

### 1196 Gastrozepine and Triple Therapy in the Treatment of H<sub>2</sub>-Blocker Resistant Duodenal Ulcer Disease

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**Aim:** To investigate the efficiency of combination of M<sub>1</sub>-selective receptor antagonist gastrozepine and triple therapy (Denol + amoxicillin + metronidazole) in the treatment of Helicobacter pylori (HP) positive duodenal ulcer (DU) patients (pts) resistant to 8 weeks treatment of ranitidine 300 mg/d.

**Methods:** 38 pts with endoscopically proven DU (diameter was not less than 5 mm) randomized into 2 groups receiving: Group A (n = 20) Gastrozepine (100 mg/d for 2 weeks then 50 mg/d for 2 weeks) + De-nol (colloidal bismuth subcitrate) 480 mg/d for 4 weeks combined with amoxicillin 500 mg g. i. d. and metronidazole 250 mg g. i. d. for the first two weeks (triple therapy). Group B (n = 18) omeprazole 20 mg/d for 4 weeks and amoxicillin 500 mg g. i. d. for 2 weeks. The pts were rescoped 4 weeks, 6 and 12 months after the end of the treatment. HP was sought by histology and biopsy urase test. Eradication was defined as all tests negative at 4 weeks post treatment.

**Results** are summarized below:

Group	Healing DU (%)	Eradication HP (%)	Relapse DU (%)
A (n = 20)	80	70	15
B (n = 18)	88.9	66.7	27.8

**Conclusion:** There results indicate, that type of combined triple therapy with Gastrozepine is as effective as Omeprazole with amoxicillin in healing resistant DU, in HP eradication and in prevention of DU relapse. It is a good alternative in HP positive DU pts resistant to H<sub>2</sub>-bloker.

### 1197 Sucralfate Treatment in Oral Aphthous Ulcers

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In this study, sucralfate was given to 11 patients with oral aphthous ulcers, the youngest one being 16 and the oldest, 45 years old. 7 of the patients (63%) were females and 4 (37%) were males. One had Ulcerative Colitis and another Behçet's Syndrome in relation with aphthous ulcers. No definite disease to result in aphthous ulcers was diagnosed in other patients. The patients, whose frequent history of aphthous ulcers had been taken for a minimum of the last one year were entered into this trial.

The patients were told to dissolve 1 gram sucralfate tablets in water and to gargle the prepared solution every morning and night, keeping it in mouth for at least three minutes each time. No other medicine was used during the treatment. At the end of the 15th day, in 8 patients out of 11 (72%), aphthous ulcers had completely disappeared. The patients with Behçet's Syndrome and Ulcerative Colitis were among the recovering patients. Sucralfate was thought to be effective in the treatment of oral aphthous ulcers. No research has been done on this subject before. We expect vaster studies on this subject to support this method of treatment.

### 1198 Evaluation of the Duodenogastric Reflux Using <sup>99m</sup>Tc-HIDA in Patients After Gastrectomy

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Duodenogastric Reflux is an often postoperative complication in patients who had gastrectomy. The symptoms are various.

We studied 30 patients (13 males and 17 females). All of them had undergone a surgical operation on stomach, 24 had symptoms and 6 were asymptomatic. All of them were assessed by endoscopy.

**Method:** The patient must be fasting for 3–4 hours before the examination. With the patient in supine position and the callimator over the abdominal area 5 mCi <sup>99m</sup>Tc-HIDA (Amersham U.K) injected i.v. Sequential views of 120 sec are taken for 45 min. 100–150 ml of milk was administered orally 20 min. after the i.v. injection. Finally, a small quantity (200 µCi) of <sup>99m</sup>Tc pertechnetate in 100 ml of water was administered orally to outline the stomach area.

**Results:** From the 24 symptomatic patients 19 had a typical Duodenogastric reflux radiopharmaceutical imaging in the stomach. The other five symptomatic patients with no imaging in the stomach had a long time imaging of common bile duct and delayed passage of radiopharmaceutical to the duodenum and probably this was the reason of their symptomatology. Two of the asymptomatic patients had a low grade of duodeno-gastric reflux.

**Conclusions:** Hepatobiliary scanning with Tc-<sup>99m</sup> HIDA is an excellent low risk high diagnostic value examination of Duodenogastric Reflux in patients after gastrectomy.

### 1199 The Effect of Long Acting Somatostatin Analogue in the Prevention of Post ERCP Pancreatitis

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To assess the effectiveness of long acting somatostatin analogue, sandostatatin, in the prevention of post ERCP pancreatitis a double blind randomised trial was carried out. A total number of 172 consecutive patients undergoing ERCP were randomised to receive either octreotide 100 µgr subcutaneously 30 minutes before the procedure (84 pts) or isotonic sodium-chloride (88 pts). The same premedication (butyloscopolamine, midazolam) and contrast media (sodium diatrizoate 30%) was used in all patients and the comparison of age, sex and indication for ERCP showed no significant differences between the octreotide and placebo groups. Serum amylase levels were measured before premedication and ERCP, and 180 min and 12 hours after the procedure.

**Results.** Cannulation of the papilla failed in 11 patients (6%). The pancreatic duct was visualised in 152 pts (87%). Common bile duct stone was the most common finding in ERCP, observed in 24 pts (28%) in the octreotide group and in 20 (22%) in the placebo group. Normal ERCP was found in 32% and 34% of the pts respectively. Endoscopic sphincterotomy underwent 42 pts (24%) and biliary duodenal endoprosthesis was placed in 8 pts. There was no difference between the two groups regarding the number of therapeutic procedures.

No statistical difference was observed between the two treatment groups in the mean serum amylase activity at baseline, 3 and 12 hours after ERCP. Hyperamylasemia was observed in the 57% of the patients in the octreotide group and in the 50% in the placebo group. There was also no significant difference between the number of patients who developed pancreatitis (3 and 4 patients respectively).

**Conclusion.** The results of this study suggest that octreotide may be ineffective in the prevention both of hyperamylasemia and pancreatitis following ERCP.

### 1200 Endoscopic Finding of Colonic Polyps in Acromegalic Patients

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Acromegalic patients constitute a high risk group for adenomatous colonic polyps [1]. We report preliminary data (3 months) concerning a prospective endoscopic study of patients with certain acromegaly.

Eight consecutive acromegalics (2 women and 6 men with a mean age of 55.4 years) were observed. Intestinal symptoms were never shown by patients but in one (sporadic blood after motion). No patient presented high risk for colorectal cancer. Six patients had acromegalic history from 15–20 years; two from 8–10 years. All patients had GH-secreting adenoma of the hypophysis. Colonoscopy was always performed till to the caecum. Any polyps identified were resected and submitted to histology.

Colonic polyps were revealed in 7 patients (87.5%). Nine polyps were found: 8 in the recto-sigmoid tract and 1 in the right colon; 7 were smaller than 0.8 cm., 2 were larger than 1 cm. Synchronous polyps were observed in 2 patients (in 1 case 2 hyperplastic polyps of the sigmoid and in 1 case 2 tubular adenomas in the rectum and ascending colon). Histology documented 3 hyperplastic polyps, 5 tubular adenomas and 1 tubulovillous adenoma. The tubulovillous polyp was detected in a patient with 18 years diagnosed acromegaly.

In conclusion we underline the high prevalence of colonic polyps in acromegalics (87.5% in our serie) and confirm the adenomas' prevalence in this group (66.6% in our serie). The accepted hypothesis of colorectal tumor development [2] suggest endoscopic screen for polyps in this patients, independently from symptoms.

[1] J. M. Raymond Gastroenterology 96 (sup.) A411, 1989

[2] B. Vogelstein New Engl J Med. 319: 525–532, 1988

### 1201 Gastric MALT Lymphomas – With Special Reference to the Endoscopic Appearance of the Initial Lesion and Its Pronostic Significance

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In 1984, Isaacson and Wright introduced a new concept for extranodal malignant lymphoma arising from Mucosa Associated Lymphoid Tissue (MALT). The cells of these lymphomas share the specific homing patterns that are characteristic of MALT derived lymphocytes and this accounts for their slow

evolution and their tendency to remain localized. The histopathological classification and grading of the MALT gastric lymphomas into low grade B-cell and high grade B-cell lymphomas, has great prognostic relevance, but to date little is known about the characteristics of the initial endoscopic lesion and its prognostic implications.

The purpose of the study is to describe 10 patients with gastric MALT lymphoma with special reference to the appearance of the initial endoscopic lesion.

**Methods:** An endoscopic retrospective study was performed on ten patients. These patients were classified into 8 patients low grade and 2 patients high grade B-cell lymphoma. Stage at diagnosis was made according to the Ann Arbor classification (8 stage IE, 2 stage IIE). The endoscopic lesions were classified into: (1) Initial: Multiple shallow ulcers and/or nodular mucosa with cobblestone appearance. 7 patients. (2) Advanced: Protruding, ulcerative and giant rugal folds type. 3 patients.

**Results:** We analyse the outcome of the 10 patients after treatment – in our patients surgery and eventually chemotherapy. Time of follow up ranges between 4 and 60 months, mean 30 months.

The seven patients with initial endoscopic lesions remain disease-free during the follow-up. At the meantime the other three patients with advanced endoscopic lesions have relapsed. The endoscopic signs have in our series more predictive value than the histological type or the staging.

**Conclusions:** (1) Patients with initial endoscopic lesions have in our experience good survival. This probably is due to the fact that the initial endoscopic lesion indicates that the tumor infiltration is restricted to superficial layers (mucosa and submucosa).

(2) When the initial endoscopic lesion is observed, careful follow-up with skillfully performed biopsy should be carried out in order to make an accurate diagnosis as easy as possible.

(3) Recent studies suggest regression of low grade gastric MALT Lymphomas after eradication of *H. pylori*, so more studies on the endoscopic aspects of gastric MALT lymphomas are necessary to decide the best therapeutic regime in this kind of tumors – Antibiotics?.

## 1202 Clinical Significance of Bowel Wall Thickening in Inflammatory Bowel Disease

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Bowel wall thickening (WT) is the most frequent ultrasonographical sign in inflammatory bowel disease (IBD). However, a clear relationship between this parameter and disease activity in ulcerative colitis (UC) and Crohn's disease (CD) has not been established. The aim of this study is to evaluate the correlation between WT and clinical-biochemical parameters of activity in UC and CD.

**Methods:** 52 patients (20 UC - 32 CD) were evaluated by ultrasonography with a 3.5 MHz transducer probe. The ultrasound operator received no prior information about the patients (diagnosis, localizations of lesions, or degree of disease activity). The maximum thickness observed, expressed in millimeters, was reported. Patients were recruited irrespectively of previous surgery and present disease activity. Severity of disease has been assessed by CDAI for CD and Truelove index for UC, respectively, as well as CRP and ESR for both diseases. Statistical analysis has been performed by means of Spearman and Pearson tests.

**Results:** the mean WT for UC was  $6.17 \pm 1.8$  and  $7.87 \pm 2.2$  ( $p < 0.007$ ) for CD. Mean biochemical activity values were 33 for ESR (range 4–125) and 2.8 for CRP (range 0.1–9) in UC and 32 for ESR (range 5–82) and 1.9 for CRP (range 0.1–6.3) in CD. WT in UC was related to clinical ( $p < 0.001$ ;  $r: 0.7$ ) and biochemical activity ( $r: 0.5$  for CRP;  $r: 0.6$  for ESR) but not to age and length of disease. Significant correlation was found between the extension of UC and extension, ultrasonically evaluated, and clinical activity of the disease ( $r: 0.7$ ;  $p: 0.002$ ). No correlations were found in CD.

In conclusion, ultrasonographic evaluation of WT may be a reliable method for the evaluation of clinical activity in UC, but not in CD.

## 1203 Early Endoscopy in Ischemic Colitis

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From the 1st of November 1991, when endoscopic on call duty began in our Unit, to date, we have evaluated all the cases of ischemic colitis arriving at the Emergency Department of the two hospitals where we work. During this period a total of 2426 lower examinations were performed. The aim of this study was to collect, thanks to the prompt execution of endoscopy, symptoms, clinical onset features and initial and evolving endoscopic pictures of the disease. We assessed a total of 22 pts (11 m, 11 f mean (DS) age 70.7 (9.9) years old) suffering from ischemic colitis defined by clinical, endoscopic and histological parameters. All the pts, except two, were admitted to the hospital; all the pts required a conservative treatment. Four pts, owing to the sever-

ity of the clinical picture, (severe anemia) required urgent endoscopy; 68% of all the patients were evaluated within 48 hours from the onset of symptoms. Onset symptoms reported were: abdominal pain (10 cases), rectorrhage (11 cases) diarrhoea (2 cases), constipation (2 cases), melena (1 case). The most frequently involved district was the left side (left transverse in 7 cases, descending in 12, sigma in 14, rectal sigmoidal junction in 4; less frequently, was the right side involved (caecum 1 case, ascending 3, right transverse 1), the rectal ampulla always macroscopically appeared spared. The most frequently endoscopic pictures were: mucosal congestion (15 cases), petechiae (11), ulcers with fibrin (7), erosions (7), necrosis and cobblestone nodularity (6 cases). We were unable to detect pale mucosa. At 7th day endoscopic check (11 pts) we found favourable evolution in 73%, complete healing in 9% and unchanged picture in 18%. None of the pts we considered required surgery. No important symptom recurrence was reported after a 14.5 month mean follow-up. We conclude that ischemic colitis is a relatively rare disease (1.5% of all the lower endoscopic examinations); early endoscopic examination allows to adequately identify a disease having in most cases a fast and favourable evolution.

## 1204 Flumazenil in Upper Gastrointestinal Endoscopy

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Aim of this study was to investigate the antisedative effect of Flumazenil in patients who underwent upper gastrointestinal endoscopy following sedation with Diazepam and to evaluate the effect of sedation on patient's tolerance and duration of endoscopy.

**Subjects and Methods:** 41 patients (22 female, 19 male) received Diazepam (0.15–0.25 mg/kg iv) until full sedation was achieved and underwent endoscopy. Following the procedure patients were randomized to receive either iv Flumazenil 0.2 mg iv or saline and consciousness was evaluated at 0, 10, 30, 60 and 120 minutes.

Another 23 patients (11 female, 12 male) who underwent upper gastrointestinal endoscopy without receiving Diazepam were evaluated for endoscopic tolerance and duration of procedure and results were compared with patients who were sedated prior to procedure.

**Results:** The efficiency of Flumazenil in reversing the effect of Diazepam was significantly higher than placebo ( $p < 0.01$ ). The effect of Flumazenil was rapid and clearly noticed 10 minutes after its administration.

The patients who received sedation prior to endoscopy had a better tolerance and duration of endoscopy was significantly shorter.

**Conclusion:** Use of Diazepam and Flumazenil for medication in upper gastrointestinal endoscopy increase the patients tolerance, shortens the duration of procedure and increase the circulation in endoscopy room.

## 1205 Therapeutic Oesophageal Endoscopy: One Year's Review

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Oesophageal endoscopy is commonly employed as a palliative and definitive treatment for several disorders. The practice is different in various centres in regard to fluoroscopy, post-procedural chest radiographs, Barium swallows and hospital admission. We reviewed all the therapeutic oesophageal endoscopies performed in our unit during the year 1993. We examined the use of screening, post-procedural radiographs, hospital admission and 48 hour complication rate. 146 therapeutic procedures were performed accounting to 3.3% of all the upper G.I. endoscopies. Savary-Bougie dilatation of strictures-66, Achalasia balloon dilatation-18, laser therapy-20, Atkinson's prosthesis-2, variceal sclerotherapy-40.

Fluoroscopy was used in 8 patients for oesophageal dilatation as the lumen was totally obstructed and the guide wire had to be passed under screening and also in all the patients for achalasia dilatation and placement of Atkinson's prosthesis. The average age was 70.8 years and 18 of the dilatations were for malignant strictures. Dilatation was performed to a mean of 45 French. 40 variceal sclerotherapies (mean age 50.6 yrs) were done, 8 of which were emergencies. 4–16 ml (mean 8.2 ml) of 5% Ethanolamine was injected both intra and paravariceally. 3 patients in the acute group bled which settled after blood transfusion and vasopressin. All the patients in the acute group were admitted for observation. 3 patients had mild bleeding after elective sclerotherapy which stopped spontaneously and were discharged after a few hours. 20 patients (mean age 70.6 yrs) underwent laser therapy for oesophageal cancers and a mean of 4423 joules of contact and non-contact laser was applied. 6 patients were admitted for further management. 2 patients had mild aspiration pneumonia.

Routine chest x-ray or gastrograffin swallow was not performed in any patient and all the patients were discharged (except for social reasons) after a few hours of observation in the day ward.

Our results demonstrate that elective therapeutic oesophageal en-

doscopy can be safely performed and neither routine radiology nor overnight admission is necessary.

### 1206 Management Strategies for Dyspepsia and Open Access Gastroscopy: A Way of Reducing the Workload

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Demand for open access gastroscopy (OAG) is increasing in the purchaser-provider environment of the British National Health Service. This has the potential to swamp existing GI endoscopy services, with estimated referral rates of 25 cases per week (or 1250 per annum) from catchment populations of 300,000. To try and contain this workload an OAG service has been established employing management strategies for both ulcer dyspepsia and reflux dyspepsia, thus providing general practitioners (G.P.s) with guidelines to follow, based for example on patient age (with 45 years and over being an indication for referral), severity of symptoms and response to therapy.

We report our experience of the first year of this service to which 624 patients were referred and of which 86 were turned down as not fulfilling the referral criteria, 39 failed to attend and 39 were cancelled by their general practitioners, leaving 460 examinations (male 52%, female 46%). Age at the time of endoscopy ranged from 10 to 87 years (mean 57 years), with 84% age 45 and over. Monthly referral rates ranged from 27 to 89 (mean 53), while average waiting times between referral and gastroscopy rose over the first 7 months to a maximum of 37 days, following which the wait dropped to 25 days (mean wait time for the 12 months was 20 days).

The distribution of endoscopic findings was normal (17%), minor abnormalities (34%) and serious findings (48%) suggesting that this method of providing an OAG service produces a smaller number of normal examinations than others have experienced and which has been a criticism of the orthodox forms of open access gastroscopy service. Furthermore, the need for patients to fulfil referral criteria has reduced the annual number of referrals to less than 50% of what would be expected.

### 1207 Endoscopic Ultrasonography (EUS) in the Preoperative Assessment of Gastric Cancer (GC): Who Should be Operated On?

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EUS seems to be reliable for preoperative staging of GC, in order to assess depth of parietal invasion, lymph node involvement and resectability with curative aim. To evaluate accuracy of EUS in predicting stage and resectability of GC we compared EUS preoperative staging of 87 out of 109 GC cases, observed between 1987 and 1993, with the pathological TN system based on surgical specimens. 10 patients were not operated on owing to EUS-T4 preoperative staging and 12 for medical reasons. Data are summarized in the table.

	n <sup>o</sup>	agreement	overstaging	understaging
pT	87	70 (80.5%)	8 (9.2%)	9 (10.3%)
pT1	19	15 (79%)	4 (21%)	
pT2	27	19 (70.4%)	4 (14.8%)	4 (14.8%)
pT3	20	18 (90%)		2 (10%)
pT4	21	18 (86%)		3 (14%)
pN0	35	27 (77%)	8 (23%)	
pN1	46	34 (74%)		12 (26%)

EUS is accurate in the evaluation of tumor infiltration. Early GC can be distinguished from advanced. Major difficulties are encountered in staging pT2 tumors: T3 overstaging may be due to EUS inability in distinguishing serosal from subserosal layer. In spite of the overall good results in lymph nodes evaluation, further improvement in detection and differentiation of benign and malignant nodes is required. In 18 pT4 cases in whom only explorative laparotomy or surgical palliation were performed, EUS previously diagnosed unresectability. These patients could have been treated with less risky palliative procedures.

In conclusion EUS is of value in planning surgical decision in GC.

### 1208 Prospective Evaluation of Endoscopic Ultrasonography in Diagnostic and Therapeutic Strategies of Extrahepatic Cholestasis

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The high accuracy of endoscopic ultrasonography (EUS) for diagnosis of extrahepatic cholestasis is well documented. The clinical effectiveness of EUS

use on the management of extrahepatic cholestasis has not been prospectively studied yet.

**Aim:** To evaluate prospectively the impact of the use of EUS on diagnostic and therapeutic strategies of extrahepatic cholestasis.

**Methods:** Ninety patients having EUS (Olympus GF-UM3) for extrahepatic cholestasis were prospectively included. Investigations performed before EUS were: ultrasonography n = 85; computed tomography n = 65; duodenoscopy n = 27; ERCP n = 24 (bile duct cannulation failure in 16 cases). For each patient the following parameters were recorded before EUS: suspected diagnosis; next investigation planned for diagnostic confirmation; and suggested treatment. These data were compared to final diagnoses and effective treatments.

**Results:** EUS couldn't be performed in 3 cases (3%) because of a stenosis. In 6 cases (7%) no EUS diagnosis was made (3 of them were calcified pancreatitis). Final diagnoses in the remaining 81 patients were: no obstruction n = 9; stone n = 44; cancer n = 28. Eighty of 81 EUS diagnoses were subsequently confirmed. EUS detected 37 (41%) obstacles that had not been seen previously (26 stones, 11 cancers) and corrected 16 (18%) wrong initial diagnoses: in 6 cases there was no obstruction and in 10 cases the nature of obstruction was wrong (7 stones, 3 cancers). EUS results avoided doing 10 diagnostic ERCP, led to 8 renewed ERCP attempts for stone extraction after initial cannulation failure (5 precut papillotomies were necessary), and modified 8 times (9%) the diagnostic strategy. Except for the 16 (18%) wrong initial diagnoses that were corrected by EUS, EUS results never had direct impact on therapeutic management, even for cancers. Neither laparotomy nor endoscopic sphincterotomy were decided or avoided owing to EUS results.

**Conclusions:** Owing to its high accuracy, EUS is an unequalled and particularly convenient diagnostic tool for extrahepatic cholestasis exploration. But, in a non-selected population, EUS use had only few consequences on diagnostic strategy and no direct impact on therapeutic management.

### 1209 Single Lipase Measurement at 2 h as Sufficient Indicator of ERCP/EST Induced Pancreatic Damage

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Post-ERCP/EST elevations of serum lipase are reported in up to 40–75%, a pancreatitis with clinical symptoms in 0.7–7.4%. Monitoring 46 patients receiving no procedure related drugs we had found that a single measurement of serum lipase at 2 h was sufficient to identify patients at risk for developing ERCP/EST induced pancreatitis. In a new study testing octreotide as a possible protective agent this finding was checked again. **Methods:** 30 patients (23 f, 7 m; 29–77 y) underwent a standardized, well documented ERCP (17 of whom received additional EST) by two experienced endoscopists (W.E.D., H.U.K.). 0.1 mg octreotide were given s.c. 30 min before and 5 h after the investigation. Blood samples were taken before, 40 min, 2 h, 4 h, 6 h and 24 h after ERCP/EST and checked for 26 laboratory parameters including lipase, amylase, elastase and some acute phase proteins. **Results** are shown in the following table:

Time:	40 min after ERCP/EST	2 h after ERCP/EST	4 h after ERCP/EST	6 h after ERCP/EST
No of pat. lip < 190 U/l	16	12	13	13
No of pat. lip ≥ 190 U/l	14	18	17	17

All of the 12 patients with normal lipase levels at 2 h stayed below 210 U/l at 4 h and 6 h. Only one of these patients developed a pancreatitis later caused by the unusual event of a thrombus in the pancreatic duct. In contrast, only 3 of the patients with elevated lipase levels (≥190 U/l) at 2 h stayed below 210 U/l at the following time points, the remaining 15 showed further increase of lipase up to 15000 U/l. **Conclusions:** A single measurement of serum lipase at 2 h is sufficient to identify patients at risk for developing relevant pancreatic damage after ERCP/EST (sensitivity 93.7%, specificity 78.6%). The administration of octreotide did not change this finding.

### 1210 Myogenic Tumors of the Upper Gastrointestinal Tract – Diagnosis and Follow-Up Using Endoscopic Ultrasonography

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Myogenic tumors are the most frequent submucosal tumors of the upper GI tract. Their diagnosis, so far uneasy, has become highly accurate owing to endoscopic ultrasonography (EUS). This method enables detailed depicting of the tumor, determination of the wall layer the tumor originates from and tracing the development during repeated controls. The contribution of EUS is shown on the group of 30 patients in which the EUS examination revealed leiomyoma (n = 29) or leiomyoblastoma (n = 1). Between January 1990 and

December 1993 48 examinations were done altogether using Olympus EU-M3 equipment. The tumor was localised 14x in esophagus and 16x in stomach. The confirmation of EUS findings was by operation (n = 9), by aspiration biopsy (n = 11) or by clinical follow-up (n = 10, period 0.5–3.5 yr). EUS diagnosis was correct in 28 patients, the degree of malignancy was wrongly assessed twice – tumors considered as leiomyomas were proved in operation as leiomyoblastomas.

Myogenic tumors have typical EUS appearance, but to state the diagnosis on it alone is very difficult and the biopsy is necessary for differentiation between benign and malignant changes. In proving and following up of myogenic tumors EUS is the most accurate contemporary method.

### 1211 Transjejunal Endoscopic Cholangiography

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Extrahepatic biliary obstruction following gastric resection or gastroenterotomy may necessitate endoscopic cholangiography. 6 patients 4 males and 2 females with a mean age of  $61 \pm 17.8$  years were presented by manifestations of extrahepatic biliary obstruction in the last 8 months. 5 patients had previous truncal vagotomy and gastrojejunostomy for cicatricial pyloric obstruction and one had hemigastrectomy for benign gastric ulcer. Forward view upper gastrointestinal endoscopy was tried to reach the duodenal papilla for cholangiographic studies. The procedure was successful in 4 patients (66%) and revealed malignant stricture of the common bile duct in two and calculi obstruction in the other 2 patients. Papillotomy and stone extraction was easy in one patient and difficult in the other. Failure to complete the procedure occurred in 2 patients either due to long afferent loop in one or to abnormally high situated gastrojejunostomy in the other. In conclusion, transjejunal forward view endoscopic cholangiography is feasible following gastric surgery, not only as a diagnostic but also as a therapeutic procedure.

### 1212 Endoscopic Thermochemical Disinfection: Results of a 6 Years Experience in Gastroenterology

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**Introduction:** The importance of nosocomial infection and disinfection in endoscopy is now well recognised. Various measures were adopted to prevent nosocomial infection in a digestive endoscopy unit, including the use of an endoscopic thermodesinfector (ETD Olympus) since 1988. The aim of this study was to report a six years experience in thermochemical disinfection in a digestive endoscopy unit.

**Method:** In order to perform a bacteriological analysis of endoscopes and mechanical washer, residual water was collected in various part of the mechanical washer and sterile water (100 ml) were passed through the channels of the scopes immediately after a complete automatized cycle, and after storage. Isolated germs were typed according to antibiotic sensitivity, serotyping and puls air electrophoresis of digested DNA (after restriction enzyme digestion).

**Results:** During the 6 years period, two contaminations with *P. aeruginosa* were identified: 1/*P. aeruginosa* was identified in water samples from external and internal piping leading to a steam condenser contamination. Placement of a trap on the external piping and regular disinfection with chlorax lead to a definitive eradication of these germs. *P. aeruginosa* had been isolated in the water outlet before and after disinfection cycles for months, whether the scopes were found to be sterile during the same period. Puls air electrophoresis of digested DNA showed that only one strain of *P. aeruginosa* was identified, indicating that the localization of the contamination was the disinfectant itself. The contaminated part of the disinfectant (desionizer) was replaced, improving the bacterial analysis of water samples. During this period, no patient presented nosocomial infection in relation with this strain of *P. aeruginosa*.

**Conclusion:** 1/No contamination of the scopes were reported in this 6 years period. 2/*P. aeruginosa* was isolated twice in different parts of the disinfectant, and a decontamination could be obtained. 3/Puls air electrophoresis of digested DNA is a permanent technic for identification of *P. aeruginosa* strains and is a useful tool for contamination site identification.

### 1213 Evaluation of Intraductal Ultrasonography of the Biliary System During ERCP

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Endoscopic ultrasonography allows a precise examination of the biliary system.

It appeared to be a complementary technique to ERCP for the diagnosis of cholelithiasis and biliary malignancies. However development of intraluminal ultrasonographic probes may provide a higher resolution of the bile ducts. We have investigated the performances of ultrasounds catheter probes available during endoscopic investigations of the biliary system.

**Patients and Method:** 12 patients (W: 6, M: 6, mean age 74 yrs) were included because of obstructive jaundice (n = 5), angiocholitis (n = 7). Ultrasonic probe catheters from Olympus Optical Co. (outside diameter of 2.4 mm, working frequency of 12 MHz), connected with the EU-M3 ultrasound system, were inserted through the working channel of Olympus JF-100 through the papilla either into the bile duct system.

**Results:** Papillotomy was necessary in 6 cases, and a dilatation of a common bile duct (CBD) stenosis in one case. No complications occurred during all examinations. A complete examination of Intrahepatic bile ducts, CBD and adjacent structures (portal vein, cystic duct, gallbladder infundibulum, head part of the pancreas) were visualized in 9 cases. A CBD stenosis was visualized in 4 cases the miniprobe eliciting the biliary (n = 2) or the pancreatic origin (n = 2) in each case. A microlithiasis (stones less than 3 mm in size) was clearly detected in 3 cases. In one patient an infiltrative carcinoma (1.5 cm in diameter) of the papilla (surgically managed) was also precisely observed.

**Conclusions:** High resolution provided by ultrasonographic miniprobe may provide a reliable examination of the biliary tract especially for the diagnosis of CBD stenosis, CBD microlithiasis or small ampullary tumor.

### 1214 Fine Needle Aspiration Cytology Guided by Endoscopic Ultrasonography Using a Curved Array Transducer. Results in 96 Patients

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Endoscopic ultrasound (EUS) is a recent development that has greatly improved assessment of gastrointestinal tumors. However EUS does not allow reliable differentiation between malignant and benign disease in cases involving submucosal, submesocolic, mediastinal or pancreatic lesions. The purpose of this study was to attempt to achieve cytological diagnosis of such lesions by EUS-guided fine needle aspiration cytology. From November 1991 to January 1994, 96 patients underwent endoscopic ultrasonography with guided fine needle aspiration biopsy at our institution. The indication was a mediastinal mass in 13 cases, periesophageal mediastinal adenopathy in 16 cases, a submucosal tumor in 7 cases, large fold gastritis with inconclusive endoscopic biopsies in 11 cases, coeliac lymph nodes in 15 cases, pancreatic tumors in 29 cases, small liver metastasis in 2 cases, reorectal tumors in 2 cases and an adrenal metastasis in 1 case. The endoscopic ultrasonography was performed with a FG 32 UA; Hitachi/Pentax connected to a Hitachi ultrasound scanner (EUB-450). The biopsy was performed with a retractable 22-gauge/5 cm long aspiration needle. Tolerance was excellent. Insertion of the needle into the lesion to be biopsied was always successful. Adequate cytology specimens were obtained in 75 out of 96 patients (78.2%). Seventy-five of the 96 patients in this study had malignant disease. Fine needle aspiration under ultrasonic guidance was positive in 59 cases with a sensitivity of 78.6% and a specificity of 100% for malignancy. In the subgroup of 29 patients presenting mediastinal tumors (mass or adenopathy) EUS-guided cytology allowed good diagnosis in 25 cases (86.2%). In the 15 patients with coeliac lymph node cytology allowed diagnosis in 12 cases (80%) and in the 29 patients with pancreatic tumors, cytology allowed diagnosis in 23 cases (79.3%). EUS guided fine needle aspiration cytology with a curved array transducer provides a high diagnostic yield in 78% of patients with mediastinal masses, submucosal tumors, coeliac lymph nodes, large fold gastritis and pancreatic tumor. Widespread use of this technique should diminish the need for exploratory mediastinoscopy, thoracotomy and laparotomy.

### 1215 Cholestasis with Dilatation of Common Bile Duct (CBD) of Unexplained Origin. Value of Endoscopic Ultrasonography. Results in 42 Patients

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The purpose of this study was to determine the clinical effectiveness of a new endoscopic ultrasonography (EUS) device using a curved array transducer with 120° sector scan in the diagnosis of cholestasis with dilatation of CBD of unexplained origin. The accuracy of EUS was evaluated by comparison with surgery and/or endoscopic retrograde cholangiopancreatography (ERCP). From October 1991 to January 1994, 42 patients (29 men and 13 women) with a mean age of 60.8 years (range: 22–78 years) underwent EUS to assess laboratory findings demonstrating cholestasis with dilated bile ducts of unexplained origin. The EUS device used (FG 32 UA; Hitachi/Pentax) was a 60-degree forward oblique-viewing fiberoptic gastro-scope with a curved array ultrasonic transducer mounted in front of the optic

lens. No complications occurred during performance of any of the 42 procedures.

Thus EUS provided an accurate explanation for cholestasis in 38 cases (90%). In 18 of the 42 patients presenting unexplained cholestasis with dilation of the biliary ducts, EUS depicted a stone in the CBD. This finding was confirmed by endoscopic sphincterotomy in 17 cases. In one case there is no stone in the CBD. In 9 cases EUS attributed cholestasis to a tumor in the common bile duct. This diagnosis was confirmed by surgery in 4 cases and by ERCP in 4 cases. Misdiagnosis occurred in 1 case in which EUS detected a tumor in the common bile duct instead of a stone. In 9 cases EUS detected a tumor less than 20 mm in diameter in the head of the pancreas. This finding was confirmed by laparotomy in 7 cases and by ERCP in 1 case. But in one case, EUS showed a tumor in the head of the pancreas whereas laparotomy revealed a tumor in the hilum of the liver associated with extensive prepancreatic lymph node involvement. In 4 cases EUS demonstrated stenosis of the secondary bile ducts due to CCP. This was confirmed by ERCP in all cases. In 1 case EUS showed an ampulloma confirmed by ERCP and in 1 case, EUS had detected a stone while ERCP documented a stone and ampullary carcinoma. Conclusion: Our experience suggests that EUS using a curved array transducer is an effective diagnostic technique for unknown cholestasis.

### 1216 Endoscopic Ultrasonography for the Diagnosis of Malignant Submucosal Tumors

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Endoscopic ultrasound (EUS) has proved its accuracy in the diagnosis of submucosal tumors vs extrinsic lesions. Many patients with such lesions are operated on because of the difficulty of the diagnosis of malignancy by endoscopy or usual imaging methods. The aim of this study was to evaluate the EUS ability to detect malignant lesions and thus to limit the number of patients operated on.

**Methods:** Between June 86 and November 93, 145 patients with an endoscopic bulging lesion with negative biopsies were found at EUS to have a submucosal tumor. Only 49 patients were included, because they had a definite diagnosis obtained by pathology of the resected specimen. EUS criteria for malignancy were: size above 3 cm, irregular outer border, lymph nodes looking metastatic, invasion of adjacent organs. When the tumor had none of this criteria, it was considered benign. When 2 criteria or more were present, the tumor was classified as malignant. When only the size was above 3 cm, the tumor was considered as at risk.

**Results:** In 18 cases, EUS made the diagnosis of benign submucosal tumors (no criteria present). In all cases, surgery confirmed the diagnosis of benign tumors (EUS accuracy: 100%). In 5 cases, EUS made the diagnosis of malignant tumors. The diagnosis was confirmed in all cases (EUS accuracy 100%). In 26 cases, EUS found a submucosal tumor at risk because of size above 3 cm without other abnormality. In this group, there were 4 malignant tumors, 3 leiomyoblastoma and 19 benign lesions.

**Conclusions:** Tumor size was very useful at EUS to ascertain the risk of malignancy of upper GI tract submucosal tumors. A well-limited submucosal tumor of less than 3 cm could be not operated on. When the tumor was large, irregular and invasive, malignancy was always confirmed. In the largest group of patients with well-rounded tumor more than 3 cm, malignant tumors were found in 15% and tumor of indefinite malignancy in 12%.

### 1217 Endoscopic Ultrasonography in Diagnosis of Chronic Pancreatitis and Pancreatic Carcinoma Compared to Endoscopic Retrograde Cholangiopancreatography and Conventional Ultrasonography

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Endoscopic Ultrasonography (EUS) is the most precise method in obtaining a differential diagnosis between chronic pancreatitis (CP), and pancreatic carcinoma (PCA). We have investigated the diagnostic ability of EUS in pancreatic diseases, appreciated as one of the most useful diagnostic methods in gastrointestinal diseases. EUS, endoscopic retrograde cholangiopancreatography (ERCP) and conventional ultrasonography (US) have been performed in 44 cases of PCA and in 67 cases of CP. We have compared the accuracy of these diagnostic procedures. In group with PCA, EUS demonstrated PCA in 41/44 pts. (93.2%) clearly as a hypoechoic lesion with an insight in surrounding lymph nodes, ERCP showed tumor in 37/44 pts. (84%), as a stop in canalicular system without visualisation of parenchyma, and US showed PCA in 35/44 pts. (79.5%), as an unclear hypoechoic lesion, preoperatively. In 3/44 pts. PCA was diagnosed intraoperatively. In the group with CP, EUS clearly showed pancreatic changes in 67/67 pts. (100%), ERCP confirmed CP in 64/67 pts. (95.5%), and US showed CP in 56/67 pts. (83.5%). EUS gave more accurate diagnosis than ERCP and US especially in the local pancre-

atitis, because EUS could clearly demonstrate calculi and dilated ductal system in entire pancreas. EUS clearly showed small stones and slight marginal changes in the pancreatic parenchyma. In conclusion, our experience is that EUS is highly valuable diagnostic method in mentioned pancreatic diseases.

### 1218 Palliative Bipolar Electrocoagulation Treatment of Obstructing Esophageal Cancer

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This prospective study aimed to evaluate the efficacy and safety of palliative bipolar electrocoagulation probe (BICAP) treatment in 23 patients (18 males, 5 females, mean age 71 yr) with non surgical, obstructive esophageal cancer (17 squamous cell carcinoma, 6 adenocarcinoma). BICAP was the primary treatment in 19 patients. Dysphagia before and after treatment was scored from 0 to 4 using a standard grading scale. The mean tumor length was 7.6 cm. The strictures were located as follows: 3 in the cervical esophagus, 7 in the thoracic esophagus, 11 in the distal third of the esophagus, and 2 involved both the cervical and thoracic esophagus. Most lesions were circumferential (79% vs 21% non circumferential) and exophytic (81% vs 19% sub mucosal). Coagulation was carried out under direct endoscopic control in the antegrade direction from the proximal to the distal edge of the tumor. The success of treatment was evaluated on the basis of the degree of reopening achieved (easy passage of an endoscope 12 mm in diameter) and good functional results (improvement of dysphagia score for more than 15 days). **Results:** 23 patients underwent a total of 42 BICAP treatments. Tumor dilatation was required prior to BICAP treatment in 62% of cases. The mean number of session necessary for good initial results was  $1.2 \pm 0.4$ . Reopening was achieved in 90% of cases and good functional results were obtained in 78% (mean dysphagia score: 3.1 before treatment vs. 1.2 after treatment). The median interval between initial BICAP treatment and recurrent dysphagia was 7.5 weeks. Nine patients required several BICAP treatments with an average of 1.5 sessions per patient. 19 patients underwent other palliative procedure including radiotherapy with or without chemotherapy in 10 cases, dilatation in 3, stent placement in 4, perendoscopic or surgical gastrostomy in 3. Median survival was 8.4 months. Major complications occurred in 4 cases (9.5% of procedures): 2 esophageal fistulas, 1 fatal hemorrhage, and 1 aspiration pneumonia. **Conclusions:** Palliative BICAP treatment of malignant esophageal strictures is an effective, safe, well-tolerated method that provides relatively long lasting relief of dysphagia. The procedure was easily accomplished in all cases regardless of the tumor location, length, or endoscopic appearance. Controlled comparative studies will be done to determine if this method provides a satisfactory alternative to laser therapy.

### 1219 Do Endoscopists Agree on What They See?

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A previous study has shown that endoscopists describe different features of similar findings in endoscopy reports. More standardized reports may be achieved when endoscopists describe findings with a standardized set of terms.

Therefore, 10 endoscopists were asked to evaluate 10 photographs of ventricular ulcers with a standard form. This form contained items on the main descriptive aspects of ulcers, such as shape, depth, base, border and surroundings. Options for description were given together with an option to indicate that no reliable judgement could be given. The endoscopists were also asked to give an interpretation (malignant or benign). To evaluate agreement in description, we dichotomized the answers into contradictory statements (eg presence vs absence), such that agreement ranged from 50% (half of the endoscopists state A, the other half B) to 100% (all endoscopists state A or B).

Average agreement on descriptive items was 84% (range 69% to 99%). For the items presence of exudate and undermining of the border, agreement was more than 90%. For the items swelling of surrounding mucosa, normal or abnormal color of surrounding mucosa, and raised or flat border, agreement was less than 80%. Average agreement on interpretation was 81% (range 55 to 100%). Overall, there was no clear relation between interpretation and description. However, items that seemed to discriminate malignant and benign judgements of endoscopists to some extent were: regularity and elevation of the border, and presence of elevations in the surrounding mucosa.

In conclusion, agreement of endoscopists on both descriptive items and interpretation of ventricular ulcers is about 80%. A possible explanation may be that endoscopists assign different meanings to words when they describe what they observe. Since agreement was only 80%, reference images depicting terms may be considered to improve agreement between endoscopists using standardized terms.

## 1220 Endoscopic ultrasonography (EUS) and Esophageal Tumor Stenosis

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Endoscopic ultrasonography (EUS) is the most accurate preoperative imaging technique for the assessment of TN-stage and resectability in esophageal cancer patients. Tumor stenosis represents a possible obstacle to the completion and reliability of the EUS examination, but the reported rate of impassable tumor stenosis varies widely, and the management and impact of this stenosis in connection with preoperative EUS is seldom reported. We report our experience with this problem in a material of 56 consecutive patients with esophageal cancer who were referred for pretherapeutic endosonographic assessment of resectability. Seventeen patients (30%) had tumor stenosis which hindered the passage of the linear array echoendoscope (diameter: 12 mm) into the stomach. Balloon dilatation was attempted in 10 (59%) of these patients and was successful (passage of the echoendoscope) in 5 cases (50%). The following EUS assessment of resectability was correct in all 5 cases. Three patients were offered dilatation (metal olives) in general anesthesia because balloon dilatation failed and because suprastentotic EUS was inconclusive. After dilatation a standard endoscope could pass into the stomach in all three patients, but a complete EUS was possible in only one patient. In two patients, both intubated because of non-resectable tumors, a small perforation was found by X-ray of the chest following dilatation and intubation. EUS made a correct pretherapeutic assessment of resectability in 9 of the 10 patients who were dilated (or attempted dilated). Seven patients (41%) with impassable tumor stenosis were not dilated because suprastentotic EUS gave sufficient information as to the resectability in these cases (2 resectable, 5 non-resectable).

**Conclusion:** Impassable tumor stenosis has to be expected in about 1/3 of the patients with esophageal cancer in an unselected material. Sufficient dilatation was possible in 60% (n = 6) of these patients. Despite this moderate success rate in the dilatation of these patients, EUS was inconclusive in only one patient (6%). EUS made a correct assessment of resectability in all patients with tumor stenosis who were not dilated (n = 7) and in 90% of the patients who were dilated (n = 10). These findings suggest that balloon dilatation should be attempted in patients with tumor stenosis if suprastentotic EUS is inconclusive.

## 1221 Prospective Study of the Accuracy of Echoendoscopy (EUS) for the Diagnosis of Bile Duct Stone

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Studies ascertaining the accuracy of EUS in the diagnosis of bile duct stone are scarce and often retrospective. Here, we conducted a prospective study on the value of EUS for the search of bile duct stone in a large series of patients.

**Methods:** From June to October 93, 83 patients referred for a suspicion of bile duct lithiasis were prospectively examined by EUS (Olympus GF UM20). At the date point (December 1st, 1993), 58 had a definite diagnosis obtained by following ERCP (n = 37) or preoperative cholangiography (n = 21). Results of EUS were thus compared to those of bile duct exploration.

**Results:** EUS concluded to the presence of bile duct stone in 29 patients, and their absence in 29. Of the 29 patients with stone at EUS, 26 (90%) had lithiasis confirmed at ERCP (n = 25) or preoperative cholangiography (n = 1). Noteworthy, in 3 patients endoscopic cholangiography did not show stone but sphincterotomy and use of a Dormia basket confirmed bile duct lithiasis. In 3 patients, no stone was evidenced. One error could be explained by spontaneous stone elimination during the 35 days interval between ERCP and EUS. A second patient had normal cholangiography shortly after EUS, but sphincterotomy was not performed. The patient was well 4 months later. The 3rd patient had at EUS a stone above a thickened inflammatory ampulla; surgical cholangiography showed only an enlarged bile duct and choledochoduodenal anastomosis was performed. Of the 29 patients without stone at EUS, none had stone at preoperative cholangiography (n = 18), or ERCP (n = 11). On the whole, EUS was an accurate method for the diagnosis of bile duct stone: sensitivity: 100%, specificity: 89%, accuracy 95%.

**Conclusions:** EUS is very accurate for the diagnosis of bile duct stone. In patients with a suspicion of bile duct stone, especially before coeliocholecystectomy, ERCP or preoperative cholangiography could be avoided when EUS is negative. Sphincterotomy must be performed in patients with normal cholangiography and typical stone at EUS.

## 1222 Endosonographic Imaging of Islet Cell Tumors

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Islet cell tumors may be very small at the time when they cause clinical symptoms, and precise preoperative localization may therefore be difficult using transabdominal ultrasonography (US), computed tomography (CT) or magnetic resonance imaging (MRI). We have used endosonography (ES) to visualize hormone-producing pancreatic tumors. During a 13 months period we performed ES examinations in six patients with suspected insulinomas, using an Olympus EU-M20 echoendoscope.

Three patients with clinical symptoms indicating hypoglycemia had normal endosonographic images of the pancreas, and clinical follow-up showed no evidence of hyperinsulinism. In two patients with proven hyperinsulinism, solitary hypoechoic tumors were correctly localized by ES. One tumor with a maximal diameter of 11 mm was localized in the pancreatic tail. The tumor, which was invisible on CT and US, was removed by resection of the pancreatic tail. The other tumor with a maximal diameter of 16 mm was enucleated from the head of the pancreas. This tumor could not be localized by CT, but was visible on US images. None of the two patients had postoperative signs of residual tumors. The third patient with biochemical indication of insulinoma, had no sign of pancreatic tumor on US or MRI images. ES scanning from the duodenal bulb position revealed two closely related hypoechoic tumors with maximal diameters of 5 mm and 11 mm in the pancreatic head. Operation of this patient is planned in the immediate future.

Our experience is consistent with the statement that ES is the most sensitive imaging modality for preoperative localization of islet cell tumors. Biochemical confirmation of hyperinsulinism should precede endosonographic tumor localization.

## 1223 The Contribution of Sigmoidoscopy to the Study of Colon Mucosa (Infections, Tumours, Immunology) in HIV(+) Patients

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We studied 32 (31 M, 1 F) HIV seropositive patients (pts) presenting changes in bowel habits (increased frequency of bowel movements or diarrhoea with or without blood) with rigid sigmoidoscopy and biopsy. The pts ranged in age from 25 to 56 years (yrs) (median 37). Twenty two were homosexual, seven bisexual and three heterosexual (one intravenous drug abuser). CDC classification: 30 pts were at stage IV and 2 at stage II. Stool examination (by culture and microscopy for ova and parasites), prior to endoscopy, was positive in 3/32 pts only: Salmonella D with Giardia lamblia (1 pt), MAC (1 pt) and Cryptosporidium (1 pt).

**Endoscopic findings:** (a) Normal mucosa (16 pts), (b) Hyperaemia and oedema (11 pts), (c) Specific lesions, like ulceration, aphthoid ulcers, fistula, tumour (5 pts).

**Histological findings:** Kaposi's sarcoma (KS) (2), HSV (1), CMV (1), MAC (1), Spirochaeta (1), Campylobacter (2), inflammatory infiltration of the lamina propria associated with unidentified infectious agents (16) and AIDS associated colitis (8).

Biopsies (14/32) with histologically chronic inflammatory, non specific, infiltration were studied by the method of the immunoperoxidase ABC. We used monoclonal antibodies against the protein P24 of the HIV capsid and against the HLA class II (DR). 3/14 cases presented positive cells, P24(+), with characteristics of neuroendocrine cells in the base of the crypts and in 6/14 (3 previous included) the vessel endothelial cells were HLA-DR(+).

**Conclusions:** (1) Rigid sigmoidoscopy is useful in the diagnosis of opportunistic infections in combination with histological examination for HIV(+) pts. (2) Its contribution to the diagnosis of KS was of particular interest. (3) The mucosa of the colon presents immunohistochemical signs which are indicative of an immune response similar to that of the graft-versus-host disease (G.V.H.D.).

## 1224 Informed Consent for Upper GI Endoscopy (OGD)

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Informed consent for OGD requires that the patient understand the nature of, and reason for, the proposed procedure, and that he/she be given adequate time to deliberate and ask questions. In most Units, information is provided by (i) the referring doctor, (ii) a written information sheet, and/or (iii) the endoscopist. However, little time is usually given to patients to ask questions or read a consent form immediately before OGD. Therefore, we assessed

patients' opinions about the quality of information provided, and compared patient acceptance of a new OGD consent form with the standard surgical form. **Methods:** 200 outpatients referred for diagnostic OGD (99 M, 101 F; mean age 50, range 21–85 yr), who were sent a detailed information sheet 2–4 wk before OGD, were surveyed prospectively. Immediately before OGD, and one day later, each patient completed a questionnaire which assessed (on a five-step nominal scale) satisfaction with information provided by the referring doctor, information sheet, and endoscopist. In the second 100 patients, a new OGD consent form which was simpler and easier to read than the standard surgical consent form (Gunning fog index 10 v 13, respectively) was sent with the information sheet. Patients were directed to sign the new consent form before arriving at the Unit only if they had no further questions about the OGD. **Results:** In the first 100 patients, the reason for the OGD, and how it was done, were explained clearly by the referring doctor in 88% and 74% of cases, respectively, while 12% stated that no explanation had been given. Patient satisfaction with the information provided was similar among those referred from hospital clinics (n = 72) or directly from their GPs (n = 18). 93% found the information sheet to be helpful, but 22% stated they were not given enough time to ask questions by the referring doctor. 54% of patients had read the standard surgical consent form in the Endoscopy Unit before signing it. In contrast, in the second 100 patients, the new form sent with the information sheet was read by 95%, and signed by 88% before coming to the Unit. 84% found the new form easier to read and understand than the standard form, while 14% had no preference. Thirteen patients, none of whom had undergone a previous OGD and only one of whom had already signed the consent form, asked questions of the endoscopist, which related to the risks and side effects of OGD. Nine of the 13 stated they had been given no explanation about the OGD by the referring doctor. **Summary:** In our Unit, up to one-quarter of patients referred for OGD may not be adequately informed about the test. In contrast to the standard surgical consent form, a simple OGD consent form sent out with the information sheet was preferred by almost all patients, and safeguards against patients undergoing OGD without informed consent.

### 1225 Most Patients Prefer No Sedation for Upper GI Endoscopy

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Sedation during diagnostic upper GI endoscopy (OGD) is standard practice in Britain, and is thought to improve patient comfort. Most, but not all, previous studies have shown that OGD with spray alone is tolerated less well. However, it is also well recognised that anxious patients tolerate OGD poorly. We proposed that such patients would benefit most from sedation, but that OGD with spray alone would be preferred by most non-anxious patients. **Methods:** In a prospective study, 200 outpatients underwent diagnostic OGD by two endoscopists \* after introduction of two detailed information sheets, which (i) offered patient choice between spray or sedation (n = 100), or (ii) offered the same choice but encouraged those who were anxious about OGD to choose sedation. Patient anxiety, reasons for sedation choice, discomfort and overall satisfaction with the test were assessed by questionnaire (five-step nominal scales), and compared with the endoscopist's assessment of patient anxiety, ease of intubation, and patient discomfort. **Results:** In the first 100 patients, 59 opted for spray alone (lignocaine 100 mg) – 93% in order to avoid post-procedure drowsiness. The remaining 41 who were sedated with diazepam (mean 12.2 mg, range 5–20 mg), gave as reasons that they were worried about the diagnosis (15%) or possible discomfort (44%), or they had been given sedation for a previous OGD (41%). Anxiety about OGD discomfort was similar in both the spray and sedation groups. In the spray group, introduction of the gastroscopist was easier (p = 0.03) and patients appeared to be more comfortable (p = 0.04), although they actually reported more discomfort than the sedation group (p = 0.02). However, after introduction of the second information sheet, those in the spray group were less anxious (p < 0.001), and did not experience greater discomfort (p = 0.96) than those in the sedation group. If the OGD were to be repeated, 73% of the spray group and 77% of the sedation group would make the same choice again. 33 of the 200 patients (17%) had undergone two or more previous OGDs with sedation. They reported less anxiety (p < 0.0001), and experienced less discomfort (p = 0.014), than those without OGD experience. 26 of 33 patients (79%) who chose spray but had been given only sedation for a previous OGD, would again choose spray at a future OGD. **Conclusion:** When given an informed choice, most patients prefer not to be sedated during diagnostic OGD. If patients who are anxious about the procedure are advised to choose sedation, those who opt for topical throat spray alone find the OGD just as comfortable. Patients should be given the choice between spray or sedation for diagnostic OGD.

### 1226 The Value of Endoscopic Ultrasonography in Whipple's Disease

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Whipple's disease is a rare systemic disorder with the main changes in the upper parts of the small intestine. Diagnosis is established on the basis of clinical features and histological examination of duodenal or jejunal mucosa. We have not found in the literature that in any case of Whipple's disease endoscopic ultrasonography (EUS) had been performed and, therefore, it is of interest to assess value of EUS in diagnosis and follow up of this disease. In two patients with Whipple's disease proven histologically enteroscopy and EUS of the upper part of the small intestine were performed before and six months one year after starting of treatment. Enteroscopy showed a pale and mildly shaggy mucosa with yellow-whitish plaques. EUS revealed a thickened intestinal wall with a loss of normal layer structure and also enlarged adjacent lymph nodes. This EUS finding is in agreement with the findings which are found at laparotomy and autopsy of cases with Whipple's disease. In control group consisted of 8 pts with celiac disease these EUS changes have not been seen. Six months after starting of treatment with trimethoprim-sulphamethoxazole (complete clinical recovery of pts on lab tests normal) repeated EUS of the upper part of the small intestine showed the normal layer structure of the wall and lymph nodes could not be seen. Repeated EUS after one yr showed a normal structure of the wall of small intestine. Enteroscopy also showed a normal intestinal mucosa. Results suggest that EUS of the upper part of the small intestine should be performed in all patients suspected of Whipple's disease for two reasons: to differentiate Whipple's disease from some cases of celiac disease having similar symptoms and endoscopic appearance of intestinal mucosa and to follow up the effect of the treatment.

### 1227 Echoendoscopy of Bile Duct Strictures with Miniprobes

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Etiology of bile duct stenosis (BS) is frequently undetermined despite the use of endobiliary biopsies or cytology. Echoendoscopic analysis with miniprobes inserted in the BS could allow to distinguish between inflammatory and neoplastic lesion. We describe a method to insert the probe and the results obtained with new Olympus 12 and 20 MHz products.

**Methods:** The probe is introduced in a catheter previously positioned through the BS for biliary drainage. A silicone 15F drain is used for transhepatic access and a 12F endoprosthesis for retrograde one. Before probe introduction, the bile ducts are filled with saline, and sterile oil is injected in the drain. Position of the probe is controlled using fluoroscopy. **Results:** 21 patients presented with a common bile duct (12) or hilar (9) BS. Final diagnosis was obtained by endobiliary biopsies (12), percutaneous cytology (3) or surgery (6). Examination of the BS was possible in all patients without problems related to air bubbles or the sheath. 20 MHz probe allowed a good exploration 2 cm around the sheath (stent: 6, drain: 15). **Inflammatory BS (12 pts)** presented as an isoechoic homogeneous circumferential thickening of the biliary wall (2–5 mm) (normal = 1 mm); **Infiltrative malignant BS (cholangiocarcinoma, 2):** id to inflammatory BS; **Nodular malignant BS (pancreas, 5):** hypoechoic non circumferential thickening or compression; **Biliary adenoma (2):** intraluminal tissue with normal bile duct, but complete visualization of the lesion is often impossible. Resolution of the 12 MHz probe was judged not enough satisfactory to permit tumoral staging.

**Conclusion:** Insertion of echoendoscopic miniprobe in BS is easy provided the probe is introduced in a sheath. With the 20 MHz probe, nodular malignant lesions are detected. Distinction between inflammatory BS and infiltrative malignant BS is still difficult.

### 1228 A Rare Case of Severe Displasia of the Duodenum-Treatment and Follow Up

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The incidence of adenocarcinoma of the duodenum comprises about 0.3% of all gastrointestinal tumors. Areas of displasia are occasionally present in duodenal polyps but till now we have not found any report of displasia on a flat duodenal lesion. In May 1990 a 60-year old man was referred to our endoscopic unit because of dispeptic symptoms. Upper endoscopy, performed 11 years previously, revealed a duodenal ulcer which was treated periodically with H2 antagonists.

New endoscopy showed a hiatal hernia, diffuse erosive gastritis, duodenal bulb ulcer scar and in the second part of the duodenum (about 15 mm above the papilla) an irregular, slightly elevated area (diameter 10 \* 6 mm) of whitish mucosa was present. The biopsies were obtained either from the stomach or

from the duodenal lesion. Histological examination was diagnostic for severe duodenal dysplasia.

On the follow-up video endoscopy (one month later) a vital staining with methylene blue was performed to better delimitate the margins of the lesion which was eventually cauterized by the hot biopsy forceps.

During a 3.5 years follow-up, four endoscopies were performed (the last one in October '93).

In this period the patient received periodic therapy for his hypersecretive pathology.

The biopsies obtained at every control from the site of previous lesion resulted negative for dysplasia.

In our experience vital staining is a helpful method to evidence dysplastic and small neoplastic lesions and electrocautery proves to be a cheap and quick treatment of small dysplasia.

### 1229 Site Distribution of Polyps in the Large Bowel in Relation to Age: Rightward Shift or Leftward Shift?

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An increased risk of colorectal cancer in older patients is well recognized. The increasing age, furthermore, seems to be strictly associated with a left to right shift of colorectal cancer. Aim of the present study was to evaluate the site distribution of colorectal polyps in relation to the age of the patients and to histological and macroscopic appearance of the polyps. 253 colorectal polyps endoscopically removed in the last three years in 130 patients (M90, F40) with a mean age  $\pm$  SD of  $59.5 \pm 13.1$  were evaluated. The patients were subdivided in three groups (<40, 40–60, >60) according to their age. An increase of proximal/distal ratio positively related to the age of the patient was observed. Such increased ratio was statistically significant ( $p < 0.01$ ) only for adenomas but not for hyperplastic polyps. A positive correlation ( $p < 0.001$ ) between the severity of histological type, the size of the polyps and the age of the patients was also observed. On the other hand if we considered only the "high risk polyps" (larger than 1 cm and/or with moderate or severe dysplasia) such increased proximal/distal ratio was not observed. These "high risk polyps", furthermore, are found much more in the sigmoid colon and rectum. Our study confirms the evidence of a left to right shift of colorectal adenomas in relation to the age of the patients. Such evidence is not confirmed for "high risk adenomas" which, on the contrary, seem to be located much more in the left side of the colon independently from the age of the patient.

### 1230 Endoscopic and Histopathologic Correlates of Esophagitis

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The correlation between endoscopic features and a pathologic diagnosis of esophagitis in children has been clearly established. Therefore, the aim of this study was to determine if endoscopic findings correlate with histopathologic evidence of esophagitis. Endoscopic and pathologic findings were reviewed in 431 children [13.1  $\pm$  9.2 yrs (mean  $\pm$  SD); 238 males, 193 females] undergoing diagnostic endoscopies over 66 months. Of 278 children with esophageal biopsies, the pathologic diagnosis of esophagitis was confirmed in 127 (52%); 71 (56%) mild; 44 (35%) moderate, and 12 (9%) with severe esophagitis. Esophagitis was identified by both histopathology and endoscopic observations in 81 of the 127 (64%) patients. The endoscopist failed to identify esophagitis in 46 (36%) children with biopsy-proven esophagitis. In contrast, an endoscopic diagnosis of esophagitis was not confirmed by histology in 36 children. These results indicate that the endoscopic features of esophagitis had a sensitivity of 63.8%, a specificity of 55.6%, a positive predictive value of 54.7% and a negative predictive value of just 64.6%. The low sensitivity and specificity of visual findings indicate that biopsies should be taken at the time of all diagnostic upper endoscopies in children in order to confirm or exclude a diagnosis of peptic esophagitis.

### 1231 Endoscopic and Histopathologic Correlates of Gastritis and Duodenitis

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The frequency of gastritis and duodenitis in children with symptoms of dyspepsia is not known. Therefore, the aims of this study were to determine the frequency of gastritis and duodenitis and to examine whether there was a correlation between histopathologic and endoscopic findings. Over a period of 5.5 years, 431 consecutive children underwent diagnostic upper endoscopy. The pathologic findings, endoscopy report and patient charts were reviewed.

A pathologic diagnosis of gastritis was established in 146 (70%) of the 206 children with a gastric biopsy taken from the antrum (11.5 yrs  $\pm$  5.9 yrs, mean  $\pm$  SD; range 1–18 yrs; 58 females, 88 males). Gastritis associated

with *Helicobacter pylori* infection in 47 (33%). The 99 children with *H. pylori*-negative gastritis included Crohn's disease ( $n = 18$ ), drug ingestion ( $n = 14$ ), eosinophilic gastroenteritis ( $n = 3$ ), and portal hypertensive gastropathy ( $n = 3$ ). Abnormal findings were noted at endoscopy in 59 of the 146 children (40%). The endoscopic features of gastritis had a sensitivity of 40%, specificity of 40%, a positive predictive value of 62% and a negative predictive value of just 22%.

Of the 61 children who underwent endoscopic duodenal biopsy, 48 (79%) had pathologic evidence of duodenitis (13.8  $\pm$  5.1 yrs, range 4–18 yrs; 17 females and 31 males). Duodenitis was associated with *H. pylori* infection of the antrum ( $n = 24$ ), Crohn's disease ( $n = 10$ ), eosinophilic gastroenteritis ( $n = 3$ ) and acute drug ingestion ( $n = 3$ ). Duodenitis was associated with gastritis histologically in 38 (79%) of 48 children. Endoscopic features of duodenitis had a sensitivity, specificity positive predictive value and negative predictive value of 81%, 38%, 83% and 38% respectively.

The low sensitivity and low specificity of visual findings in the diagnosis of gastritis indicate that antral biopsies should be taken at the time of diagnostic endoscopy to confirm or exclude the diagnosis by histopathologic assessment. There is a stronger correlation between abnormal endoscopic findings and histopathologic confirmation of duodenitis.

### 1232 Transendoscopic Ultrasonography in the Diagnosis of Dieulafoy's Vascular Malformation

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Dieulafoy's vascular malformation may cause severe gastric bleeding. The lesion represents a dilated artery localized in the submucosa in the upper part of the stomach. It might be difficult to see at endoscopy because the mucosal aspect of the lesion is usually small. Transendoscopic ultrasonography is a new technique which allows imaging of the subepithelial layers of the gastric wall. When combined with Doppler sonography, vascular flow in a lesion may be detected.

A male, 49 years of age, with recurrent severe gastric bleeding from a small lesion located on the posterior wall of the upper part of the stomach was treated twice with endoscopic injection. A Dieulafoy's malformation was suspected and for further diagnosis, transendoscopic ultrasound probes were inserted through the biopsy channel of a conventional endoscope. Endoscopy revealed a small scar, and transgastric ultrasound B-mode imaging (20 MHz Fujinon Sonoprobe, Japan) demonstrated a hypoechoic mass in the submucosa. Using a transendoscopic 10 MHz pulsed Doppler probe (prototype attached to the Doppler device, SD 100 Vingmed Sound a/s, Norway), arterial signals could be obtained from the submucosal lesion, supporting our assumption of a vascular malformation.

Subsequently, the lesion was resected surgically, and histology showed a dilated artery in the submucosa, penetrating the muscularis mucosae.

In conclusion, transendoscopic ultrasound probes combining B-mode imaging and Doppler sonography, are useful in detecting and characterizing vascular subepithelial lesions.

### 1233 New Miniprobe Prototypes for Echoendoscopy of the GI Tract: Preliminary Results

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The first generation EUS miniprobe 7.5 MHz (Olympus Co) improved staging of stenosing tumors [1]. However its practical usefulness was limited by the necessity to pass it through large channel endoscopes and its high fragility. Here we report our preliminary experience with 12 and 20 MHz miniprobes usable through the channel of a standard endoscope.

23 patients have been explored so far. 11 patients had an esophageal carcinoma with tight stenosis. 2 patients had rectal anastomotic stenosis with suspicion of recurrence. 8 had small endoscopic abnormalities (esophagus,  $n = 5$ ; antrum,  $n = 1$ ; rectum,  $n = 2$ ) with at least dysplasia at biopsies and discussion of endoscopic treatment. Finally 2 patients had painful anal abscess. The 12 MHz probe (18 examinations), giving a deeper penetration and the 20 MHz probe (8 examinations), giving a higher definition, were used respectively in large and small tumors. In all cases, the probe was passed directly through the operative channel and applied closely to the wall. Water was instilled when possible (stomach, rectum).

Examination was always successful. The usual 5 to 7 layers pattern was evidenced in all but 3 patients with previous radiotherapy. In large tumors, the probe gave more informations than the GF UM20 echoendoscope (invasion of adjacent organs, coeliac nodes, anastomotic recurrence), but missed some mediastinal nodes. In small tumors, 1 tumor was accurately staged T3, no abnormality was found in 3 (severe dysplasia or in situ carcinoma). 4 tumors were staged uT1. As a new echo poor layer was evidenced in the echo dense submucosal layer, 3 of the 4 tumors were thought to be limited to the mucosa and were treated by photodynamic therapy. Finally in the 2 patients



with anal abscess, the probe was passed directly into the canal anal without pain and allowed a good exploration of the sphincters.

In conclusions, the new miniprobes are less fragile, and display better images. The striking possibility to visualize specifically the mucosa has still to be confirmed.

[1] *Gastrointest Endosc* 1991; 37: 157

### 1234 Echoendoscopy in the Follow-Up of uT1N0 Esophageal Squamous Cell Carcinoma Treated by Photodynamic Therapy (PDT)

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The role of echoendoscopy (ENS) in the follow-up of treated carcinoma is poorly known. It was studied here in esophageal squamous cell carcinoma staged uT1N0 and treated by PDT.

From 1988 to 1993, 64 patients were treated by PDT for a squamous cell carcinoma of the esophagus staged uT1N0 at initial EUS. Follow-up could not be performed in 24 patients (stenosis, associated diseases, PDT failure or follow-up elsewhere). Thus 40 patients were included with a mean follow-up of 29 months. 30 patients received radiotherapy 2 months after PDT, while 10 patients did not (previous radiotherapy in 1, poor general status in 9). 107 EUS examinations (Olympus G UM 2, 3 and 20) were performed (mean 3 examinations/patient) at least two months after PDT or radiotherapy. 3 EUS patterns were distinguished: normal pattern (good visibility of the 5 layers), cicatricial pattern (regular circumferential thickening), recurrence pattern (asymmetric irregular thickening). Results were compared to those of the regular patient evaluation.

Of the 107 explorations, 32 were normal, mostly in the absence of radiotherapy, with only 1 cancer at biopsy. Of the 70 showing cicatricial pattern, mostly after radiotherapy, there were 5 recurrences, only 1 leading to death, 4 being retreated successfully by PDT. In 30 patients with normal or cicatricial but stable pattern at EUS and normal biopsies, follow-up was uneventful for at least 6 months in 19 patients and for 2-6 months in 11. Of the 5 recurrence pattern, 2 were not confirmed (previous radiotherapy), 3 staged uT2/T3 were confirmed by surgery or rapid fatal evolution.

Thus, i) endoscopy remained necessary to detect recurrences as EUS missed most superficial recurrences and a risk of false positive after radiotherapy. ii) EUS was necessary to stage recurrences and choose the treatment. iii) More important normal or stable cicatricial EUS pattern with normal endoscopic biopsies was a strong argument for prolonged remission.

### 1235 Usefulness Catheter Type Ultrasound Probe Under the Endoscopy in Diagnosis of Colorectal Submucosal Tumor

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Ultrasound probe <Sonoprobe System SP-101 and SP-501 (20 & 15 MHz, Fujinon. Co)> was employed for the study of colorectal submucosal tumor. The subjects were 27 patients with colorectal submucosal tumor (carcinoid tumor, malignant lymphoma, benign lymphoma, lipoma, lymphangioma, lyoma, neurofibroma, pneumatosis cystoides intestinalis). In the high frequency ultrasonography imaging, the colorectal wall structure was divided into 9 layers, the 1st-3th layers corresponded to the mucosa, the 4th layer to the muscularis mucosa, the 5th layer to the submucosa, the 6-8th layers to the muscularis propria, and the 9th layer to the serosa or adventitia. Based on this, all cases were accurately described and diagnosed of the location. Diagnosis by the ultrasound probe system presented the quality of the tumor and differential diagnosis. *Results:* Useful of sonoprobe system. (1) This probe could be described location and internal quality of the submucosal tumor which couldn't diagnosed by 7.5 MHz endoscopic ultrasound, and sonoprobe's view were resemble to microscopic view. (2) Differential diagnosis between carcinoid and lymphoma was not easy, because their location and quality are resemble, slightly different thing were irregularity of tumor margin and internal density. (3) Sonoprobe was efficacy to decision of treatment effect, example chemotherapy effect to the malignant lymphoma.

### 1236 Cross Section of an Artery in a Biopsy Specimen from the Stomach

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A 76-year-old female patient was examined by gastroscopy because she had burning epigastric pains. Two antral ulcers were found and in addition a mucosal protuberance was observed in the fornix. Its diameter was about 8 mm and it was thought to be a submucosal tumor. One normal biopsy was

taken. No unusual bleeding occurred. The histology showed that the biopsy specimen contained a transected, unusually large, thick-walled, submucosal artery. After differential diagnostic consideration it was suspected to be a Dieulafoy's lesion but the absence of massive gastrorrhagia contradicted this suspicion.

In conclusion, if it is necessary at all, before histologic verification of a small gastric submucosal lesion Doppler sonography may be helpful because such a lesion may contain a large submucosal artery.

### 1237 Ultrasound (US) and ERCP in the Diagnosis of Intrahepatic Rupture of Liver Hydatid Cyst

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Hydatid liver cysts are very common in this part of the world, often presented as a sudden attack of obstructive jaundice with fever, due to the intrahepatic rupture of the cyst. The aim of our study was to assess the accuracy of US and ERCP in the diagnosis of this condition, by comparison with operative findings.

During 7 yrs period ('86 to '93) precise diagnosis of hepatic hydatid cyst was provided in 91 pts (36 m and 55 f, age from 21 to 80 ys) by the means of sonography, fine-needle aspiration biopsy and hydatid serology. 21 pts with right upper abdominal quadrant pain and signs of obstructive jaundice, under suspicion of intrahepatic rupture of hydatid cyst were further investigated, by another US examination and/or ERCP; 19 pts underwent surgery.

US showed cystic liver lesion communicating with dilated biliary tree and enlarged gallbladder in 12 pts, while ERCP was diagnostic in 15 pts, revealing enormously dilated common bile duct with filling defects (daughter cysts) 3 pts had normal appearance of the biliary tree on ERCP; 1 pt showed biliary dilatation induced from the compression by hilar hydatid cyst; 1 pt underwent urgent surgery (female in 6th month of pregnancy) and 1 pt died in liver failure.

Laparotomy confirmed intrahepatic rupture of hydatid cyst in 6 pts. 1 pt with hydatid debris found in common bile duct during ERCP refused surgery - he was further treated with Albendazole; hydatid debris was additionally found in 1 pt with regular ERCP finding.

According to the results we conclude that ultrasonography (75%) and ERCP (94%) can accurately detect intrahepatic rupture of liver hydatid cyst, especially if they are applied together, early in the investigation of this complication.

### 1238 Extracorporeal Piezoelectric Lithotripsy (EPL) in Patients with Chronic Pancreatitis: Fragmentation Rate and First Clinical Results

Chronic pancreatitis (C.P) is often accompanied by calcifications of the pancreatic duct system. These calculi may lead to a relevant duct obstruction, which is today accepted as one of the multifactorial causes of abdominal pain in C.P. Since surgical decompression of the duct is associated with a high mortality rate (2-5%) and eventually failed to improve pancreatic function, endoscopic methods have been introduced. Endoscopic extraction of pancreatic calculi, however, may be hindered by strictures, size or location of stones. After good results with EPL for common bile duct stones, we were encouraged to apply shock waves to patients with pancreatic duct stones (P.D.S.) in whom endoscopic stone extraction had failed.

Between 1989 and 1993, we treated 30 patients (26 male, 4 female, mean age 52 years) with P.D.S., using the Piezolith 2,300 (Wolf, Knittlingen, Germany). Seven patients had solitary stones and the others had multiple stones. Focusing of the stones was achieved sonographically in 28 patients (93%). In these patients, 88 lithotripsy sessions (mean 3, 2-6) with an average of 3,785 (1,000-6,000) shock waves were carried out. During each treatment only mild intravenous sedation/analgesia (2-5 mg midazolam, 25-75 mg pethidin) was required.

Disintegration of stones was achieved completely in 10 patients (33%) and partially in 8 (27%), thus preparing the way for a further endoscopic approach with complete (5 patients) or partial (5) clearance of the duct or the implantation of an endoprosthesis (5). The other patients reported a reduction of pain; none of the patients had to be operated on. Severe complications did not occur, but one treatment had to be abandoned because of serious pain sensations.

EPL can be safely applied in patients with C.P. and ductal stones. The procedure is complementary to endoscopic techniques and improves the success of nonsurgical ductal decompression. Our results in patients with P.D.S., however, were lower than the results obtained in common bile duct stones. Long-term relief of pain as well as improvement of exocrine pancreatic function remains to be seen.