1646 The Role of the Hepatic Radionuclide Angiography in the Portal Perfusion Assessment in Cirrhosis and Liver Tumours

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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 hemoodynamic 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 fsec), using ROTA scintillation camera and Micro Delta computer (Siemens). HPI was estimated using 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 (HAA, 0.57 ± 0.03), 13 with liver cirrhosis without (LC, X = 0.49 ± 0.13) and 18 with esophageal varices (LCVE, X = 0.32 ± 0.19), as well as in 4 patients with LC and sclerosated esophageal varices (LCSCV, X = 0.16 ± 0.11). Comparing to HAA and LC (HAA-LC, p < 0.05), HPI values were significantly lower in LCVE (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 (C-LH, p < 0.05). However, in 4 patients with hepatocellular carcinoma (Hpc, X = 0.26 ± 0.02), and 8 with liver metastases (LM, X = 0.40 ± 0.28), HPI values were significantly decreased (p < 0.01), but they didn’t differ between themselves (H-LM, p = 0.05).

Portal liver perfusions decreases in respect to the portal hypertension and collateral circulation development. Thus, significant difference is proved between HPI values in cirrhotic patients with and without 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.

1647 Endoscopic Aspects in Portal Hypertensive Gastropathy

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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 ultrasonographic, laparoscopic and splenoportographic modifications.

Material and Methods: The study was carried out on 60 patients with PHt and HC in different evolutionary stages. Eso-gastro-duodenoscopy was performed in all patients, and the modifications of the gastric mucosa were determined. In some patients antral and fundic biopsies were taken. The endoscopic aspects were correlated with the Child-Pugh stages of HC and compared with the ultrasonographic, laparoscopic and splenoportographic signs of PHt.

Results: Four types of endoscopic gastric mucosa modifications were noted: (1) A scirrhatia 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 areas of erythematos edematous and normal mucosa, localised mostly in the antrum, but also in the fundic area of the stomach, and even on the duodenum; histologically, there were no significant changes, but electron microscopic findings revealed eciasmic 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 modifications. The ultrasonography, laparoscopy and isotopic splenoportography (with 119 In, and the determination of the spleno-porto-cardiac circulation time) confirmed the presence of elements of PHt in all patients with erythema and varices at the gastric level. A good correlation with the evolutionary stages of HC has been noted.

Conclusions: The presence of a congestive gastropathy 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.

1648 Doppler Ultrasoundography (US) Examination of Portal Circulation After Transjugular Intrahepatic Portosystemic Shunt (TIPS)

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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 average (Vmean) velocity of blood flow (cm/sec) in the portal (PV), splenic (SV) superior mesenteric (SMV) veins and stent.

Results: PV SV SMV Stent

Vmean basal 22 ± 9 19 ± 5 12 ± 5 *
Vmean 48 hr 32 ± 14 28 ± 11 15 ± 5 88 ± 25
Vmean 1 wk 40 ± 24 36 ± 15* 18 ± 9 103 ± 18
Vmean 1 mo 44 ± 18* 32 ± 12* 23 ± 8* 102 ± 32
Vmean 3 mos 40 ± 18* 35 ± 15* 22 ± 10 105 ± 28
Vmean 6 mos 47 ± 20* 26 ± 4* 21 ± 12 72 ± 30

*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 h, 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 Vmean maximum increase in the stent is reached at 3 months, while a decrease is observed at 6 months. After TIPS a transient thrombosis of the intrahepatic portal branch was observed in some cases.

1649 Complications and Risks of Transjugular Intrahepatic Portosystemic Shunts in 28 Consecutive Patients

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Purpose: Transjugular intrahepatic portosystemic shunt (TIPS) is used as a safe and effective method for showing treatment by symptomatic portal hypertension. 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%) with follow-up ranging from 1 to 18 months (mean 8 months). Shunt patency was evaluated by doppler sonography. Shunt velocities below 25 cm/s 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 3 (11%) 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 occlusion. 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 mediastinal hematoma 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 dilation. (2) Doppler ultrasonography is accurate in noninvasively assessing shunt stenosis following TIPS. 3) At this time the follow-up procedure with careful follow up will be considered as long term treatment for symptomatic portal hypertension.

1650 Nutritional Status, Energy Expenditure and Portal Hypertension

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Estimation of energy expenditure and nutritional assessment may define energy requirements that are of importance in chronic disorder when energy needs can differ from normal requirements and some focal liver diseases. The energy expenditure was measured using standard double-sites (Bodys equation) were used to construct the standard diagram of newly developed age and sex-dependent anthropometric coefficient (AC) for the population 4-18 years on the basis of the equation: AC = WH2 / BSA. AC enabled to express nutritional status in a single number that was within the normal range (AC ± s.d. = standard deviation) or beyond, indicating nutritional problems. Statistical analysis was performed using unpaired t-test and Yates corrected chi-square test when appropriate; p < 0.05 was considered significant. Patients and controls did not differ with respect to age, body mass (b.m.) and BSA. Resting energy expenditure (REE); after overnight fast, indirect calorime-
Aims: To...

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 ectopic varices bleeding may be encountered by EVL.

Post-portal hypertensive cirrhosis
Pugh's grade A/B/C
Control of active bleeding
Recurrent bleeding
Ectopic varices bleeding
Obliteration
Sessions to obliteration
Patients with complications
Patients with mortality

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

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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. Sclerosant 1.5% Sotradecol and Steigmann-Golf ligator were used, respectively. Endoscopic treatment was repeated at an interval of 2-3 weeks until varices obliterated.

Results:

Post-portal hypertensive cirrhosis
Pugh's grade A/B/C
Control of active bleeding
Recurrent bleeding
Ectopic varices bleeding
Obliteration
Sessions to obliteration
Patients with complications
Patients with mortality

Conclusions: EVL is superior to EIS when comparing with the efficacy and complications between the sclerotherapy and ligation in management of bleeding esophageal varices. It might be a better method to treat esophageal varices bleeding in clinical practice.

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


Methods: 19 patients (18 males, one female, mean age 60 ± 9 yrs) with history of esophageal variceal 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-spleno-venogram was performed before EVL and after varices obliteration to assess venographic findings. The pressures of main portal vein (PVP), splenic vein (SVP) and superior mesenteric vein (SMVP) 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 EVL. 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%, SVP increased 18% and SMVP increased 4%. Among patients with a reduced pressure change, PVP decreased 24%, SVP 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 Hypertension in Cirrhotic Patients as a Marker of Liver Disease and Portal Hypertension

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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 gastropathy and esophageal varices was evaluated by endoscopy.

Results: After the meal the increase in portal flow was significantly lower in patients with severe gastroopathy (±23%) and esophageal varices (±26%) compared to patients without gastric lesions (±39%, p < 0.05) 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%, VF = 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)

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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 ± 4.27 months range 2-18 months in survivors. The mean portosystemic gradient decreased from 30 ± 5 to 11 ± 4 mm 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 1 week 1.36 ± 1.6 ± p < 0.0001) and was maintained at 6 months (score 1.5 ± 1.4). Bleeding occurred in 1 patient after 60 days from a small residual esophageal varices and was successfully treated with sclerotherapy. Congestive gastropathy (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), evidenced by doppler US as a reduction in blood velocity in the stent, which was treated with angioplast (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 observed during 6 months. Doppler-US is useful in monitoring stent patency.

Somatostatin as an Adjunct to Emergency Sclerotherapy of Bleeding Esophageal Varices

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Introduction: - Acute sclerotherapy (AS) is considered to be an useful and difficult 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 adjutant 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 sclerosant, 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 × viewing condition (1–3)) × 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 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 (mean 9.4 ± 0.08 ml vs 9.4 ± 0.04). 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 therapeutical complement could allow AS to be undertaken not only by highly skilled endoscopists, but also by gastroenterologists with a moderate expertise on therapeutical endoscopy.

1658  Congestive Gastroopathy with Liver Cirrhosis

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We have had gastrointestinal examinations of many patients with congestive gastroopathy complicated to liver cirrhosis. However, reddening and edema of gastric mucosa were not found in cases with congestive gastropathy, but chronic gastritis was found 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 to liver cirrhosis and 30 patients with chronic gastritis. In gastroscopy, the change metachromasia of colour after spraying to the mucosa with reddening was observed and biopsy specimens of the same gastric portion were taken. Furthermore, gastric juice was collected by aspiration. Histological diagnosis was done by HE. Histological staining using toluidine blue before and after chondroitin ABC digestion was carried out. The measurement of chondroitin sulfate in gastric juice was carried out using chondroitinase digestion method. [Results] In endoscopic findings, diffuse reddening of mucosa in the greater curvature of body was stronger in congestive gastropathy than in chronic gastritis. But another reddening patterns, erythematous macular 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%. Histological staining of toluidine blue in specimens of chronic gastritis revealed staining metachromasia, staining of goblet cells, but after chondroitin ABC digestion, metachromasia staining pattern almost diminished. In congestive gastropathy, metachromasia of goblet cells was very weak. Furthermore the amount of chondroitin sulfate A,B,C in gastric juice of congestive gastropathy was lower than that of chronic gastritis (decrease to about 40%). [Discussion] Toluidine blue is famous for metachromasia staining for chondroitin sulfate. Patients with chronic gastritis more than 50 years old, have almost intestinal metaplasia. Therefore, chondroitin sulfate was secreted from goblet cells into gastric juice. However, in patients with congestive gastropathy the amount of chondroitin sulfate in gastric juice is considerably less in congestive gastropathy than chronic gastritis, because the production of chondroitin sulfate might be inhibited by congestion. [Conclusion] It was strongly suggestive that the gastric production of chondroitin sulfate in congestive gastropathy might be inhibited because of congestion. The fact was also certified using endoscopic toluidine blue spraying and useful for the diagnosis.


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40% of the first VB episodes in cirrhosis occur within the first 6 mths of observation, and early occurrence has been found to be an independent predictor of mortality. We have aimed to identify the risk factors for early and late occurrence of VB through univariate survival analysis. We studied 155 consecutive cirrhotics with varices and without previous VB. At entry and at six months intervals the severity of liver disease and the appearance of varices were assessed according to the Child-Pugh classification and the JRSHP 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 rate were estimated at each mths interval by life tables, Breslow (early differences) and Mantel-Cox test (overall differences). The table shows the results: variceal size (VS), cherry-red spots (CRS), ascites, nutritional status 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 before 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 2 = 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, Conn index, ammonia levels, galactose elimination capacity and liver volume before TIPS, the stent diameter and the post-TIPS porto systemic gradient. The 2 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 the stability of PSE index was found. In conclusion the incidence 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.
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 mth) VBF were 67% for F3 from entry and 70% for F3 during FU (P = ns), 50% for F2 at entry and 34% for F2 during f-u (P = ns). Conclusions: (1) Univariate analysis VBF seems to be the most important variable in predicting the first VBF. (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 VBF.

Cumulative % of bleeding at 6 mths intervals

<table>
<thead>
<tr>
<th>Time (mths)</th>
<th>6 mths</th>
<th>12 mths</th>
<th>18 mths</th>
<th>24 mths</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>13%</td>
<td>0.0005</td>
<td>9%</td>
<td>0.0005</td>
</tr>
<tr>
<td>F2</td>
<td>50%</td>
<td>0.0005</td>
<td>53%</td>
<td>0.0005</td>
</tr>
<tr>
<td>F3</td>
<td>84%</td>
<td>0.0005</td>
<td>60%</td>
<td>0.0005</td>
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</tbody>
</table>

**1660** Non-Shunt Surgery for Bleeding Varices. 12 Years Experience

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During the period from 1979 to 1991, 596 cases of splenectomy and devascularisation were done electively for portal hypertension patients with history of moderate, massive or repeated attacks of haematoma and or menela (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 54.8 ± 10.5. Male to female ratio was 9:1. Complete liver functions, kidney functions, complete blood picture and upper gastrointestinal 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%, mild 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 3.18% & 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 equal dose 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 catheterisation were carried out before and 5 min after NTG administration. Wedged hepatic venous pressure (WHVP) reduced after NTG by 8%; p < 0.1 in LDG, and by 15%; p < 0.01 in UD. Hepatic blood flow with ICG did not change in both groups. In LDG, azgys blood flow (AZF) did not change in contrast to a significant decrease by 11%; p < 0.05 in UDG. Mean portal 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 (r = 0.7, p < 0.05) was observed. This suggested that splanchic vasocconstriction 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** Blood Flow and Intestinal Transport in Chronic Bilary Anastomoses

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**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-jejuno-duodenal interposition (HJIP) 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), HJIP 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 99mTc Hepatobid® and a Picker Dyna-Camera-4.

.. regions of interest (ROI) were liver, bile ducts, anastomotic side of the jejunal loop, distal part of the RY-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 HJIP (23.0 min, p < 0.05). Tm in the extrahepatic bile ducts showed a similar delay in RY-BA and HJIP (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 HJIP group (58.5 min). On the other hand percentage of applied activity in RY-BA loops (50.1%) exceeded the value in the HJIP 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 HJIP 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 HJIP but not in RY-BA animals.

Conclusion: Consequences of chronic HJIP in dogs are a significant disturbance of hepatic bile uptake and recurrent duodeno-gastric 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 HJIP 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

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It has been shown that large doses of Pentagastrin (PG), 0.06–0.10 mg/kg BW brings about the inhibition of small bowel bioelectric activity (EIA) 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 Triopetal 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 ileal ileum was isolated and placed in unoxgenated KES. The SBEA and the PC 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 intraportaline 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.