



Dr. Jo Vandervoort
Gastroenterology
Onze-Lieve-Vrouw ziekenhuis
Aalst

Classification of post-ES bleeding


Immediate  delayed

Classification of post-ES bleeding

Immediate  delayed

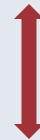
Endoscopically significant

Classification of post-ES bleeding

Immediate  delayed

Endoscopically significant

Clinically significant



Non-clinically significant

Definition of post-ES bleeding

TABLE 2. Consensus criteria for ERCP complications*†

	Mild	Moderate	Severe
Bleeding	Clinical evidence of bleeding (ie, not just endoscopic); Hb level drop < 3 g; no need for transfusion	Transfusion: ≤ 4 units; no angiographic intervention or surgery	Transfusion: ≥ 5 units or intervention (angiographic or surgical)
Perforation	Possible, or only very slight leak of fluid or contrast dye; treatable by fluids and suction for ≤ 3 d	Any definite perforation treated medically for 4–10 d	Medical treatment for more than 10 d or intervention (percutaneous or surgical)
Pancreatitis	Clinical pancreatitis; amylase at least 3 times normal at more than 24 h after the procedure requiring admission or prolongation of planned admission to 2–3 d	Pancreatitis requiring hospitalization of 4–10 d	Pancreatitis requiring hospitalization for more than 10 d, or hemorrhagic pancreatitis, phlegmon or pseudocyst, or intervention (percutaneous drainage or surgery)
Infection (cholangitis)	> 38°C at 24–48 h	Febrile or septic illness requiring > 3 d of hospital treatment or endoscopic or percutaneous intervention	Septic shock or surgery

*From Ref. 11.

†All other complications were graded for severity of the need for hospitalization and/or surgical treatment, ie, mild, unplanned hospital stay of 2–3 nights; moderate, 4–10 nights; and severe (> 10 nights or intensive care or surgery).

Incidence of post-ES bleeding

TABLE 1. COMPLICATIONS OF ENDOSCOPIC BILIARY SPHINCTEROTOMY IN 2347 PATIENTS.

TYPE OF COMPLICATION	PATIENTS WITH COMPLICATIONS	PATIENTS WITH SEVERE COMPLICATIONS	PATIENTS WITH FATAL COMPLICATIONS
		number (percent)	
Pancreatitis	127 (5.4)	9 (0.4)	1 (<0.1)
Hemorrhage	48 (2.0)	12 (0.5)	2 (0.1)
Perforation	8 (0.3)	5 (0.2)	1 (<0.1)
Cholangitis	24 (1.0)	2 (0.1)	1 (<0.1)
Cholecystitis	11 (0.5)	3 (0.1)	1 (<0.1)
Miscellaneous*	25 (1.1)	8 (0.3)	5 (0.2)
Any†	229 (9.8)	38 (1.6)	10 (0.4)

*Miscellaneous complications included cardiopulmonary complications (in 6 patients); complications of combined percutaneous access (in 3 patients: bile leak in 1 and intrahepatic bleeding in 2); ductal perforations by guide wires (in 3); stent malfunctions (in 3); ileus (in 3); papillary obstruction (in 2); diarrhea induced by antibiotics (in 2); indeterminate abdominal fluid collections (in 2); and infection of a pancreatic pseudocyst (in 1). The deaths in this category were caused by cardiopulmonary events (arrhythmia in 1 patient, aspiration pneumonia in 1, and acute chest syndrome in sickle cell disease in 1) or were stent-related (in 2).

†Some patients had more than one complication.

Incidence of post-ES bleeding

TABLE 3. Complication frequency and severity

Complication	Total (% of total procedures)	Severity (% of complications)			
		Mild	Moderate	Severe	Fatal
Overall	462 (4.0)	335 (73)	78 (17)	42 (9)	7 (2)
Pancreatitis	304 (2.6)	229 (75)	57 (19)	17 (6)	1 (0.3)
Bleeding	40 (0.3)	22 (55)	9 (23)	9 (23)	0 (0)
Infection	38 (0.3)	29 (76)	5 (13)	2 (5)	2 (5)
Cardiac	10 (0.1)	5 (5)	0 (0)	2 (20)	3 (30)
Pulmonary	9 (0.1)	6 (67)	2 (22)	1 (11)	0 (0)
Bowel perforation	12 (0.1)	4 (33)	0 (0)	7 (58)	1 (8)
Sphincter perforation	4	0 (0)	1 (25)	3 (75)	0 (0)
Medication reaction	6	6 (100)	0 (0)	0 (0)	0 (0)
Phlebitis	2	2 (100)	0 (0)	0 (0)	0 (0)
Other	37 (0.3)	32 (86)	4 (11)	1 (3)	0 (0)

Incidence of post-ES bleeding

Complication	No. (%)
Overall	137 (11.2)
Pancreatitis	88 (7.2)
Grade	
Mild	60
Moderate	22
Severe	6
Bleeding	10 (0.8)
Cholangitis	9 (0.7)
Fever	4 (0.3)
Pain 20 (1.6)	
Cholecystitis	3 (0.25)
Hypoxia	3 (0.25)
Bradycardia	3 (0.25)
Hypotension	2 (0.16)
Hematoma in CBD	1 (0.08)
Perforation	1 (0.08)
Cyst infection	1 (0.08)
Myocardial infarction	1 (0.08)
Angina	1 (0.08)
Deep venous thrombosis	1 (0.08)
Bacteremia	1 (0.08)
Death	2 (0.16)

CBD, Common bile duct.

Risk factors of post-ES bleeding

TABLE 3. RISK FACTORS FOR HEMORRHAGE AFTER SPHINCTEROTOMY IN THE UNIVARIATE AND MULTIVARIATE ANALYSES.*

RISK FACTOR	PATIENTS WITH HEMORRHAGE (N = 48)	ALL PATIENTS (N = 2347)	UNIVARIATE P VALUE	ADJUSTED ODDS RATIO (95% CI)†
Significant in the multivariate analysis				
Coagulopathy before procedure — no. (%)‡	10 (21)	120 (5)	<0.001	3.32 (1.54–7.18)
Anticoagulation within 3 days after procedure — no. (%)§	4 (8)	37 (2)	<0.001	5.11 (1.57–16.68)
Cholangitis before procedure — no. (%)	17 (35)	339 (14)	<0.001	2.59 (1.38–4.86)
Mean case volume of endoscopist ≤ 1 /wk — no. (%)	35 (73)	1189 (51)	0.002	2.17 (1.12–4.17)
Bleeding during procedure — no. (%)¶	23 (48)	678 (29)	0.004	1.74 (1.15–2.65)
Significant in the univariate analysis only				
Cirrhosis — no. (%)	5 (10)	73 (3)	0.003	
Stone as indication for procedure — no. (%)	41 (85)	1600 (68)	0.01	
Periampullary diverticulum — no. (%)	14 (29)	382 (16)	0.02	
Distal bile-duct diameter — mm	10.7 \pm 5.5	9.3 \pm 4.4	0.03	
Not significant				
Extension of previous sphincterotomy — no. (%)	3 (6)	101 (4)	0.50	
Ampullary tumor — no. (%)	1 (2)	36 (2)	0.75	
Length of incision — mm	10.0 \pm 3.0	9.9 \pm 3.7	0.82	
Aspirin or NSAID use within 3 days — no. (%)	6 (12)	292 (12)	0.99	

*Only risk factors with P values below 0.05 in the univariate analysis were included in the multivariate analysis. Numbers and percentages of patients and means are based on available data. Data were missing for more than 10 patients for the following variables: bile-duct diameter (missing in 73 cases), length of incision (missing in 36 cases), and bleeding at the time of the procedure (missing in 32 cases). Plus-minus values are means \pm SD.

†Odds ratios have been adjusted for the effect of the other variables in the model. CI denotes confidence interval.

‡Coagulopathy was defined as a partial-thromboplastin or prothrombin time more than two seconds above the normal value, a platelet count of <80,000 per cubic millimeter, or ongoing hemodialysis.

§Anticoagulation consisted of oral warfarin or intravenous heparin therapy.

¶This category includes patients with any bleeding observed endoscopically during sphincterotomy, ranging from self-limited oozing to severe bleeding requiring immediate endoscopic hemostasis.

||This category includes patients who received aspirin or a nonsteroidal antiinflammatory drug (NSAID) within three days before or after sphincterotomy.

Risk factors of post-ES bleeding

TABLE 3. RISK FACTORS FOR HEMORRHAGE AFTER SPHINCTEROTOMY IN THE UNIVARIATE AND MULTIVARIATE ANALYSES.*

RISK FACTOR	PATIENTS WITH HEMORRHAGE (N=48)	ALL PATIENTS (N=2347)	UNIVARIATE P VALUE	ADJUSTED ODDS RATIO (95% CI)†
Significant in the multivariate analysis				
Coagulopathy before procedure — no. (%)‡	10 (21)	120 (5)	<0.001	3.32 (1.54–7.18)
Anticoagulation within 3 days after procedure — no. (%)§	4 (8)	37 (2)	<0.001	5.11 (1.57–16.68)
Cholangitis before procedure — no. (%)	17 (35)	339 (14)	<0.001	2.59 (1.38–4.86)
Mean case volume of endoscopist $\leq 1/\text{wk}$ — no. (%)	35 (73)	1189 (51)	0.002	2.17 (1.12–4.17)
Bleeding during procedure — no. (%)¶	23 (48)	678 (29)	0.004	1.74 (1.15–2.65)
Significant in the univariate analysis only				
Cirrhosis — no. (%)	5 (10)	73 (3)	0.003	
Stone as indication for procedure — no. (%)	41 (85)	1600 (68)	0.01	
Periampullary diverticulum — no. (%)	14 (29)	382 (16)	0.02	
Distal bile-duct diameter — mm	10.7 \pm 5.5	9.3 \pm 4.4	0.03	
Not significant				
Extension of previous sphincterotomy — no. (%)	3 (6)	101 (4)	0.50	
Ampullary tumor — no. (%)	1 (2)	36 (2)	0.75	
Length of incision — mm	10.0 \pm 3.0	9.9 \pm 3.7	0.82	
Aspirin or NSAID use within 3 days — no. (%)	6 (12)	292 (12)	0.99	

*Only risk factors with P values below 0.05 in the univariate analysis were included in the multivariate analysis. Numbers and percentages of patients and means are based on available data. Data were missing for more than 10 patients for the following variables: bile-duct diameter (missing in 73 cases), length of incision (missing in 36 cases), and bleeding at the time of the procedure (missing in 32 cases). Plus-minus values are means \pm SD.

†Odds ratios have been adjusted for the effect of the other variables in the model. CI denotes confidence interval.

‡Coagulopathy was defined as a partial-thromboplastin or prothrombin time more than two seconds above the normal value, a platelet count of $< 80,000$ per cubic millimeter, or ongoing hemodialysis.

§Anticoagulation consisted of oral warfarin or intravenous heparin therapy.

¶This category includes patients with any bleeding observed endoscopically during sphincterotomy, ranging from self-limited oozing to severe bleeding requiring immediate endoscopic hemostasis.

||This category includes patients who received aspirin or a nonsteroidal antiinflammatory drug (NSAID) within three days before or after sphincterotomy.

Precut sphincterotomy

Risk factors of post-ES bleeding

Patient factors

Risk factors of post-ES bleeding

Patiënt factors

Anatomical factors

Risk factors of post-ES bleeding


Patiënt factors

Anatomical factors

Technical factors


Prevention of post-ES bleeding

Technical factors

- Lower case volume
- Zipper cuts
- Pure cutting  blended current
- Precut sphincterotomy

Prevention of post-ES bleeding

Technical factors

- Lower case volume
- Zipper cuts
- Pure cutting  blended current
- Precut sphincterotomy
- Balloon sphincteroplasty decreases risk

Prevention of post-ES bleeding

Anatomical factors

- Peri-ampullary diverticula
- Ampullary tumor

Prevention of post-ES bleeding

Patient factors

- Renal impairment (multifactorial)
- Cirrhotic patients (Child C)
- Platelet count < 50.000 & INR ≥ 1.5
- Anti-coagulation therapy

ASGE Guidelines : Management of antithrombotic agents for endoscopic procedures
Gastrointest Endosc; Nov 2009; 70(6):1060-70

Prevention of post-ES bleeding

TABLE 3. Procedure risk for bleeding

Higher-risk procedures

Polypectomy
Biliary or pancreatic sphincterotomy
Pneumatic or bougie dilation
PEG placement
Therapeutic balloon-assisted enteroscopy
EUS with FNA
Endoscopic hemostasis
Tumor ablation by any technique
Cystogastrostomy
Treatment of varices

Low-risk procedures

Diagnostic (EGD, colonoscopy, flexible sigmoidoscopy) including biopsy
ERCP without sphincterotomy
EUS without FNA
Enteroscopy and diagnostic balloon-assisted enteroscopy
Capsule endoscopy
Enteral stent deployment (without dilation)

Prevention of post-ES bleeding

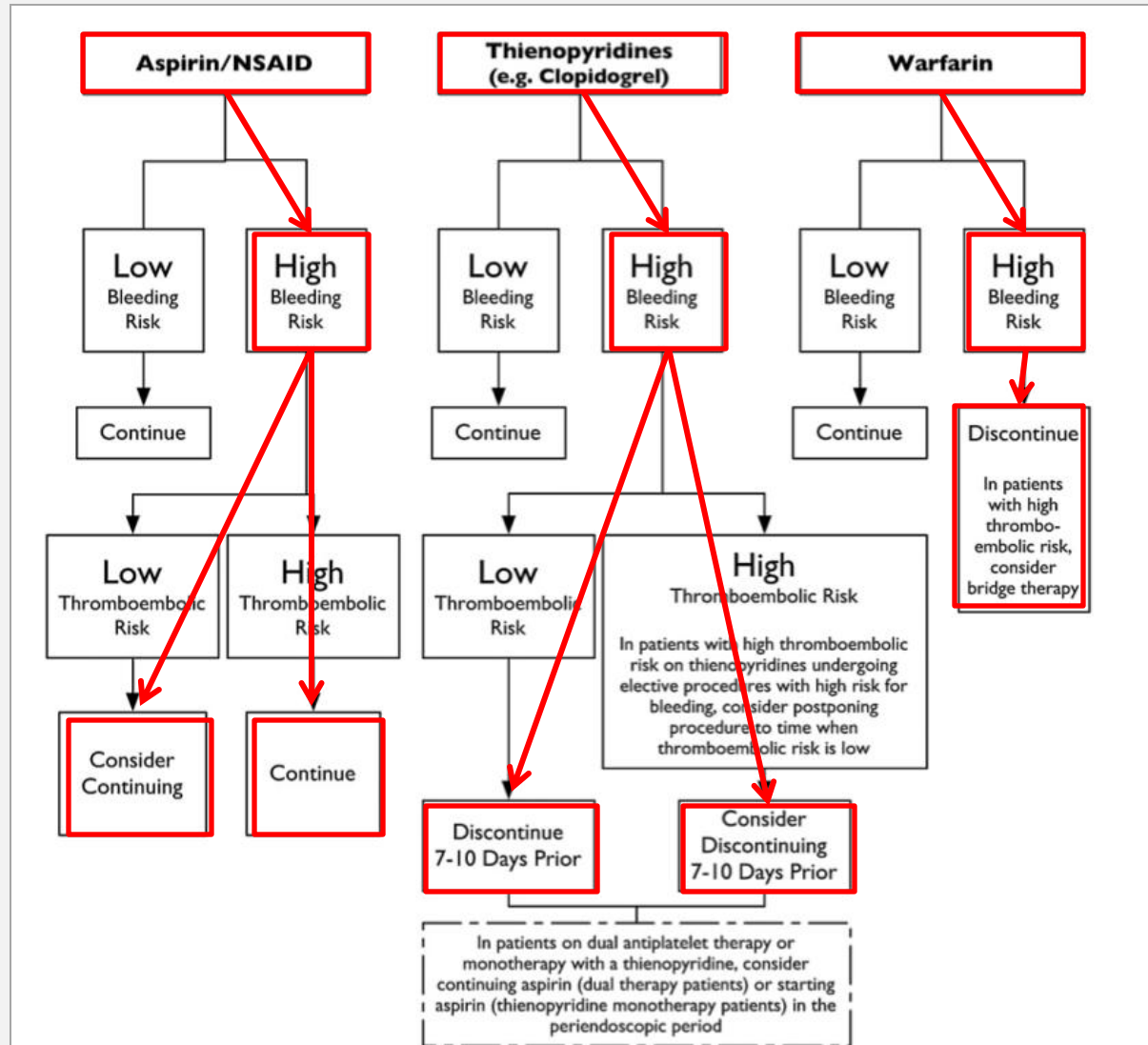


Figure 1. Management of antithrombotic agents in the elective endoscopic setting.

Prevention of post-ES bleeding

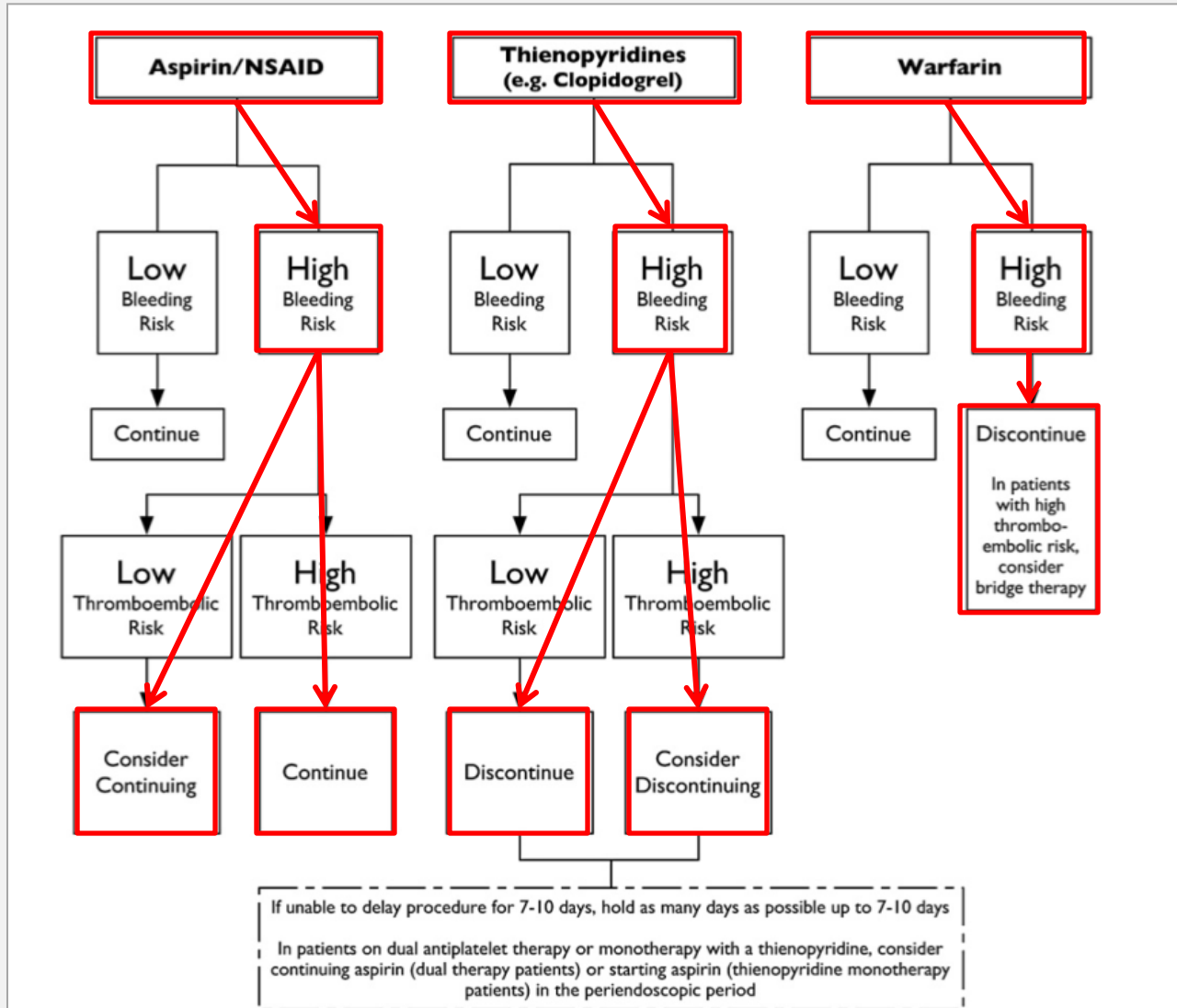


Figure 2. Management of antithrombotic agents in the urgent endoscopic setting.

Treatment of post-ES bleeding

- Most post-ES bleeding stops spontaneously
- Endoscopic treatment reserved for :
 - Endoscopically significant immediate bleeding
 - Clinically significant delayed bleeding

Treatment of post-ES bleeding

1. Medical therapy
2. Injection therapy
3. Thermal therapy
4. Mechanical therapy
5. Angiographic therapy
6. Surgical therapy

Treatment of post-ES bleeding

Medical therapy

- Prompt & appropriate resuscitation
- Management of co-morbid conditions
- Transfusion if necessary
- Supportive care
- Reversal of coagulopathy (platelet transfusion, vit.K, FFP, ...)

Treatment of post-ES bleeding

Injection therapy

- Diluted 1:10.000 epinephrine (1 – 30cc)
- Injected in the apex of the sphincterotomy
- Monotherapy is sufficient (← PUD)

Treatment of post-ES bleeding

Thermal therapy

- Bipolar or heater probe
- Settings identical as for PUD
- Avoid application to pancreatic orifice
- (Argon Plasma Coagulation (APC))

Treatment of post-ES bleeding

Mechanical therapy

- Endoclip
- Technically difficult with side-viewing endoscopes

Treatment of post-ES bleeding

Angiographic therapy

VAN NEUWENHOVE HILDA
ID:250111GM
DoB:1925-01-11
2009-12-16
15:35:11
Serie : 10
Beeldnr. : 7
0910177301



OLV-ZH Campus AALST
FLUOROSPOT H



C: 145
W: 98

VAN NEUWENHOVE HILDA
ID:250111GM
DoB:1925-01-11
2009-12-16
15:45:42
Serie : 12
Beeldnr. : 8
0910177301



OLV-ZH Campus AALST
FLUOROSPOT H



C: 145
W: 98

Treatment of post-ES bleeding

Surgical therapy

Less than 0.1%

Treatment of post-ES bleeding

Which technique to choose?

1. Most readily available method
2. Personal preference & experience
3. Difficult to locate active bleeding site : epinephrine inj.
4. Clinically severe bleeding : combination therapy (?)
5. Stigmata seen on initial endoscopic evaluation
6. Continued bleeding after monotherapy requires additional bimodal therapy