

# Emergency endoscopy

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**D Apel, JF Riemann. Emergency endoscopy. Can J Gastroenterol 2000;14(3):199-203.** The need for emergency endoscopy is a matter of debate. The time interval for emergency procedures remains to be defined. Most authors propose a time span of 24 h as emergency time, while some define a period of 72 h (especially in acute pancreatitis). Several studies have shown a possible benefit for a select group of patients. Four main indications are established for emergency endoscopy: acute gastrointestinal bleeding (variceal and nonvariceal), acute biliary pancreatitis and acute cholangitis. In the case of upper gastrointestinal bleeding, emergency endoscopy enables exact diagnosis and appropriate therapy, and provides important prognostic information. There is some evidence that emergent endoscopic injection therapy improves clinical outcome and reduces mortality in patients with acute ulcer bleeding. Patients do not benefit if endoscopy is performed only as a diagnostic procedure. Controversial results were published recently for emergency endoscopy in acute biliary pancreatitis. There is good evidence that emergency endoscopic retrograde cholangiopancreatography is helpful in patients with severe pancreatitis and stone impaction if performed within the first 24 h after onset of symptoms. However, emergency endoscopic retrograde cholangiopancreatography is not beneficial for patients with mild pancreatitis if performed later than 72 h (or 24 h) after onset of symptoms. There is a limited number of well established evidence-based indications for emergency endoscopy. Some other indications are still a matter of debate, and controversial opinions have been published.

**Key Words:** *Acute biliary pancreatitis; Acute gastrointestinal bleeding; Emergency endoscopy*

## L'endoscopie d'urgence

**RÉSUMÉ :** Le recours aux endoscopies d'urgence ne fait pas l'unanimité. Il reste encore à définir les délais de réalisation de ces interventions aux urgences. La plupart des auteurs proposent un intervalle de 24 heures, d'autres de 72 heures (surtout dans la pancréatite aiguë). Plusieurs études ont montré un avantage possible chez un groupe précis de patients. Quatre indications ont été établies pour l'endoscopie d'urgence : l'hémorragie digestive aiguë (d'origine variqueuse ou non), la pancréatite biliaire aiguë et la cholangite aiguë. Dans le cas de l'hémorragie digestive haute, l'endoscopie d'urgence permet de poser un diagnostic précis et d'administrer le traitement approprié et procure des renseignements pronostiques importants. Selon certaines preuves, le traitement par injection endoscopique concomitant améliore l'issue clinique et réduit la mortalité chez les patients qui présentent une hémorragie aiguë. Les patients ne tirent aucun avantage de l'endoscopie si elle est effectuée seulement à titre diagnostique. Des résultats controversés ont été récemment publiés au sujet de l'endoscopie d'urgence dans la pancréatite biliaire aiguë. Tout porte à croire que la cholangiopancréatographie rétrograde endoscopique d'urgence est utile chez les patients qui souffrent d'une pancréatite grave avec calculs si elle est effectuée dans les 24 heures qui suivent le déclenchement des symptômes. Par contre, l'intervention n'est pas avantageuse chez les patients qui souffrent d'une légère pancréatite si elle est effectuée après les 72 heures (ou 24 heures) qui suivent le déclenchement des symptômes. Il y a peu d'indications fondées sur des preuves bien établies pour procéder à l'endoscopie d'urgence. Certaines autres indications font toujours l'objet d'un débat et des opinions divergentes ont été publiées.

The widespread use of endoscopy during the past 20 years has provoked the question of when exactly to apply it in gastroenterological emergencies. Generally, emergency endoscopy is performed in cases such as acute gastrointestinal bleeding, acute biliary pancreatitis and acute cholangitis. Nevertheless, there is no clear definition of the time interval for the use of endoscopy in such cases. Most authors propose

a time span of 24 h as emergency time in cases of acute gastrointestinal bleeding. In the case of acute biliary pancreatitis, a time interval of 72 h is defined, although recently a decrease in time interval to 24 h has been discussed. In cases of acute cholangitis and endoscopic therapy there is no clearly defined time span. This vague definition of emergency endoscopy makes it difficult to analyze and compare

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**TABLE 1**  
**Results of randomized trials of therapeutic endoscopy**

Therapy	Further bleeding	Surgery	Mortality
Thermal contact*	0.32 <sup>‡</sup>	0.31 <sup>‡</sup>	0.67 <sup>‡</sup>
OR <sup>†</sup> (95% CI)	(0.22-0.41)	(0.19-0.43)	(0.39-1.14)
Number of trials (n)	13 (866)	13 (870)	12 (739)
Laser	0.58 <sup>‡</sup>	0.58 <sup>‡</sup>	0.49 <sup>‡</sup>
OR <sup>†</sup> (95% CI)	(0.38-0.69)	0.40-0.80)	(0.30-0.81)
Number of trials (n)	11 (1018)	13 (1072)	12 (984)
Injection	0.23 <sup>‡</sup>	0.18 <sup>‡</sup>	0.50 <sup>‡</sup>
OR <sup>†</sup> (95% CI)	(0.12-0.45)	(0.11-0.32)	(0.22-1.12)
Number of trials (n)	4 (312)	7 (517)	6 (549)
All therapies	0.38 <sup>‡</sup>	0.36 <sup>‡</sup>	0.55 <sup>‡</sup>
OR <sup>†</sup> (95% CI)	(0.32-0.45)	(0.28-0.45)	(0.40-0.76)
Number of trials (n)	25 (2139)	30 (2534)	30 (2366)

\*Heater probe and monopolar and bipolar electrocoagulation; <sup>†</sup>Treatment versus control; <sup>‡</sup>Statistical heterogeneity. Reproduced with permission from reference 14

studies. Nevertheless, some studies, in select groups of patients, may prove a benefit of quick and urgent performance of endoscopy. The following discussion weighs the advantages and disadvantages of the urgent application of endoscopic measures in emergency cases.

#### ACUTE UPPER GASTROINTESTINAL BLEEDING

Eighty-five per cent to 90% of acute gastrointestinal bleeding occurs in the upper gastrointestinal tract, while only 10% to 15% occurs in the lower gastrointestinal tract (1). Upper gastrointestinal bleeding is divided into variceal and non-variceal, and is more serious than lower gastrointestinal bleeding. Usually the hemorrhage of the colon (90%) or the small intestine (10%) is not fulminant, so it is possible to prepare the patient for the endoscopic examination; therefore, this examination cannot be defined as emergent.

Causes of upper gastrointestinal bleeding are peptic ulcers (51%), esophageal varices (20%), esophagitis (6%), malignant tumours (5%), Mallory-Weiss lesions (3%), erosions of different genesis (3%), angiomata (1%) and others such as anastomotic ulcer, postpapillotomy, Dieulafoy's ulcer and Boerhaave's syndrome (11%) (1). As with peptic ulcers, bleeding lesions can be treated with the use of endoscopic injections, laser or argon plasma coagulation.

In cases of peptic ulcer bleeding, some unfavourable prognostic factors can influence the further therapeutic strategy, including bleeding activity (Forrest and Doppler classification), bleeding intensity (hemoglobin less than 8 g/dL), symptoms of shock, ulcer size and location (greater than 2 cm, posterior wall of duodenal bulb or lesser curvature), age over 60 years, persistent or recurrent bleeding and additional severe disease (2,3). Some of these characteristics are summarized in the Baylor bleeding score (4,5). Urgent endoscopic proof of such factors enables the physician to plan the further medical care much better and to predict the prognosis of an emergency patient more precisely. The importance of a quick diagnosis in cases of peptic ulcer bleeding was presented by Wilcox and Clark (6), and Segal and Cello (7).

Both groups have shown that ulcer size greater than 2 cm, older age and history of smoking are especially associated with painless peptic ulcer bleeding. These claims provide good evidence for urgent endoscopy of patients after their admission to hospital. Generally, the diagnostic yield of endoscopy in acute upper gastrointestinal hemorrhage ranges from approximately 76% (8) to over 90%, according to the different series and the population of patients investigated (9,10). Failure to establish a source of bleeding did not unfavorably affect the outcome of one study (8). In a previous study (11) in which patients were stratified by age, mortality for patients older than 80 years who were not diagnosed was 29%, almost twice as high as that associated with ulcer bleeding.

In cases of quick diagnosis after the onset of bleeding, there are many therapeutic options, including injection therapy, thermal therapy (laser, electrocoagulation, heater probe), clips and band ligation (1). The introduction of injection therapy to the emergency endoscopy, for example, was associated with a reduction in transfusion requirements, hospitalization days, surgical interventions and mortality in patients with active bleeding or nonbleeding visible vessels (12). All of these factors remained unchanged high before inauguration of the endoscopic injection therapy (12). It can be claimed that single modality (injection or thermal) is better than no endoscopic intervention in peptic ulcer bleeding (13). The question of which of the different therapeutic options is best is the subject of many comparative studies and is beyond the scope of this discussion (14) (Table 1). An important protocol seems to be the repeated injection of fibrin glue, which is significantly more effective than injection of polidocanol 1% in the treatment of bleeding from gastroduodenal ulcers (15), although this form of therapy increases the treatment costs considerably.

It seems logical to administer endoscopic injection as soon as possible after the onset of bleeding to improve circulatory status and minimize blood transfusions. This often requires out of hours emergency endoscopy (performed between 5:30 pm and 8:30 am from Monday to Friday and during the weekends) and may be performed under suboptimal conditions. Choudari and Palmer (16) studied patients with peptic ulcer bleeding who received endoscopic injection in relation to the time of treatment. The outcomes of patients treated during working hours or out of hours were very similar. However, it was surprising that the prognosis of treated patients was almost identical whether they were treated within 6 h of admission or after 12 h to 24 h of admission. These findings suggest that out of hours endoscopy is as safe and effective as endoscopy performed under more optimal conditions during working hours. They do not explain, however, why there were no differences between the outcome of admission and the timing of endoscopy.

Nevertheless, we argue for a quick diagnostic and, if necessary, therapeutic endoscopy after admission to hospital of a patient with a history of upper gastrointestinal hemorrhage. Urgent action can not only improve the prognosis of the patient, but also, in cases of endoscopic exclusion of an active

bleeding lesion and stable vital signs, result in an early discharge of the patient. Lai et al (17) developed an aggressive early discharge policy for patients admitted with upper gastrointestinal bleeding due to duodenal ulcers without high risk stigmata of recent hemorrhage. The patients with melena or hematemesis during the previous 6 h to 120 h and with stable vital signs, no concomitant serious medical illness and no stigmata of recent hemorrhage were discharged on the same day of the emergency endoscopy. In this group there were no episodes of rebleeding nor significant drops in hemoglobin levels two weeks after discharge. Comparable results were also found by Hsu et al (18).

Clinical and endoscopic parameters are highly predictive of recurrent hemorrhage. The endoscopic parameters can only be specified by urgent endoscopy. By using such tactics, low risk patients can be differentiated very easily from high risk patients. Without loss of time, unstable patients at risk receive further treatment in the intensive care unit. Patients with clean-based ulcers can be discharged soon after volume resuscitation, stabilization and institution of antiulcer therapy. The identification of low risk factors leads to the reduction of hospital costs and the increased availability of emergency beds.

Emergency endoscopy is the most accurate method for diagnosing the cause of upper gastrointestinal hemorrhage. It also provides useful prognostic information and helps the physician to make subsequent management decisions. Urgent endoscopy permits the application of endoscopic hemostatic therapy. It is not appropriate to perform emergency endoscopy without the possibility of therapeutic intervention. The use of Doppler ultrasonography is helpful in emergency endoscopy (19,20). It changes the visual Forrest classification in around 42% of cases, supplies the identification for the endoscopic therapy and reveals superficial vessels in 70% of Forrest IIB ulcers. Doppler ultrasonography must be repeated until the signal disappears. It decreases rebleeding rate and mortality, and controls the efficacy of the endoscopic treatment (19). If Doppler sonography is not used, results of the second look endoscopy are controversial. On the one hand, second look endoscopy is beneficial (21), on the other hand, this strategy does not influence the outcome compared with that of patients receiving only a second endoscopic intervention on evidence of recurrent hemorrhage (22,23).

In conclusion, we would like to remember that eradication of *H pylori* infection reduces the recurrence of peptic ulcers, therefore, reducing rebleeding more effectively than does long term maintenance therapy with an H<sub>2</sub> blocker (24).

Acute variceal bleeding is a very serious event. Treatment regimens have been aimed at reducing portal pressure by balloon tamponade, pharmacological agents, surgery or endoscopic procedures (endoscopic sclerotherapy, obliteration with cyanoacrylate tissue glue, rubber band ligation and ligation using endoloops). Endoscopic rubber band ligation of esophageal varices has been shown to be an effective and safe alternative to injection sclerotherapy (25). Some con-

trolled clinical trials comparing variceal ligation with endoscopic sclerotherapy have shown a lower incidence of rebleeding and more rapid variceal elimination by ligation. For both types of endoscopic treatment, the hemostatic efficacy is around 90%, but sclerotherapy is preferred as the emergency treatment. Ligation is then used as the subsequent elective treatment to eradicate the collaterals (26-29). To weigh the advantages and disadvantages of the particular types of therapies is beyond the scope of this discussion.

### ACUTE BILIARY PANCREATITIS

Although it is now agreed that the passage of gallstones through the ampulla of Vater, rather than permanent impaction, is much more common in acute pancreatitis, the precise mechanism by which the passing stone precipitates an attack is the subject of some considerable debate. For urgent therapy to be taken when cholelithiasis is suspected as the source of acute pancreatitis, there needs to be a reliable way to detect gallstones and differentiate the cause of an attack from other nonbiliary etiological factors. We have ultrasonography, labour data and endoscopic retrograde cholangiopancreatography (ERCP) at our disposal.

There exists only four randomized studies that deal with an urgent decompression of the hepatobiliary system by means of endoscopic sphincterotomy.

In the study of Neoptolemos et al (30), 121 patients with acute biliary pancreatitis were randomly assigned to either endoscopic or conservative treatment within 72 h. Altogether, patients profited significantly from the urgent endoscopic sphincterotomy (ES), with a morbidity rate of 12% and a mortality rate of 2%, in comparison with the conservative treatment group, with a general complication rate of 43% and a mortality rate of 8% (P=0.03). The outcome was identical in both groups with mild pancreatitis (morbidity 12%, mortality 0%). There was, however, an important difference in favour of the endoscopic treatment group concerning patients with severe pancreatitis (morbidity 24% versus 61%, mortality 1.7% versus 18%, hospitalization 9.5 days versus 17 days).

The study was reproached for establishing benefits by relieving the accompanying cholangitis rather than by relieving the acute pancreatitis. Excluding the 11 patients with cholangitis, the statistical analysis still shows a benefit of urgent ERCP (eg, complication rate 15% versus 60%, P=0.003).

In a study from Hong Kong (31), of 195 patients, an emergency ERCP was performed within 24 h, either with or without ES. In the ES treatment group, the incidence of biliary sepsis was zero, whereas in the conventional treatment group the rate was 9% in patients with mild and 20% in patients with severe pancreatitis. With regard to the systemic complications, there was a difference only in patients with severe pancreatitis (39% versus 62%).

The study was criticized for its definition of the severity of pancreatitis. A severe attack was defined as hyperglycemia of more than 11 mmol/L and serum urea of more than 7.4 mmol/L. It has subsequently been shown that this

method of severity assessment may be inadequate, with a sensitivity of 33% and specificity of 88% (32). Before being randomly assigned, patients had not been stratified according to the severity of their disease, and only 127 of them had gallstones. Excluding nongallstone patients from the analysis, however, the results are similar to those of the study by Neoptolemos et al (30).

Fölsch et al (33) randomly assigned, in a multicentre study, 238 patients with acute biliary pancreatitis and a bilirubin level of less than 5 mg/dL into two groups. In the first group (n=126), ERCP was performed within 72 h. The remaining 112 patients were treated conservatively. The patients were not stratified according to the severity of the attack. In 96% (121 of 126) of cases, the initial ERCP was technically successful. The ES was performed to remove bile duct stones in 58 cases (46%), and stone extraction was successful in 57 of 58 cases (98%). In the conventional treatment group, an elective ERCP had to be performed in 22 patients when they had increased cholestasis (n=8), a rise in temperature over 39°C (n=8) or biliary cramps (n=6). In 13 of these patients, bile duct stones could be proved (59%) and successfully extracted afterwards. The mortality rate was higher in the interventional group (11.1% versus 6.2%; P=0.10). The general complication rate was approximately the same in both groups (46.0% versus 50.9%). The authors concluded from these results that an early ERCP and papillectomy in patients with acute biliary pancreatitis without essential bile duct obstruction or biliary sepsis is not profitable. This study was criticized for its large number of participants

with too different training levels, which may explain the high complication rate in the interventional treatment group.

Interesting conclusions were drawn from another study, which has been published as an abstract (34). In 280 patients with acute biliary pancreatitis, a duodenoscopy was performed within 24 h. In 75 patients (group I) with an impacted stone in the papilla of Vater, an immediate ES was performed. Two hundred and five patients with a normal papilla of Vater were randomly assigned to two groups: group II with early ES within 72 h (103 patients) and group III with conservative treatment (102 patients). The complication rate and the mortality rate were 17% and 2%, respectively, in the interventional groups and 36% and 13%, respectively, in the conventional group. Among patients treated endoscopically, the best results were obtained when the interval between onset of symptoms and ES was shorter than 24 h (complications 7%, mortality 0%). The worst results were obtained when the delay exceeded 72 h (complications 22%, mortality 8%).

There is good evidence that early endoscopic intervention is a procedure of choice in patients with stone impaction and cholangitis. ERCP and ES improve the prognosis of the patients with severe form of acute biliary pancreatitis. There are controversial results according to mortality in the two treatment options. The possible reason is that the time span of 72 h is too long. At the end of a period of 72 h; however, the conservative therapy should be continued, unless the clinical condition gets worse.

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