EASL CONGRESS
Barcelona Spain 27–30 May 2026

Management of anticoagulation in patients with cirrhosis undergoing invasive procedures

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CRI CENTRE DE RECHERCHE SUR L'INFLAMMATION

Vessels in Liver Diseases

Agenda

1. What factors should we take into account?

2. Elective invasive procedures

3. Emergency procedure

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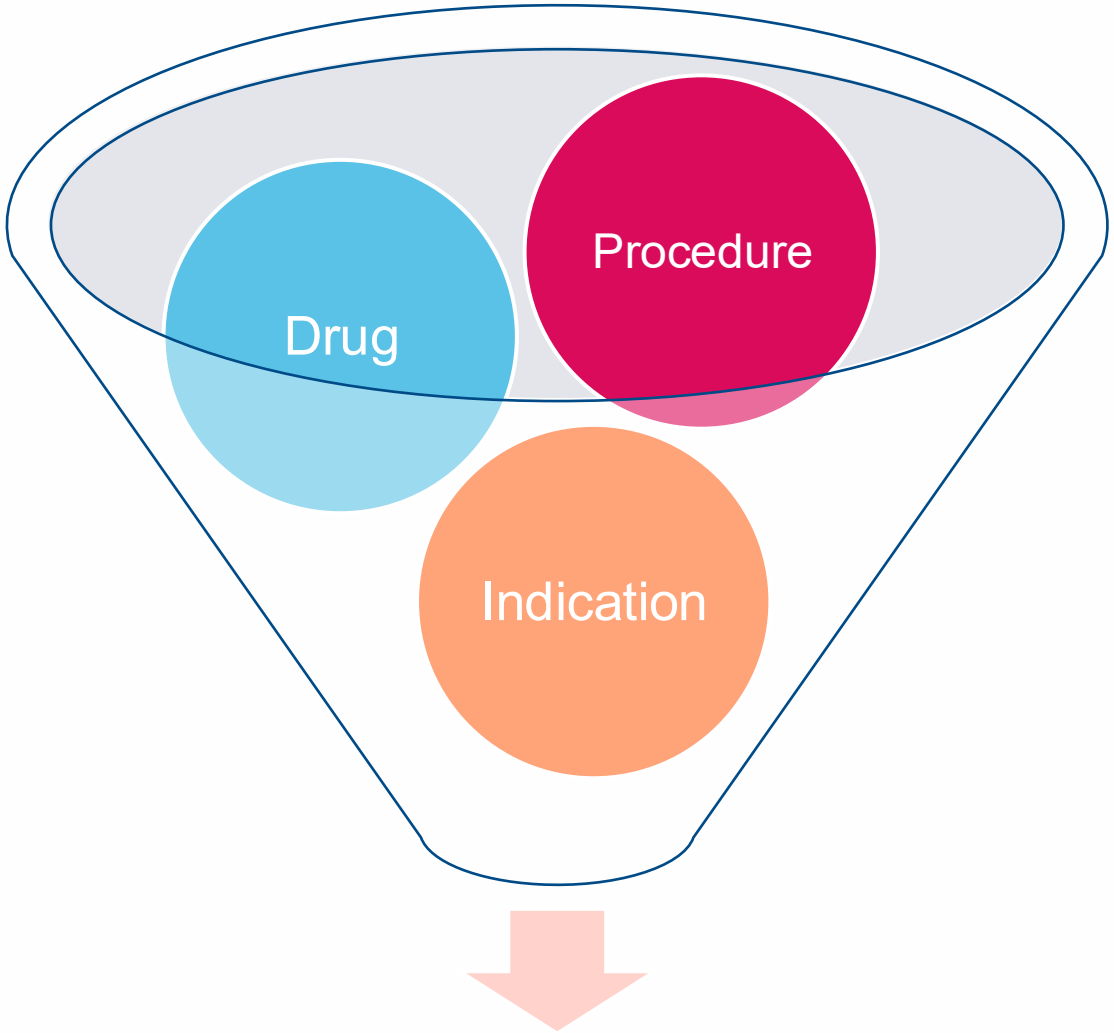
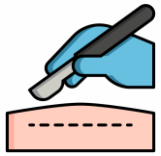
What factors to take into account ?





The procedure : classification in patients with cirrhosis

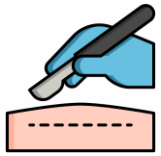
Low risk
- ✓ diagnostic procedures
- ✓ Central line removal/changes
- ✓ Transjugular liver biopsy
- ✓ Dental cleaning

High risk
- ✓ interventional endoscopy
- ✓ percutaneous biopsies
- ✓ central nervous system

Low risk: bleeding is
- Uncommon
- Not severe
- Easily controlled
- Local hemostasis possible

Otherwise: High risk

Riescher *et al.*, JHEP Rep 2023,



The procedure : degree of emergency

Elective	Weeks	*ex: hip replacement*
Emergency	Hours	*appendicectomy*
Urgent	Minutes	*Central venous catheter in septic shock*

Can we differ the intervention?

The indication for anticoagulation

What is the risk of thrombosis if anticoagulation is interrupted?

High

Mecanic heart valve

VTE < 3 months

Atrial fibrillation and history of stroke

Low

VTE > 3 months

Atrial fibrillation w/o history of stroke

(very) low

Portal vein thrombosis

The drug: Pharmacokinetics of oral anticoagulant

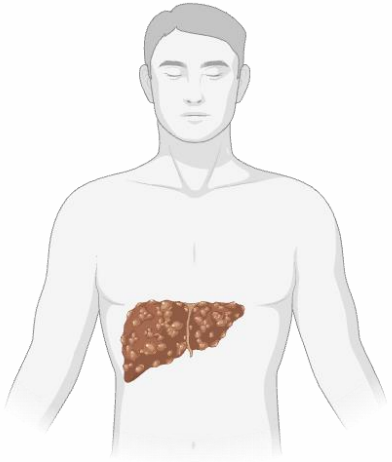
« It is safer to perform the procedure when the concentration is low »

	Half-life	Peak onset of action	Renal clearance
VKA	40 hours	5 days	negligible
Apixaban	9 hours	1-4 hours	25%
Rivaroxaban	8 hours	2-4 hours	35%
Dabigatran	15 hours	2 hours	80%
Edoxaban	10-14 hours	1-2 hours	50%

Parasmampuria Clin Pharmacokinetik 2015; Browne Curr Urology 2018

What factors to take into account ?

Patient



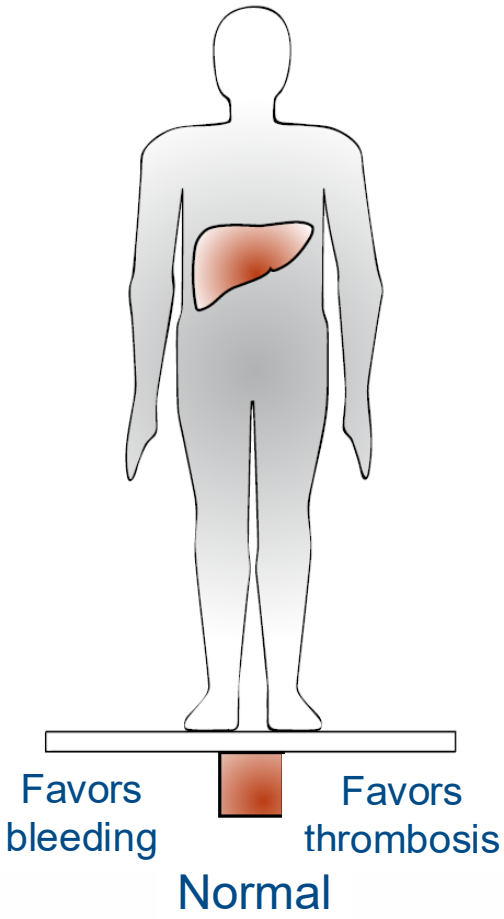
Type of AC

Procedure

Indication

Management

Fragile haemostatic balance in cirrhosis

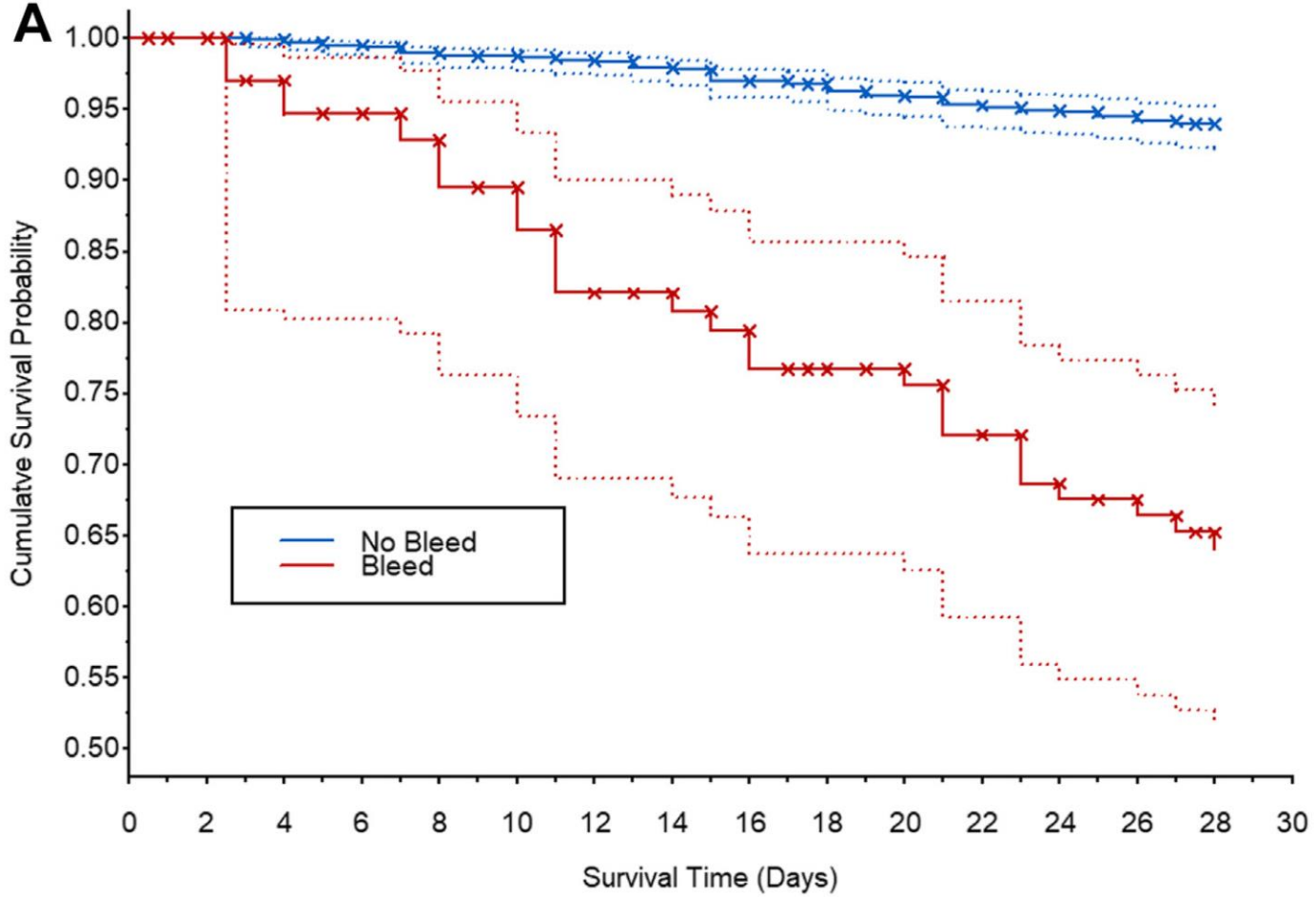


Courtesy of Pierre-Emmanuel Rautou

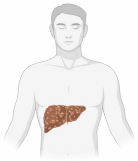
Rautou, CGH *2023*

Procedural bleeding : poor survival

PROC-BLeeD study : 1187 patients (3006 procedures)
2.3 % major bleeding



Intagliata, Gastroenterology 2022

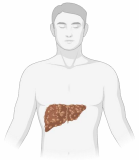


Factors associated with procedural bleeding and mortality

	Bleeding	Mortality
MELD	✓	✓ *(MELD ≥ 25)*
Kidney injury *(Acute or chronic)*	✓	✓
BMI	✓	X
Age	X	✓ *(over 65 years)*

Advanced cirrhosis : benefit-risk balance?
Acute decompensation : Differ the intervention ?

Hung Liver int 2018, Intagliata Gastroenterology 2022



Should we correct coagulation abnormalities ?

	EASL CPG 2022
INR	Do not correct
Platelets ≥ 50 x 10^9/L <50 x 10^9/L	Do not correct *High-risk procedure / no local hemostasis : correction possible*
Fibrinogen	Do not correct

- Reflect the severity
- Baseline status
- Guidance if bleeding

Rautou CGH 2023, EASL CPG

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Elective procedure : management of anticoagulation

Low risk procedure

Anticoagulation can be maintained

Vitamin K antagonist
- Measure INR
- No surdosage

DOACs
- No drug measurement
- Omit Day -1 *(Day -2 if renal failure)*
- Resume Day +1

PAUSE study: 1 day omission of anticoagulation

- 3007 patients with AF treated with DOACs, elective intervention
- Low-risk intervention : n=2000

	Apixaban n=857	Rivaroxaban n=709	Dabigatran n=440
Preoperative omission, days	1 (1-1)	1 (1-1)	1 (1-1)
Postoperative resumption, days	1 (1-1)	1 (1-1)	1 (1-1)
Major bleeding	0.59%	1.27%	0.91%
Thrombotic events	0.16%	0.37%	0.60%

Douketis JAMA intern med 2019

Elective procedure : management of anticoagulation

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High-risk procedure

Indication of anticoagulation

Low risk of thrombosis

No Bridging

Temporary discontinuation
VKA 5 days; DOAC : 48 h*

**72 hours if dabigatran or renal failure*

Groupe d'Intérêt en Hémostase Péri-opératoire (GIHP) 2026; Keeling BJH 2016

Low risk of thrombosis : no bridging

Randomized controlled study
1884 patients with atrial fibrillation

	VKA-LMWH bridging n=934	VKA-placebo bridging n=950	P
Arterial events	0.3%	0.4%	NS
Major bleeding	3.2%	1.3%	0.005

Douketis , NEJM 2015

Elective procedure : management of anticoagulation

High-risk procedure

Indication of anticoagulation

Low risk of thrombosis

No Bridging

Temporary discontinuation

High risk of thrombosis

Differ intervention +++

Not possible : bridging

Groupe d'Intérêt en Hémostase Péri-opératoire (GIHP) 2026; Keeling BJH 2016

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Emergency procedures : vitamin K antagonists

- Drug measurement : INR

👍 Safety threshold 1.5

- Reversal

Procedure can wait for 6-8 hours → Intra-venous vitamin K1

Procedure cannot wait → Vitamin K1 (IV or oral)
Four-factor Prothrombin complex concentrate

Groupe d'Intérêt en Hémostase Péri-opératoire (GIHP) 2026; Keeling BJH 2016

Emergency procedures : DOACs

Calibrated assays	Not reimbursed
• antiXa (apixaban or rivaroxaban) • Thrombin time (dabigatran)	Variability Interpret with caution

Safety threshold 50 ng/ml

GIHP 2024, Brakta JTH 2022, Kitchen Br J Haemostasis 2014, Keeling Br J Haemostasis 2016

DOACs : reversal agents

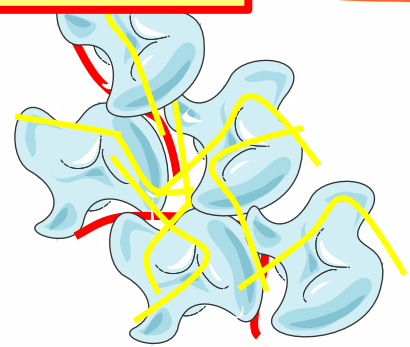
Andexanet

Not available everywhere
Safety concerns (thrombosis)

Rivaroxaban (Xarelto®)
Apixaban (Eliquis®)
Edoxaban (Lixiana®)

Dabigatran (Pradaxa®)

Idarucizumab (Praxbind®)



FXa

Thrombine

Fibrine

Fibrinogen

Connolly, N Engl J Med 2016; Pollack, N Engl J Med 2015, Connolly N Engl J Med 2024

Emergency procedures : DOACs

Low risk procedure

High-risk procedure

Bleeding events can be fatal

Concentration < 50 ng/mL

Concentration ≥ 50 ng/mL

Procedure can be safely performed

Bleeding events are rare

Dabigatran : Idarucizumab
Other: Prothrombin complex concentrate

Differ whenever possible

Godon Thrombosis research 2022; Groupe d'Intérêt en Hémostase Péri-opératoire (GIHP) 2024; Levy JTH 2024

Key messages

1. **In patients with cirrhosis,** procedural bleeding is mainly related to the severity of cirrhosis and comorbidities

2. **Elective procedure :** no bridging in most cases (incl. portal vein thrombosis), temporary discontinuation

3. **Emergency procedure :** try to wait as much as possible, reversal of anticoagulation when no other option

Thank you

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