4 weeks (r = 0.65; p < 0.02). Between 3 and 6 months of follow-up 4/13 patients (31%) had episodes of HE. In 3 of these patients a stable impairment of PSE index was found. In conclusion the in
cidence of episodic HE is high after TIPS but tends to drop after the first 3 months. A stable chronic elevation in the PSE index is still present in 23% of patients at 6 months although the alteration in mental state never exceeded grade I.

### 1658 Modifications in Liver Function After Transjugular Intrahepatic Portosystemic Shunt (TIPS)

R. Servi, M. Merli, O. Riggio, P. Medi, F. Montagnese, M. Cardi, G. Balducci, P. Rossi, L. Capocaccia. 2 Gastroenterology, Radiologia Universita “La Sapienza” di Roma, Italy; 1 Clin Chirugica, Radiologia Universita “La Sapienza” di Roma, Italy

This study describes the modifications in liver function in 20 cirrhotics (14 M, 6 F age 63 ± 7) who underwent TIPS for variceal bleeding (18 pts) or in
transplant patients (2 pts). Child class, liver tests, and liver and spleen diameter (US measurement) were evaluated in all patients before and 2, 7, 30, 90 and 180 days after TIPS. The galactose elimination capacity (GEC) was performed before and at 6 months. 3 patients died within the first month, 17 completed 3 months and 13 completed 6 months of follow up. Results:

<table>
<thead>
<tr>
<th>Basal</th>
<th>1 mon</th>
<th>3 mons</th>
<th>6 mons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child T score</td>
<td>7.1 ± 2.1</td>
<td>7.8 ± 1.6*</td>
<td>6.9 ± 1.8</td>
</tr>
<tr>
<td>GEC (mg/kg/min)</td>
<td>4.2 ± 1.1</td>
<td>4.3 ± 0.5</td>
<td>4.8 ± 0.5</td>
</tr>
<tr>
<td>ALT (U/ml)</td>
<td>60 ± 12</td>
<td>65 ± 72</td>
<td>59 ± 44</td>
</tr>
<tr>
<td>Bil (mg%)</td>
<td>1.8 ± 1.2</td>
<td>2.3 ± 1.3*</td>
<td>2.9 ± 2.2</td>
</tr>
<tr>
<td>Prothact %</td>
<td>62 ± 16</td>
<td>60 ± 20</td>
<td>62 ± 22</td>
</tr>
<tr>
<td>Liver Diam (cm)</td>
<td>13 ± 2</td>
<td>12 ± 11</td>
<td>11 ± 15*</td>
</tr>
<tr>
<td>Spleen Diam (cm)</td>
<td>17 ± 3</td>
<td>15 ± 2.2*</td>
<td>15 ± 2.6</td>
</tr>
</tbody>
</table>

* p < 0.01 or at least vs basal (paired test)

In the first week jaundice developed in 6 patients (30%). In 3 patients this was due to hemolysis, with an increase in unconjugated bilirubin, a decrease in hemoglobin and the presence of schistocytes. A sharp transient increase in ALT (up to 800 U/ml) and a reduction in Proth Act indicates that liver necrosis accompanied jaundice in these 3 patients. In 13 other patients liver and spleen diameter (US measurement) were evaluated in all patients before and 2, 7, 30, 90 and 180 days after TIPS. The galactose elimination capacity (GEC) was performed before and at 6 months. 3 patients died within the first month, 17 completed 3 months and 13 completed 6 months of follow up. Results:

### 1657 Incidence of Hepatic Encephalopathy (HE) in Cirrhotic Patients Submitted to the Transjugular Intrahepatic Portosystemic Shunt (TIPS)


Twenty cirrhotic patients treated with TIPS were followed up prospectively to determine the incidence of hepatic encephalopathy after this procedure.
during f-u (P = 0.04); 8% in F2 present from entry and 0% in those developed during f-u (P = ns). The figures for late (>6 mths) were 67% for F3 from entry and 70% for F3 during FU (P = ns), 50% for F2 at entry and 34% for F2 during FU (P = ns). Conclusions: (1) Univariate analysis VS seems to be the most important variable in predicting the first VB. (2) Different treatment strategies should be used for F2 and F3 varices. (3) Regular endoscopic f-u is needed to improve the prediction criteria for the first VB.

Cumulative % of bleeding at 6 mths intervals

<table>
<thead>
<tr>
<th>Time (mths)</th>
<th>6 mths p</th>
<th>12 mths p</th>
<th>18 mths p</th>
<th>24 mths p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanccle size</td>
<td>13%</td>
<td>9%</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>F1</td>
<td>50%</td>
<td>53%</td>
<td>47%</td>
<td>32%</td>
</tr>
<tr>
<td>F2</td>
<td>84%</td>
<td>60%</td>
<td>63%</td>
<td>61%</td>
</tr>
<tr>
<td>F3</td>
<td>28%</td>
<td>28%</td>
<td>27%</td>
<td>11%</td>
</tr>
<tr>
<td>CRS</td>
<td>65%</td>
<td>46%</td>
<td>55%</td>
<td>49%</td>
</tr>
<tr>
<td>+/+/++</td>
<td>81%</td>
<td>92%</td>
<td>50%</td>
<td>60%</td>
</tr>
<tr>
<td>Nutrition Normal</td>
<td>28%</td>
<td>26%</td>
<td>22%</td>
<td>05</td>
</tr>
<tr>
<td>Poor</td>
<td>44%</td>
<td>48%</td>
<td>46%</td>
<td>37%</td>
</tr>
<tr>
<td>Ascites Absent</td>
<td>28%</td>
<td>24%</td>
<td>25%</td>
<td>02</td>
</tr>
<tr>
<td>Present</td>
<td>51%</td>
<td>63%</td>
<td>55%</td>
<td>42%</td>
</tr>
</tbody>
</table>

1660 Non-Shunt Surgery for Bleeding Varices. 12 Years Experience
Ahmed Sultan, Nabil El-Ghawaly, Omar Fathey, Mohamed Abdel Wahab, Mohsen El-Barbary, Nabil El-Hak, Gamal El-Ebiedy, Farouk Ezzeid, Gross urology Center, Mansoura, Egypt
During the period from 1979 to 1991, 586 cases of splenectomy and devascularisation were done electively for portal hypertension patients with history of moderate, massive or repeated attacks of haematocrit and or melena (elective group). 41 case of the same procedure were done for patients with acute variceal hemorrhage which failed to be controlled with emergency sclerotherapy (emergency group). All patients were Child A & B. The mean age of the patients was 34.8 ± 10.5. Male to female ratio was 9:1. Complete liver functions, kidney functions, complete blood picture and upper gastro intestinal endoscopy were done for all patients. Needle liver biopsy was done for 554 patients from the elective group. The pathology was schistosomal in 36.8%, mixed schistosomal and cirrhosis in 33.4% and non-schistosomal in 29.8%. The operation was done by the technique of Hassab (1962). Splenectomy & devascularisation gives immediate control of bleeding in 92.7% of emergency group. Hospital Mortality was 3.8% ± 2.2% in both groups respectively. All patients were followed up for 50 ± 31 month. Recurrent rebleeding was 15.3% ± 17% in both groups respectively. Encephalopathy developed in 2.5% in both groups. Late mortality was 8.55% ± 9.7% in both groups respectively. We concluded that splenectomy & devascularisation was able to control bleeding both in emergency and elective cases with acceptable recurrence rate of rebleeding and low rate of encephalopathy.

1661 Portal Haemodynamic Response to a Very Low-Dose Nitroglycerin in Cirrhosis
A low dose of nitroglycerin (NTG) predominantly dilates the venous system. Portal haemodynamic responses to a very low dose of NTG were studied in patients with portal hypertension and cirrhosis, compared with those to an unselected group of coronary heart disease. A 0.15 mg of NTG was sublingually given to 10 patients (LDG) and a 0.3 mg to another 10 patients (UDG). Haemodynamic measurements under the hepatic and right cardiac catherization were carried out before and 5 min after NTG administration. Wedged hepatic venous pressure (WHVP) reduced after NTG by 8%; p < 0.01 in LDG, and by 15%; p < 0.01 in UDG. Hepatic blood flow with ICG did not change in both groups. In LDG, azogys blood flow (AZF) did not change in contrast to a significant decrease by 11%; p < 0.05 in UDG. Mean arterial pressure fell by 4%; p < 0.05 in LDG and by 18%; p < 0.01 in UDG. Cardiac index did not change in LDG, but it decreased by 12%; p < 0.05 in UDG. In LDG as well as UDG, mean pulmonary arterial pressure and pulmonary capillary wedge pressure significantly fell and the magnitude of these falls in both groups were same. In UDG, a correlation between changes in WHVP and AZF was (r = 0.7, p < 0.05) was observed. This suggested that splanchic vasoconstriction mediated by high-pressure, rather than low-pressure, baroreceptor reflex mainly contributed to a decrease in portal venous blood flow, resulting in a WHVP reduction. Whereas, a slight but significant fall of WHVP induced by a very low dose of nitroglycerin might be due to venodilatation including hepatic vascular bed.

1662 Flow and Intestinal Transport in Chronic Biliary Anastomoses
A.P. Oettginger, M. Polivoda, G. Arlt, V. Schumpelick. Joint Institute for Surgical Research, Moscow, Aachen

Aim of the study: Disadvantages of Roux-Y biliary anastomoses are duodenal bypass of bile and the lack of an endoscopic access to the biliary anastomosis. Recently hepatico-jejunoo-duodenal interposition (HJD-IP) has been propagated to overcome these problems. The aim of our study was to investigate the changes in bile flow in these procedures.

Methods: 15 cholecystectomized mongrel dogs were operated as follows: RY-BA using a 30 cm jejunal loop (n = 5), HJD-IP with a 15 cm jejunal segment (n = 5), no additional procedure (control-group, n = 5). Four months postoperatively all animals underwent a hepat-biliary scintigraphy using 99m Tc Hepatobida® and a Picker Dyna-Camera-4.

- Regions of interest (ROI) were liver, bile ducts, anastomotic side of the jejunal loop, distal part of the ROY-loop, Treitz ligament, gastric antrum and cecum.

Results: Hepatic uptake of the tracer, that means time of max. activity (Tm) in the liver field was delayed in RY-BA (13.2 min) in comparison to the controls (9.0 min). This delay was even more pronounced in HJD-IP (23.0 min, p < 0.05). Tm in the extrahepatic bile ducts showed a similar delay in RY-BA and HJD-IP (40.0-42.6 min versus 20.0 min for the controls). Initial evacuation into the loop (T1) was also similar in both biliary anastomoses (33.2-33.5 min) but maximum of activity (Tm) appeared in the proximal part of RY-BA more late (71.2 min) than in the HJD-IP group (58.5 min). On the other hand percentage of applied activity in RY-BA loops (50.1%) exceeded the value in the HJD-IP loop (41.8%) indicating circulation of bile in the RY-BA loop. Transport through the Roux-Y loop lasted as long as bile flow from the HJD-IP loop to Treitz ligament. Ti at the ileo-cecal region showed a similar delay in both groups (123.4-127.0 min) compared with the controls (95.0 min). Bile reflux into the gastric antrum was a regular phenomenon in HJD-IP but not in RY-BA animals.

Conclusion: Consequences of chronic HJD-IP in dogs are a significant disturbance of hepatic bile uptake and recurrent duodenogastric bile reflux. RY-BA show a more normal liver function but a pronounced stasis of bile in the Roux-Y loop. Chronic hepatic inflammation following HJD-IP and motility disorders in the Roux-loop in RY-BA may be the underlying pathophysiological mechanisms.

1663 The Mechanism of Pentagastrin Related Inhibition of Small Bowel Bioelectric Activity - An Experimental Study on the Rat
A.P. Oettginger, K.G. Krishnan, G. Arlt, Ch. Toens, M. Polivoda. Joint Institute for Surgical Research - Moscow/Aachen
It has been shown that large doses of Pentagastrin (PG, 0.06-0.10 mg/kg BW) brings about the inhibition of small bowel electrical activity (SBEA) which is suspected to be caused by a decrease in blood flow due to vasoconstriction. Our aim was to investigate the mechanism of action of PG and the correlation of its effects with the O2 balance in the bowel, which can be of value as an important prognostic sign in various surgical conditions of the intestine, especially in small bowel transplantation.

Methods: The study was conducted in 15 murine small bowels in vivo and in vitro. The latter in conditions of bowel perfusion in oxygenated (pO2 = 450 mm Hg) and unoxgenated (pO2 = 100 mm Hg) Krebs solution (KES) at 37°C. Under Tiptonel narcosis in 7 rats (control group) the native SBEA and its reaction to intravenous PG administration (0.06 mg/kg BW) were registered with silver bipolar electrodes of the clip type. Then 5 cm of the central ileum was isolated and placed in unoxgenated KES. The SBEA and the PG effect were recorded. Afterwards the bowel was transferred to oxygenated KES and the same procedure was repeated. 8 rats (test group) were saturated with an antihypoxant substance (carotene like substance, 5 mg/kg BW) by intraperitoneal administration 30 min prior to laparotomy and procedures were repeated as mentioned above.

Results: In vivo the SBEA readily vanished to a straight line on PG administration in the control group. This effect was absent in the test group. In hypoxia in vitro the control group again showed a vanishing tendency of the SBEA on PG, while the test group documented no change. In normoxia in vitro the control group showed a decrease in the amplitude and the frequency parameters of the SBEA on PG, but not to the extent of vanishing. The test group, here, recorded an increase in the SBEA values on PG.

Conclusion: We conclude that the reaction of the SBEA to high doses of PG is related to the direct action of PG on the smooth musculature and activation of the intramural neural elements through the decrease in the oxygen uptake by the tissue. We suppose that a "high-dose PG test" may serve as an intraoperative test of the bowel in surgical interventions and transplantation.