

N-acetylglucosamine yielded a fraction containing the mucin receptor protein. The receptor protein gave on SDS-PAGE a single protein band of 97 kDa and displayed specific affinity, in a concentration-dependent manner, towards the nitrocellulose discs coated with gastric mucin. The receptor showed requirement for carbohydrate chains in mucin for binding, as the glycosylated mucin lost 87% of its receptor binding capacity. Scatchard analysis of specific binding resulted in a linear plot consistent with a single class of high affinity receptors. The results from "Ligand" program data gave a  $K_d$  value of 43.8 nm and a  $B_{max}$  of 140 pmol/mg protein. These results attest to the role of mucins in the maintenance of gastric epithelial integrity, and suggest that the mucosal mucin receptor expression may be yet another important factor in the complex phenomenon of gastroprotection.

### 1806 The Mucoic Cap and Mucosal Blood Flow Inhibit Carcinogen Penetration into Damaged Rat Gastric Mucosa

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After a superficial gastric mucosal damage, the presence of a mucoic layer over the damaged mucosa (mucoic cap) and the following hyperemic response has been shown to protect the mucosa against deeper damage and against new noxious assaults (adaptive protection). We recently found that immediately, after gastric mucosal injury caused by exposure to 4.5 M NaCl for 5 min, carcinogen penetration to the proliferative cells in the mucosa was inhibited. We wanted to find the mechanism(s) behind this protection.

All rats received bromodeoxyuridine to label cells in S-phase and were exposed to 4.5 M NaCl for 5 min. Group 1 was left untreated. Group 2 had the mucoic cap removed 10 min after the salt damage. Group 3 had the celiac arteria ligated 10 min after the salt damage. Group 4 had the mucoic cap removed and the celiac arteria ligated. Ten min after salt damage N-(3H)methyl-N'-nitro-N-nitrosoguanidine (3H-MNNG) was given intragastrically 10 min before the end of the experiment. Carcinogen penetration from the gastric lumen to the proliferative cells in the gastric mucosa was evaluated in histological sections after immunohistochemistry and autoradiography. S-phase cells labeled with 3H-MNNG is the cell population at risk of MNNG-induced carcinogenesis.

Ligation of the celiac arteria abolished gastric mucosal blood flow and gastric fluid efflux. Removal of the mucoic cap had no effect on mucosal blood flow. In antrum the percentage of S-phase cells labeled with 3H-MNNG was 0.2, 10.1, 1.5 and 28.2 in groups 1-4. In corpus the percentage of S-phase cells labeled with 3H-MNNG was 0.1, 2.0, 9.8, and 21.9 in groups 1-4.

Our results show that both the mucoic cap and the increased mucosal blood flow contribute to protect against carcinogen penetration to the proliferative cells in the superficially injured gastric mucosa.

### 1807 Immunohistochemistry of Gap Junction in Human Gastric Epithelial Cells of Normal and Various Gastric Diseases

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Gap junction mediated intercellular communication has been postulated to be an important mechanism to maintain tissue homeostasis. Furthermore recent studies with gap junction antibodies revealed that certain carcinomas have a reduced level of gap junction proteins. This could be also important in neoplastic progression. In order to identify the presence of connexin 32 gap junction protein in human gastric mucosa of normal and various diseases, we performed an immunohistochemical study.

**Materials and Methods** Biopsy specimens of gastric mucosa taken through an endoscope were obtained from healthy subjects and patients with atrophic gastritis, erosive gastritis, metaplastic gastritis or gastric carcinoma. The specimens were fixed with formalin and embedded in paraffin. Deparaffinized sections were stained immunohistochemically by the avidin-biotin complex method (Vectastain avidin-biotin complex kit, Vector Laboratories, Inc, Burlingame, CA), using mouse anti-connexin 32 monoclonal antibody (Takeda, Japan) as primary antibody.

**Results** In normal mucosa immunohistochemical staining for connexin 32 was localized to the lateral cell membrane predominantly between foveolar epithelial cells, but faint staining was also seen between proper gastric glandic cells. The similar fashions were observed in the atrophic mucosa. On the other hand, the foveolar epithelial cells near erosion were faintly stained. None or faint staining was seen between intestinal metaplastic cells, and also carcinoma cells.

**Conclusion** It indicates that gap junction mediated intercellular communication was impaired in erosive gastritis and metaplastic gastritis, and this impairment might allow these epithelial cells to escape local control mechanisms. Then a decreased level of gap junction mediated intercellular communication in erosive gastritis and metaplastic gastritis might increase a risk of malignant change as well as metaplastic process.

### 1808 Inhibition of Gastric Epithelial Restoration by Bile Acid and Protective Effect of Teprenone...Evidence Using a Culture Cell Model

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Bile acids have been thought to be one of the causative agents in gastric mucosal damage. However, the detail cellular mechanism of bile acids is still unclear. Recently, we established a new gastric epithelial restoration model for quantitative assessment of wound repair (Gastro. 104:A222, 1993). Using this model, we investigated effects of bile acids with or without gastric defensive drug, teprenone, on epithelial restoration process. **Method:** Isolated rabbit gastric epithelial cells (90% mucous cell) were cultured in F-12 medium and formed complete monolayer cell sheet in 48 h. A wound with cell-free area of constant size (2 mm<sup>2</sup>) was created by cell denudation using rotating silicon tip. The restoration was monitored by measuring wound size every 12 h. The proliferative cells were detected by BrdU staining. Effects of deoxycholic acid (DC)  $1 \times 10^{-6}$  -  $1.4 \times 10^{-4}$  M and teprenone (TP) ( $1 \times 10^{-6}$  -  $1 \times 10^{-5}$  M) were assessed. **Result:** The change of the size of cell-free area was presented in a table. Data: mean, n = 5, number: mm<sup>2</sup>, \* p < 0.05

	0 h	12 h	24 h	36 h	48 h
control	2.1	1.1	0.5	0.2	0
DC: $1.4 \times 10^{-4}$ M	2.0	1.2	0.8*	0.6*	0.5*
TP: $1.0 \times 10^{-5}$ M	2.0	1.1	0.6	0.2	0
DC + TP	2.0	1.1	0.4	0.2	0

Effect of DC was dose-dependent. Addition of TP prevented the inhibitory effect of DC on mucosal restoration. Proliferative cells were detected in mainly 24-36 h in controls. DC also retarded the cell proliferation. **Conclusion:** Present data show that bile acids modulate gastric epithelial repair after damage and TP might act protectively in this process.

### 1809 The Role of Therapeutical Endoscopy in Upper Gastrointestinal Bleeding. Experience of a University Hospital

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**Background:** Upper gastrointestinal (GI) bleeding has a 6-10% mortality, depending upon specific cause, being up to 50% for variceal bleeding. Despite the availability of diagnostic endoscopy, this rate has no changed. The proposed beneficial effect of therapeutical endoscopy has not been fully evaluated.

**Objectives:** To describe: (1) The etiology of upper GI bleeding; (2) Overall mortality and adjusted to etiology; and (3) The impact of therapeutical endoscopy on mortality.

**Methods:** From May 1992 to May 1993 all adult patients with clinical evidence of upper GI bleeding (hematemesis or melena), were prospectively included. Upper GI endoscopy was performed in every patient within the first 6 hours of admission by a fellow supervised by an attending physician, using an Olympus GIF-XQ 20 endoscope. Demographic and anatomic data were collected in each patient. Peptic ulcers and variceal lesions were considered for sclerotherapy if they showed signs of active or recent bleeding (adherent clot and/or visible vessel). Patients were followed during hospitalization until discharge or death. Results are expressed as mean  $\pm$  standard deviation or relative frequency. Comparisons were done by Student-t test and the significance level set at p < 0.05.

**Results:** 280 were included, 190 males and 90 females. Mean age for males and females was  $48 \pm 12$  years and  $56 \pm 13$  years, respectively (p = 0.003). Mean age for duodenal and gastric ulcers patients was  $46 \pm 19$  years and  $63 \pm 17$  years, respectively (p = 0.0001). Sclerotherapy was performed in 76 (92%) cases with peptic disease and in all variceal bleedings. Total in hospital mortality was 10.7% (n = 30).

Lesion	Frequency (%)	In hospital mortality (%)
Esophageal varices (n = 92)	33	28
Peptic ulcer (n = 82)	29	4.8
Erosive gastritis (n = 65)	23	
Peptic esophagitis (n = 22)	8	
Miscellaneous (n = 12)	4	
Mallory-Weiss Tears (n = 7)	3	

**Conclusions:** Esophageal varices, peptic ulcer and erosive gastritis, comprised 85% of upper GI bleedings in this report. The 10.7% total in hospital mortality is similar to that found in literature. However, variceal bleeding treated with sclerotherapy had a 28% mortality, lower than previously reported. Therapeutical endoscopy therefore, has a positive impact on mortality from GI bleeding due to esophageal varices.

### 1810 Bleeding Duodenal Varicose Veins

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Varicose veins in the oesophagus and/or gastric fundus are commonly responsible for gastrointestinal (GI) bleeding in patients with portal hypertension. Although less common, ectopic varices from the duodenum to the rectum may also bleed. Duodenal varices are rare and only about 100 cases are reported.

A 35-year-old woman with chronic B hepatitis and partial thrombosis of the portal vein was referred to our department for further investigations because of two episodes (a week and three days earlier) of acute upper GI bleeding of unknown origin, that stopped spontaneously. Esophagogastroduodenoscopy (EGD) had been performed within few hours the onset of bleeding episodes: no ongoing hemorrhage were detected but initial esophageal varices and a not well defined submucosal "tumor" of the duodenal bulb were disclosed, a large amount of altered blood being present in the stomach and in the duodenum. On admission, abdominal ultrasound confirmed the partial thrombosis of the portal vein in absence of other pathological findings. EGD showed two initial columns of esophageal varices, congestive gastropathy and an ulcer (about 0.5 cm) penetrating varicose veins in the duodenal bulb. The patient was treated conservatively (omeprazole 40 mg daily). Successively she was treated with long-term omeprazole (20 mg daily). During the next 36 months of follow-up no further bleeding episodes occurred.

Endoscopy is the diagnostic investigation of choice in upper GI bleeding, even if performed in emergency. Nevertheless, it seems to be less successful in patients with active or recent bleeding duodenal varices. Thus, a high index of suspicion and careful endoscopy are necessary for accurate diagnosis. According to the literature data, our case documents that in bleeding duodenal varices due to prehepatic portal hypertension conservative treatment seems to be recommended, endoscopic sclerotherapy remaining the treatment of choice in the control of active bleeding and prevent rebleeding due to portal hypertension in patients with cirrhosis.

### 1811 Quality Assurance in Emergency Digestive Endoscopy (EDE): One Year Experience in Upper Gastrointestinal Bleeding (UGB)

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EDE is considered essential in UGB diagnosis and management, allowing immediate endoscopic therapy. Operative EDE can reduce transfusion requirements, surgery rate, hospital stay and, perhaps, mortality. Aims of this study were to evaluate quality, appropriateness and effectiveness of our diagnostic and therapeutic approach to EDE in UGB; to evaluate operators' compliance to prefixed guide-lines; to do a peer review of supplied output on the basis of selected quality indicators. The study is a prospective one including all the patients submitted to EDE in our Department in 1992 (410 emergency endoscopies in 381 pts). Follow-up data are limited to 154 out of 161 pts with oesophageal varices and peptic ulcers. Operative EDE was performed in 70 cases. Data are summarized in the table.

	Groups (no. pts):			
	I (20)	II (57)	III (46)	IV (31)
Initial success	14/14 (100%)		38/39 (97.4%)	
Rebleeding rate	5/20 (25%)	6/57 (10.5%)		
early			12/46 (26%)	10/31 (32%)
late			13/46 (28%)	10/31 (32%)
Mortality	2/20 (10%)	6/57 (10.5%)	15/46 (33%)	13/31 (42%)
Surgery/TIPPS	1/20 (5%)	2/57 (3.5%)	4/46 (8.7%)	0

I: bleeding ulcers haemostasis. II: non-treated ulcers. III: varices sclerotherapy. IV: non-treated varices.

In conclusion EDE is essential in UGB decisional procedure, effective in immediate and ultimate ulcers haemostasis and in stopping acute varices haemorrhage, but rebleeding and mortality remain high. Mortality correlates with age, Child, hepatocarcinoma. Endoscopists' compliance to prefixed guidelines must be better. A new prospective study based on guidelines modifications suggested by this preliminary observational study is in progress.

### 1812 Hemobilia – A Rare Cause of Upper Gastrointestinal Hemorrhage

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**Introduction:** The growing use of percutaneous liver puncture for the diagnosis and therapy of hepatobiliary disease and the increased incidence of blunt and penetrating hepatic trauma have contributed to a rising incidence of hemobilia. Clinically hemobilia is characterized by a classical triad as gas-

trointestinal hemorrhage (90%), biliary colic (70%) and jaundice (60%). Other causes are hepatic artery aneurysms, inflammatory disease, calculi and liver or bile duct neoplasms.

**Patients and Methods:** Over a period of 10 years hemobilia was diagnosed as cause of upper gastrointestinal hemorrhage in 7 patients (0.3% of all patients with upper gastrointestinal bleeding) at the Department of Surgery Karl-Franzens University Graz. A blunt abdominal trauma, mucosal erosion of the gallbladder by a large gallstone, diagnostic percutaneous liver puncture, obstruction of bile flow by neoplasms and percutaneous transhepatic drainage in 3 cases and an expandable metal stent in bile duct were causative of hemobilia. The diagnosis was confirmed by endoscopy and/or selective angiography.

**Conclusion:** Treatment of hemobilia is primarily surgical, with direct exploration of the liver, ligation of the appropriate lobar artery and relief of bile duct obstruction. The technique of arteriography and embolisation allows accurate localization of intrahepatic bleeding sites in few cases only but may avoid the need for a direct surgical approach. Otherwise the problem of the underlying conditions such as liver injury or biliary tract disease are not resolved.

### 1813 Evaluation of the Gastrointestinal Tract in Patients with Iron-Deficiency Anemia

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In adults over 50 yrs, iron-deficiency anemia (IDA) is usually the result of chronic gastrointestinal blood loss, whereas genital hemorrhage is the leading cause in younger women.

**Aim:** To determine the underlying cause of IDA in patients referred for evaluation to a gastroenterological outpatient clinic.

**Methods:** Between April 1992 and November 1993, 1545 patients were referred to our Department. In 24 (1.5%) cases the referral cause was IDA. They were evaluated according their symptoms with different diagnostic techniques.

**Results:** Group I: ( $\leq 50$  yrs, mean age 39.4, range 19–50 yrs) consisted of 10 women. IDA was attributed to gynecological entities (7 cases), oesophagitis (2 cases, 1 of them with hipermenorrhea), and coeliac diseases (1 case). IDA had been present for a mean period of 3.7 yrs (range 1–7 yrs). Group II: ( $> 50$  yrs, mean age 65, range 51–85 yrs) consisted of 14 patients (11 women). IDA was attributed to oesophagitis (5 cases), undiagnosed (4 cases), previous gastrectomy (2 cases), gastric adenocarcinoma (1 case), cecum adenocarcinoma (1 case) and duodenal angiodysplasia (1 case). IDA had been present for a mean period of 2.8 yrs (range 8 month–6 yrs).

**Conclusions:** (1) In younger patients ( $\leq 50$  yrs) IDA almost exclusively seems to affect women, and gynecological losses are the leading cause; those patients are referred later than older patients for gastrointestinal evaluation. (2) In older patients upper gastrointestinal tract blood losses are the main cause of IDA. (3) 16.6% of patients remain undiagnosed. (4) Ultrasonography should be included in the workup of IDA.

### 1814 Upper Gastrointestinal Hemorrhage (UGH) Due to Uncommon Etiology. Our Experience of 7 Cases in an Unselected Series of 252 Observations

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UGH is said to be due to uncommon etiology when its causes occur in less than 2% of cases in large series. Little systematic information is available about uncommon UGH. Here we report our experience of 7 such cases.

In the time span 1st January 1988–1st December 1992 we performed emergency esophagogastroduodenoscopy (EGDS) in 252 consecutive patients; the time range occurring between the First Aid Unit observation and the EGDS performance was 1–24 hours. The overall diagnostic accuracy was 98%.

We found a 70% prevalence of peptic diseases; bleedings related to portal hypertension were 11.5%. Cases bleeding for malignancies of the gastrointestinal tract were 5%. Mallory-Weiss syndromes were 2.8%. 5 cases (2%) remained undiagnosed. 7 cases (2.8%) were classified as having uncommon UGH. 2 of them had leiomyomas (gastric and duodenal); 2 had gastric Dieulafoy vascular malformations; 1 had pseudo-hemobilia due to gastroduodenal artery pseudoaneurysm ruptured into a pancreatic pseudocyst in an alcoholic chronic pancreatitis; 1 had hemobilia following ultrasound-guided percutaneous liver biopsy in cirrhotic. Another cirrhotic patient bled from unsuspected pharyngeal varices.

In conclusion, when managing UGH the multidisciplinary of gastroenterology is emphasized. Emergency EGDS is vital because specific therapeutic modality are both available and necessary.

### 1815 Upper Gastrointestinal Bleeding. A Five Year Survey of Consecutive Cases

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278 consecutive upper gi-bleedings in 239 adults during a five year period in 1988–1992 are analysed.

Emergency upper gi endoscopy service with specialised endoscopists and nurses were available around the clock, and most of endoscopies were performed within six hours from the onset of the bleeding or from admission to hospital.

The mean age of the 239 consecutive patients was 56.5 years (range 21–88 years), and 63% of them were men. 162 (68%) of the patients had serious primary diseases. The main sources of bleeding were: gastric ulcer 19%, oesophagitis 18%, duodenal ulcer 15%, oesophageal varix 13%, tumour 10%, Mallory-Weiss lesion 6%, and duodenitis 5%. Transfusions up to 91 units blood were required. Therapeutic procedures were used in 102 (43%) of the patients, in the remaining patients the bleeding ended with transfusions and medical treatment. Sclerotherapy was performed in 48 (20%) of the 239 patients, Laser-coagulation in 17 (7%), and Sengstaken-tube applied in 28 (12%) of the patients. 54 (23%) of patients underwent surgery, 8 (14%) straight after endoscopy and 46 (86%) after unsuccessful therapeutic procedure. The death rate of the patients until now is 31% with a median follow-up time of 3.7 years, 20 (27%) had died of bleeding or of the complications of bleeding and 54 (73%) of other causes.

We conclude that the rapid endoscopic diagnosis of the cause of a upper gi-bleeding produces the best results in patients with life-threatening bleeding or with serious primary diseases.

### 1816 Bleeding Gastroduodenal Ulcers: Selection of Patients for Surgery

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In a prospective study of bleeding peptic ulcer from 1988 to 1993, endoscopic findings were found to be inferior to shock on admission in the prediction of further bleeding in the hospital. According to management policy, 40 patients (age greater than 50 years on admission) from a total of 376 cases were treated by emergency surgery for shock. Endoscopic methods of treatment were not used during this period of study. In the remaining 336 cases, 83 (25%) bled again in the hospital and 62 patients in this group underwent urgent surgery. Endoscopic findings were classified into 3 groups: active bleeding (including visible vessel), evidence of recent bleeding, and no stigmata of hemorrhage in the upper gastrointestinal tract. In patients who bled again in the hospital, there was no significant difference between the number of cases with active bleeding (44%) and those with signs of recent bleeding (30%). Visible vessel was an unusual finding, present in 4% of cases, but was associated with a risk of further bleeding of 38%, an incidence comparable to active bleeding on endoscopy. Active bleeding on endoscopy was a less common finding with gastric ulcer than with duodenal ulcer, but was associated with a significantly greater incidence of rebleeding of 58% of cases compared to 42% for duodenal ulcer.

### 1817 NSAIDs Intake and Upper GI Bleeding: Endoscopic Findings in 173 Patients with Upper GI Bleeding in Greece

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NSAIDs are widely prescribed antiinflammatory and analgesic agents; However, as it is known, NSAIDs can produce mucosal damages and upper GI bleeding in some cases. This retrospective study was undertaken to investigate the prevalence and the nature of the mucosal damages observed in patients with upper GI bleeding associated with NSAIDs intake.

**Material and Methods:** 173 consecutive patients (M:120, W:53, aged 23–93 y) who were undergone urgently upper GI endoscopy in our Department because of upper GI bleeding during a 2 year period (1-1-1991 to 31-12-1992) were included in this retrospective study.

92 patients had taken NSAIDs no more than 48 hours before the upper GI bleeding (Group A, M: 62, W: 30, aged 28–93 y), while NSAIDs were not taken by the remaining 81 patients (Group B, M: 58, W: 23, aged 23–80 y). Patients with renal insufficiency, liver cirrhosis, gastric cancer, haematologic disorders and gastrectomy were excluded.

**Results:** These are shown in the table:

	Group A	Group B
Gastric ulcer	18 (19.5%)	13 (16%)
Duodenal ulcer	42 (45%)	50 (60%)
Pyloric ulcer	6 (6.5%)	3 (3.3%)
Gastric ulcer & Duodenal ulcer	7 (7.5%)	4 (5%)
Gastric erosions	10 (11%)	5 (6%)
No mucosal injury	9 (9.5%)	6 (7.5%)

**Comments:** This study is a retrospective one. However, the results clearly indicate that in more than 50% of patients upper GI bleeding was associated with NSAIDs intake 48 hours before the haemorrhage; NSAIDs intake was more frequent in patients with upper GI bleeding associated with gastric erosions and pyloric ulcer. On the contrary duodenal ulcer was found more frequently in patients who had not taken NSAIDs.

### 1818 Salvage Surgery in Acute Variceal Bleeding

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We report our experiences with surgery in patients with acute variceal bleeding who continued to bleed or had early rebleeding after Endoscopic Sclerotherapy (ES).

At a tertiary level referral hospital in north India from Jan 89 to Dec 93, a total of 26 patients (cirrhosis 17, non-cirrhotic 9) underwent salvage surgery (emergency 15, semi emergency 11) for acute bleeding from esophageal varices (17), gastric varices (8) and post ES ulcer (1). Twenty one patients had ES and Sengstaken Blakemore (SB) tube was used for temporary control of bleeding in 13 patients. These patients had received 8 (4–30) units of blood before they were referred for surgery 4 (1–16) days after onset of bleeding. Child status was A (12), B (11) and C (3). Shunts were performed in 11 patients while 15 patients had non shunt procedures.

Bleeding was controlled in 22 (88%) patients; 4 patients continued to bleed out of which 2 died. One more patient died of sepsis after anastomotic leak. Eighteen patients have been followed up for 2–30 months – 2 had rebleeding and 4 had encephalopathy out of which one died.

Surgery (shunts and non shunt procedures) can salvage endoscopic sclerotherapy failures with a low mortality and good control of bleeding.

### 1819 Gastrointestinal Haemorrhage in a Dutch General District Hospital

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To evaluate the problem of gastrointestinal haemorrhage in a general district hospital, we analysed prospectively the hospitalisation records in our institute from January 1st 1992 to January 1st 1994.

Over a period of two years 181 patients were admitted in our hospital for hematemesis and/or melaena: mean age 67 (SD = 18) yr, of whom 80 (44%) female, 101 (56%) male (female/male ratio 0.79). As a focus of the haemorrhage in 77% the upper gastrointestinal tract, in 4% the middle and in 19% the lower gastrointestinal tract was incriminated. Seventy two (40%) patients used non-steroidal anti-inflammatory drugs during the last month before the bleeding. Anticoagulant medication was used by 18% of the bleeding patients. The following major diagnostic groups were made: reflux esophagitis 18 (10%), Barrett's esophagus 3 (2%), esophageal variceal bleeding 12 (7%), esophageal carcinoma 2 (1%), Mallory-Weiss lesions 5 (3%), prepyloric/antral erosive lesions 42 (23%), duodenal ulcers 48 (27%), duodenitis 3 (2%), post-ERCP-papillotomy lesions 2 (1%), colitis 2 (1%), angiodysplasia 3 (2%), diverticulosis 9 (5%), colonic malignancy 6 (3%), colon polyps 7 (4%), rectum lesion 5 (3%) and hemorrhoids 3 (2%), with a rest group of 5 patients (3%) with undefined causes.

Therapeutic regimens in the acute phase consisted of H<sub>2</sub>-blockers or proton pump inhibitors if indicated and/or of transfusion when needed. In 33% endoscopic sclerotherapy was applied to. In an additional 3% somatostatin was given, whereas in 1% vasopressin was prescribed. In 5% of cases surgery had to be applied to. The overall mortality rate was 6.1%; the mean age of the patients who died was 75 (SD = 15) yr.

We conclude, that gastrointestinal haemorrhage puts a great problem to the clinician because of (1) its frequent occurrence which is partly associated with a (mis)use of non-steroidal anti-inflammatory drugs, and (2) a considerable mortality in the elderly.

### 1820 Endoscopic Therapy of the Upper Gastrointestinal Bleeding

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The authors performed 884 urgent endoscopy and they found 229 active

bleeding at these patients. 184 patients were bleeding from peptic lesions and from these patients 46 had more than one lesions. The bleeding had been able to arrest at 164 patients. These patients had 210 bleeding lesions altogether.

The first endoscopic arrest of bleeding was successful in 93% of all cases. Rebleeding occurred in 18.6% of all cases and 78% of these arised from a "visible vessel" which were Forrest I/a type.

Effect of the stop of bleeding depended on the type of haemostasis and the measure of haemorrhage.

The most suitable method to treat bleeding the Forrest I/a type is the monopolar electrocoagulation with vacuum electrode. This method was developed by the authors. (The hollow sucking electrode was attached to gastric mucosa. The electrode was connected to an aspirator and a manometer. The largeness of suction was measured, controlled and according to necessity modified, because the extent of coagulation area depended on the measure of suction.)

The first arrest of bleeding was effective by using vacuum electrode in 96%, solid electrode in 89%, multipolar electrode in 72% (complications 2%), ETH tube in 69%, sclerotherapy in 76%. Rebleeding was occurred by using vacuum electrode in 15.6% and other methods in 20.5–24%.

According to our experience these endoscopic methods (multipolar electrocoagulation, ETH tube and sclerotherapy) are safe (complications less than 2%) but they are not enough effective, however these are effectual for the treatment of Forrest I/b type lesions.

We think that the endoscopic arrest of bleeding is an effective, safe and inexpensive method to treat gastrointestinal bleeding.

### 1821 Acute Upper Gastrointestinal Bleeding: Patient Profile and Results of Treatment in Central Finland and in Tartu Estonia

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The aim of the study is to compare the patient profile and results of management of patients with upper gastrointestinal bleeding in Tartu University Hospital and Central Hospital of Central Finland.

**Methods:** Data of 118 patients with acute hematemesis/melena admitted to Central Finland Central Hospital were compared to that of 124 patients treated in Tartu University Hospital from August 1992 to July 1993. Endoscopic therapy was performed to all patients with stigmata of recent bleeding. H2-blockers or omeprazole was given to all patients in Central Finland, antacids and anticholinergic drugs were used in Tartu.

**Results:** The main results are given in following table:

	Central Finland (118)	Tartu (124)
Age over 65 yrs (%)	44.9	31.5
Shock on admission (%)	20.3	8.1
Peptic ulcer as source of bleeding (%)	46.6	52.5
Rebleeding rate (%)	6.7	14.5
Blood given (units)		
– conservatively treated	4.0	2.0
– operated patients	15.0	10.0
Emergency operation N/(%)	7/5.9	12/9.7
Mortality rate N/(%)		
– operated patients	3/42.9	1/8.3
– conservatively treated	5/4.5	11/9.8
– total mortality	8/6.7	12/9.7

**Conclusion:** Peptic ulcer was the most common source of bleeding in both countries. Patients in Central Finland were older and had worse condition on admission. Rebleeding rate after endoscopic therapy was higher in Tartu. More patients were operated in Tartu where operative mortality was lower. Total mortality and mortality after conservative therapy was lower in Central Finland.

### 1822 Recurrent Hemorrhages After Emergency Endoscopy in Acute Gastroduodenal Bleedings-What to Do?

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After successful emergency endoscopy it must be decided whether or not to perform surgery. The impact of laser hemostasis on surgery as well as rebleeding rate in high risk patients has been analysed.

**Methods and Results:** 416 patients were treated for bleeding gastric and duodenal ulcers over a period of 6 years using the Neodymium-YAG Laser (Medilas MBB; trichronic Quarz fibre, coaxial CO<sub>2</sub> flow, 100 watt). At endoscopy 80 patients showed a Forrest [F] Ia and a total of 128 patients had evidence of active F1b bleeding. In 208 patients stigmata of recent hemorrhage were visualized. Initially, the overall laser hemostasis rate in actively bleeding ulcers was 85% (gastric ulcer: 72%/97%, duodenal 76%/94%) Gastric ulcers carried a rebleeding rate of 21% compared to 22.6% in duodenal

ulcers. Renewed hemostasis was reached in 80% but the rate of emergency operations increased in patients with rebleeding ulcers up to 30% along with a significantly higher mortality rate of 29%. Surgical intervention in bleeding peptic ulcers could be reduced from 52% to 12%.

**Conclusion:** To derive benefit surgery should be performed in hemorrhage free interval following photocoagulation before the risk of rebleeding begins to rise leading to emergency operation with its attendant increased mortality.

### 1823 Evaluation of the Results from Treated Hemorrhoidal Disease by Combined Technique – Rubber Band Ligation and Cryotherapy

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In this study we present combined method and its application on the patients with hemorrhoidal disease. The method consist two techniques which are connected in a unique functional treatment. In fact, the first step consider a treatment with rubber band ligation, and the next step is cryotherapy.

This technique was used on a total of 40 pts. The group contained patients of both sexes, different ages and different grades of hemorrhoides, treated for 3 ys in hospital conditions.

The success of the method is in a significant number of the patients (90%) whose symptoms of hemorrhoidal disease disappeared. Some of the pts were treated only once, and the others were treated several times. There are 17.5% of registered complications by using this combined method. Local complications are presented by ulcer and thrombosis of external hemorrhoides. Surgery treatment is used by two patients.

In this study we want to accentuate the priority, acceptance of the method by the patients, because only fewer complications are present, which are treated with success.

### 1824 Clinical Predictors for Aggressive Treatment in Patients with Non-Variceal Upper Gastrointestinal Bleeding

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It has been suggested in NIH consensus conference that patients at high risk for persistent or recurrent upper gastrointestinal (UGI) bleeding are those with active bleeding (spurting or oozing) or a visible vessel at endoscopy. These patients should be treated aggressively. This study was undertaken to identify clinical factors which could be used to predict the endoscopic signs (spurting, oozing, visible vessel). **Materials and methods:** Patients with recent UGI bleeding who underwent an emergency endoscopy within 12 h of arrival at the hospital were consecutively enrolled in this study. Patients were excluded from this study if (1) they had variceal bleeding, (2) had bleeding UGI cancer, (3) had bleeding of unknown origin, (4) had negative result at endoscopy. The patients' 16 factors, analyzed with regard to the endoscopic signs (Spurting, oozing, visible vessel), were age, sex, initial manifestation (hematemesis/melena), duration of manifestation, previous history of UGI bleeding, NSAID or anticoagulant ingestion, cigarette smoking, alcohol consumption, numbers of comorbid illness, presence of shock, hemoglobin value, hematocrit value, BUN, units of blood transfused at entry, color of drained fluid from a nasogastric (NG) tube, and endoscopic signs. **Results:** Between Sep. 1992 and Mar. 1993, a total of 350 patients were enrolled in this study. Of them, 114 patients had endoscopic signs (8 spurting, 27 oozing, 79 visible vessel). With univariate analysis, statistically significant factors were: coffee grounds or red fluid drained from a NG tube and BUN ( $\geq 30$  vs  $< 30$  mg/dl). With multivariate analysis, only the color of NG tube emerged as independent predictor for endoscopic signs (odds ratio: 2.001, 95% confidence interval: 1.218–3.289). **Conclusions:** Patients with non-variceal UGI bleeding who have coffee grounds or red fluid drained from a NG tube need aggressive treatment.

### 1825 Acute Upper Gastrointestinal Bleeding as an Indication for Urgent Endoscopy in Latvian State Hospital

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In the period of 1990–1992 we have developed Gastrointestinal Endoscopy Database "Endoflex" for endoscopy units.

P. Stradin State clinical hospital Endoscopy unit Database has 10284 endoscopy results during January 1992–November 1993. Among them 537 (5.2%) patients were subjected to urgent upper GI endoscopy. The **Results** of upper GI endoscopy are the following: gastric ulcer – 153 (28.5%); duodenal ulcer – 126 (23.5%); esophageal varices – 33 (6.1%); haemorrhagia ventriculi

(cases when blood presents in lumen, but bleeding source is not found) – 31 (5.8%); we would like to underline that this percentage varies from 1.1 to 10.2 depending on endoscopist personal experience; Mellory-Weiss syndrome – 23 (4.2%); erosions – 17 (3.8%); cancer ventriculi – 8 (1.5%); angiodysplasia – 7 (1.5%); reflux esophagi's – 6 (1.3%); miscellaneous (*ulcus pepticum jejuni*, cancer esophagi, fistula etc. – 14 (2.6%). Possible bleeding causes were found with 418 (77.8%) patients in total. Endoscopy pathology was not revealed in 25 (4.6%) cases. The rest 94 (17.6%) patients have pathology traditionally not connected with upper GI bleeding. Patients with bleeding duodenal ulcer male/female ratio was 4:1 without any age tendencies; patients with bleeding gastric ulcer male/female ratio was 1.5:1.0 with a high prevalence in female after 60 years.

**Conclusions:** (1) endoscopy diagnoses for patients sent for urgent endoscopy with acute bleeding are comparable with other endoscopy units; (2) endoscopy database allows to make analysis to evaluate endoscopist's qualification.

### 1826 The Effect of Somatostatin on Gastric and Duodenal Bleeding in Case of Unefficacious Endoscopic Hemostasis

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**Aim** of the trial was to assess the effect of somatostatin (Stilamin, Sereno) on the control of hemorrhage from gastric and duodenal ulcers in case when endoscopic methods were not efficacious and surgical procedure represented a risk due to other diseases. For the endoscopic hemostasis, photocoagulation using a neodymium-YAG laser or sclerotherapy by means of 1% polidocanol were used. If initial hemostasis was not successful or recurrent bleeding occurred twice within 48 hours, somatostatin at a dosage of 3 mg (250 ug/h) every 12 hours over 72 hours by means of an injection pump was applied in those patients in whom surgery represented a risk (cardiac and pulmonary patients, liver cirrhosis, renal transplantation).

**Results:** Of 321 patients with bleeding from gastric and duodenal ulcers admitted over a period of 12 months, 19 (5.9%) were administered somatostatin. Their mean age was  $63.86 \pm 11.2$  years. In 8 patients, ulcer was located on the posterior wall of the duodenal bulb, in 2 on the prepyloric region and in 9 on the posterior wall of the proximal part of the stomach. Hemorrhage was of Forrest Ia type. The results were compared with the data before the introduction of somatostatin. In 16 (84%) patients bleeding was successfully controlled, while 3 (16%) patients required operation as an emergency procedure for recurrent hemorrhage. One (5%) patient died after the surgery. Before the administration of somatostatin, mortality rate overall was 33% related to bleeding or surgical procedure in patients who presented a risk.

**Conclusion:** In case of unsuccessful endoscopic hemostasis in patients in whom operative procedure would represent a risk due to other diseases, it is reasonable to use somatostatin, which significantly decreases mortality.

### 1827 Surgical and Endoscopic Decision Making in Upper Gastrointestinal Bleeding Emergencies

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Within the last twenty years the introduction of endoscopic treatment has gained substantial impact on the therapeutic approach to handle life-threatening bleedings of the upper gastrointestinal tract. New endoscopically geared techniques – e.g. clipping of the vascular stump – have been introduced to control active bleeding events reliably. However, much controversy still centers around the question, what patients benefit from early elective surgery after successful initial bleeding arrest achieved endoscopically? This study was performed to demonstrate the progress in endoscopic treatment-development and to evaluate the involved risk factors which mainly contribute to its failure and to bleeding recurrences.

A retrospective analysis of the medical records of 1112 patients treated for upper gastrointestinal bleeding (UGIB) between 1973–1990 was taken to elicit the influence of endoscopic management on the morbidity and mortality in emergency hemorrhages. Thereby each UGIB was diagnosed and treated endoscopically within the first hour following hospital admission and was classified according to the criteria of Forrest.

The overall initial success rate to treat active UGIB-events was 90%. Thereby the frequency of surgical intervention (purse-string suture or resection) could be lowered from 90% in 1973 to 25% in 1990, including all patients who required early elective surgery. The concept of combined endoscopic-surgical management could lower the lethality rate from 25% to 8% over the years. Risk factors related to early recurrences and emergency surgical operation, e.g. ulcer location, bleeding activity and -intensity could be delineated and sustained the importance of elective surgery.

This study demonstrates that endoscopic treatment of UGIB warrants a safe and reliable procedure for a permanent curement. Furthermore it ac-

centuates that the indication for early elective surgical intervention is closely linked to risk factors which decrease the initial success rate of the endoscopically controlled hemorrhage. They must not be neglected.

### 1828 Non-Shunt Surgical Treatment for Bleeding Oesophageal Varices

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**Patients.** Between 1980 and 1993 12 female and 19 male patients (aged from 17 to 62 years) were submitted to non-shunt surgical treatment for bleeding oesophageal varices.

Hepatic cirrhosis was the main cause of varices appearing in 27 patients, extrahepatic bloc – in 3 patients and a primary hepatic tumor in one patient. Child's hepatic failure evaluation showed stage A in 13 patients and stage B in 18 patients. According to the endoscopic variceal evaluation scale-stage I was observed in 2 patients, stage II in 12 and stage III in 17 patients.

Emergency indications for the surgical treatment were present in 7 patients, selective indications – in 24 patients.

**The operation technique.** In the early eighties consisted of the oesophageal, cardinal and gastric fundal devascularisation – performed in 7 cases mainly for an acute massive bleeding. 5 patients were operated according to Siugura technique. During the last 6 years – 19 oesophageal transsections and anastomosis using a stapler device were done only through the abdominal access.

**Results.** The efficacy and safety of an oesophageal and gastric fundal devascularisation were poor: 6 patients rebleeded and 4 died. In the group after Siugura operation one patient died because of oesophageal hand-sewn anastomotic leak in the mediastinum. The best results were obtained after stapler transection of the oesophagus. There were 3 important rebleedings and one death caused by the anastomotic leak complications.

### 1829 Effect of Intravenous (IV) Ranitidine (RAN), RAN Plus Pirenzepine (PIR) and Omeprazole (OME) on 24-Hour Intragastric (IG) pH in Healthy Human Subjects (HS)

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The successful control of bleeding peptic ulcers is important because of its associated high mortality. Blood coagulation and platelet aggregation are greatly impaired when the ig. pH is less than 5.4. The **aim** of the study was to elucidate in 10 healthy fasted HS the effect of different iv dosage regimens (DR) of RAN [50 mg bolus (B) + 3 mg/kg/24 hr; RAN 50/3 and 50 mg B + 6 mg/kg/24 hr; RAN 50/6], RAN + PIR [RAN 50/6 + 4 × 10 mg PIR as B-injections in 6 hr intervals] and of OME [ranging from 2 × 40 mg (80 mg/die) up to 5 × 40 mg (200 mg/die): OME 40/40, OME 80/40, OME 80/40/40, OME 4 × 40 and OME 5 × 40] on the 24 hr ig pH. For clinical use OME is only available as a bolus injection, because it is too instable for longer infusion. On a given day only one DR was given. On separate days control studies with 0.15 M NaCl iv. were done. 24 hr pH-metry was performed with combined glass electrodes. **Results:** All given DR of RAN, RAN + PIR and OME, resp., significantly ( $p < 0.004$ ) increased the ig. median pH as compared to control. Only RAN, RAN + PIR and high DR of OME (160 mg/die as a four or five-bolus injection DR) raised the ig. median pH 5.4. RAN + PIR and RAN 50/6 caused a significantly ( $p < 0.007$ ) higher increase of the ig. pH as RAN 50/3. There was no significant difference between RAN 50/6, RAN + PIR, OME 4 × 40 and OME 5 × 40. OME 5 × 40 and OME 4 × 40, resp., caused a significantly ( $p < 0.03$ ) higher increase of the ig. median pH as the lower DR of OME.

Table: Median 24 hr-pH and 24 hr-pH > 6.0 (%) in response to iv RAN, RAN + PIR, OME and NaCl (Control). Results are medians and % with the interquartile distances ( ) of 10 subjects

	Median 24 hr-pH	24 hr-pH > 6.0 (%)
Control:	1.4 (1.2–1.7)	0.3 (0.0–2.2)
RAN 50/3:	5.4 (4.5–5.9)	42.6 (30.7–49.8)
RAN 50/6:	6.2 (5.7–6.5)	58.1 (43.7–71.0)
RAN + PIR:	6.3 (6.2–6.4)	66.5 (65.5–79.8)
OME 40/40:	3.7 (1.9–5.3)	19.8 (8.9–41.5)
OME 80/40:	4.4 (3.2–5.4)	21.5 (12.4–36.0)
OME 80/40/40:	4.8 (3.3–5.9)	29.4 (19.0–44.6)
OME 4 × 40:	5.6 (4.2–6.1)	42.5 (16.0–54.4)
OME 5 × 40:	5.4 (4.6–6.2)	37.9 (22.2–66.5)

We **conclude** that (1) RAN in both DR, RAN + PIR, OME 4 × 40 and OME 5 × 40 in the performed DR are able to elevate the ig. pH above the critical median pH 5.4; (2) the combination of PIR and RAN 50/6 is not more potent than RAN 50/6 alone; (3) the observation, that the percentage of ig. pH greater than 6.0 during the 24 hr study was lower after bolus injection of OME than after infusion of RAN might be due to the different forms of administration. (4) RAN 50/6 and RAN + PIR as well as OME 4 × 40 and OME 5 × 40 should

be considered as adjuvant treatment to prevent rebleeding of peptic ulcers. But this needs to be shown in patients with bleeding gastric and duodenal ulcers.

### 1830 A Comparison of the Available Methods for the Bleeding Peptic Ulcer Therapy in Latvia

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A modern endoscopic techniques for the control of peptic ulcer hemorrhage such as heater probe and laser photocoagulation are not available at the endoscopy units in Latvia because of poor economical situation yet. The aim of our work is compare the efficacy of injection sclerosis and bipolar electrocoagulation as the widely used methods for the bleeding peptic ulcer therapy during the last two years in Riga.

We compare the results of the therapy (permanent hemostasis, persistent hemorrhage, recurrent hemorrhage, emergency surgery, transfusion, mortality) between the two greatest endoscopic units in Riga. At the one of them we use injection sclerosis of 98% ethanol, other uses different types of therapy. Evaluating all patients with upper gastrointestinal hemorrhage from August 1990 and making statistical analysis we are planning to go on till the moment (the end of 1994 expected) when the modern methods will be commercially available for endoscopists in Latvia.

Seventy five patients with actively bleeding ulcers were treated at the units till December 1993. Fifty eight of them were treated with 98% ethanol and for others bipolar electrocoagulation was used. There were no significant differences among patients treated with these two methods. The hemostasis were achieved in 85% of patients. Re-bleeding rates were 25% and 27%. The proportion requiring emergency surgery were 11% and 15%. There was no significant difference in mortality 15% and 10%. Injection sclerosis and bipolar electrocoagulation are equally effective in controlling bleeding from peptic ulcer.

Injection sclerosis is a cheap and available method for Latvian endoscopists at present. We are looking for the possibility to defend the advantages of the injection therapy in future too.

### 1831 Bleeding Peptic Ulcer: Injection, Elective or Emergency Operation?

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In 210 patients with peptic ulcer bleeding injection sclerotherapy was applied. Initial hemostasis was obtained in 95% of the patients, while 11 patients (5%) required emergency surgery due to failure of injection procedure. Of 199 patients previously injected, 28 rebled (14%). The highest rebleeding rate was in the Forrest Ia group (33%); rates were lower in Forrest IIa (10%) and Forrest Ib (6%) patients. Of the rebleeding cases, 19 were successfully reinjected, while 9 underwent emergency surgery. Twenty three patients, in whom the injection was successful, underwent elective operation without active bleeding, the indication for surgery being localization of the ulcer and the caliber of visible vessel in the ulcer base. In general thanks to injection sclerotherapy, permanent hemostasis was achieved in 79.5% of the patients. In 9.5% of the patients we were forced to perform emergency surgery, because the injection was ineffective, 11% of the patients were electively operated. Concerning Forrest Ia and IIa groups, injection sclerotherapy was successful in 63% of the patients. To obtain permanent hemostasis, 17% of the patients had to undergo emergency operation, and 20% of the patients had to be electively operated. The mortality rate of all the patients was 3.8%. No patient died following endoscopic treatment alone. Two out of 11 patients (18%) undergoing emergency surgery on hospital admission died. The highest mortality rate (56%) we observed in patients emergency operated because of the rebleeding. The overall mortality rate in patients who underwent emergency surgery was 35%. Among patients electively operated one died (4.3%). It is concluded, that injection sclerotherapy is valuable method to stop the bleeding from peptic ulcers. Patients with large visible vessels of the posterior inferior duodenal bulb wall or subcardial ulcers should be considered as candidates to elective surgery after successful primary injection, to avoid rebleeding, which carries the highest risk for the patients.

### 1832 Idiopathic Megacolon (IM)- Search for a Viral or Neuropathic Aetiology

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The cause of idiopathic megarectum and megacolon is unknown. Routine histology of the gut is usually normal. We have therefore examined resected gut for evidence of a viral aetiology, as well as for morphological abnormalities of nerve and muscle.

Resected colon from six patients (3 M, age 20-42) with chronic IM whose symptoms commenced acutely were studied. Histology for viral inclusions and nested polymerase chain reaction (PCR) was performed utilising specific primers for cytomegalovirus, Epstein Barr virus, herpes simplex virus type 1 and varicella zoster virus. DNA was extracted from paraffin embedded blocks utilising a proteinase K and phenol chloroform extraction. Immunohistochemistry (IHC) with polyclonal antisera to neural markers S100 (Schwann cells) and PGP 9.5 (axons) was performed.

In no patients were there viral inclusions or cytopathic changes. PCR failed to identify herpesvirus DNA for the 4 viruses tested. However IHC for PGP 9.5 and S100 revealed qualitative abnormalities in the density of neural innervation of the muscularis propria and mucosa in 3 patients.

**Conclusion** Patients with megacolon (acute onset) have morphological evidence of neural damage but this is not attributable to the neurotropic effects of herpesviruses.

### 1833 Prevalence of the Irritable Bowel Syndrome (IBS) in a Greek Population

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**Aim:** The aim of this epidemiological study was to evaluate the prevalence of the IBS in a Greek non-patient population.

**Material and Method:** 500 subjects, 200 males and 300 females, 25-65 years old (mean age  $40 \pm 5$  years), were interviewed at home or at work.

**Results:** Sixty subjects (12%) suffered of symptoms compatible with IBS (which is characterized by some combination of (1) abdominal pain; (2) altered bowel function, constipation, or diarrhea; (3) hypersecretion of colonic mucus; (4) dyspeptic symptoms and (5) varying degrees of anxiety or depression). 150 subjects (30%) had symptoms of functional gastrointestinal disorders other than IBS (chronic painless constipation, non-colonic pain, dyspepsia and other minor complaints). In the IBS group pain and constipation were more common than pain and diarrhea (50% VS 15%), as well as, pain and constipation alternating with diarrhea (10%). The subjects of IBS group compared with the subjects of the remaining sample were predominantly females (75% vs 55,  $P < 0.01$ ) and more often complained of stress induced bowel dysfunction (40% vs 18%,  $P < 0.01$ ). In the last year, 10% of the IBS subjects had lost days of their work and 55% had consulted a doctor (only 20% had consulted a gastroenterologist) for their bowel dysfunction. Significantly more IBS subjects with than without diarrhea (100% vs 60%,  $P < 0.05$ ) and with than without abdominal pain weekly (80% vs 20%,  $P < 0.05$ ) consulted a doctor for their functional bowel disorder.

**Conclusion:** (1) In a Greek non-patient population symptoms of functional gastrointestinal disorders are very common, but only a limited part can be classified as IBS. (2) Almost  $\frac{1}{2}$  of the IBS subjects consulted a doctor but rarely a gastroenterologist (3) The presence of diarrhea and frequent abdominal pain were associated with an increased doctor consultation for IBS.

### 1834 Clinical Application of Anal Endosonography with Different Rotating Endoprobes

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Anal endosonography (AE) is a recent technique for the study of anal sphincter morphology that permits to find abnormalities in the anal canal and perianal region. Recently, rotating endoprobes with smaller diameter and different emission frequencies have been developed. We studied the modifications induced by the diameter of the probe to the sphincter morphology in normal subjects and the compliance in a group of anal stenosis with use of two different ultrasonic probes (Bruel & Kjaer: 20 mm diameter, 7 Mhz, conic vs Kretz: 13 mm diameter, 5-7.5-10 Mhz, cylindrical). We have carried out AE in 32 patients (18 M:  $42 \pm$  yrs; 14 F:  $50 \pm$  19 yrs;  $m \pm$  SD) with Bruel & Kjaer (BK) probe and in 32 patients (16 M:  $47 \pm$  13 yrs; 16 F:  $48 \pm$  16 yrs;  $m \pm$  SD) with Kretz (K) probe. Both probes were protected by a plastic cone (BK) or cylinder (K) that were filled with degassed water to provide acoustic path for the ultrasonic wave. Both probes have allowed the identification of sphincter structures, but, in the group of patients studied by BK, the larger probe determined a lower thickness of internal anal sphincter (IAS) ( $2.14 \text{ mm} \pm 0.05$ ;  $m \pm$  SD) than that measured by K probe ( $2.81 \text{ mm} \pm 0.07$ ;  $m \pm$  SD); no differences were evidenced in thickness of external anal sphincter. It was not possible to introduce the BK probe in 3 patients with substenosis from anal carcinoma and in 4 patients with post-surgical anal stenosis, while it was possible with the smaller K probe evaluating the location and infiltration degree of carcinoma and the extension of stenosis in the anal canal (appearing as a hyperechoic layer). **Conclusion:** This study has evidenced the utility of a smaller diameter probe that causes a less modification of IAS and permits to evaluate the abnormalities in anal stenoses. At last, the availability of different frequencies is advantageous for a detailed study of anal layers.