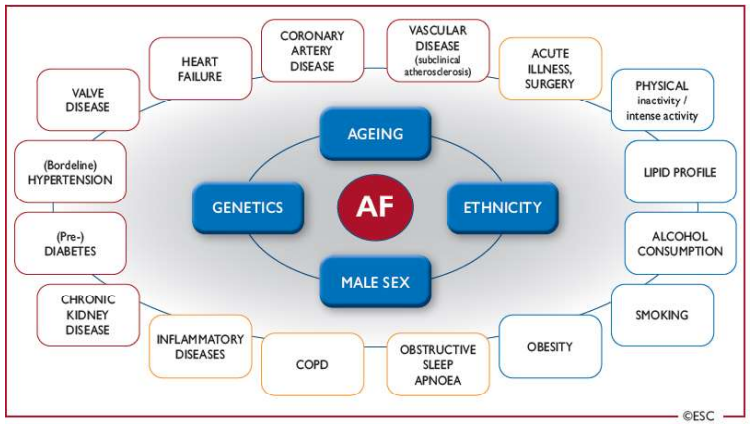
VHF und PCI: OAK, NOAK, Duale oder Triple Therapie: Was für welchen Patienten?

PD Dr. med. Gabor Sütsch

Figure 3 Summary of risk factors for incident AF



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2020 ESC Guidelines for the diagnosis and management of atrial fibrillation (European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

Advances in Medical Sciences
Volume 63, Issue 1, March 2018, Pages 30-35

Review article

Patients with atrial fibrillation and coronary artery disease – Double trouble

Ewelina Michniewicz [a], Elżbieta Młodawska [a], Paulina Lopatowska [a], Anna Tomaszuk-Kazberuk [a], Jolanta Malyszko [b]

Coronary artery disease (CAD) is the **most common cardiovascular disease** while atrial fibrillation (AF) is the **most common** cardiac arrhythmia. Both diseases share associated risk factors – hypertension, diabetes mellitus, sleep apnea, obesity and smoking. Moreover, inflammation plays a causative role in both diseases. ***The prevalence of CAD in patients with AF is from 17% to 46.5%*** while the ***prevalence of AF among patients with CAD is low and it is estimated from 0.2% to 5%.*** AF is a well-established factor of poor short- and long-term prognosis in patients with acute myocardial infarction (AMI) and is associated with a marked increase in overall mortality.

The arrhythmia is common after cardiac surgeries and occurs in about 20 to 40% of patients after coronary artery bypass graft (CABG) surgery. It is predicted that between 5 and 15% of AF patients will require stenting at some point in their lives and will receive triple therapy with aspirin, clopidogrel or ticagrelor and oral anticoagulation (OAC).

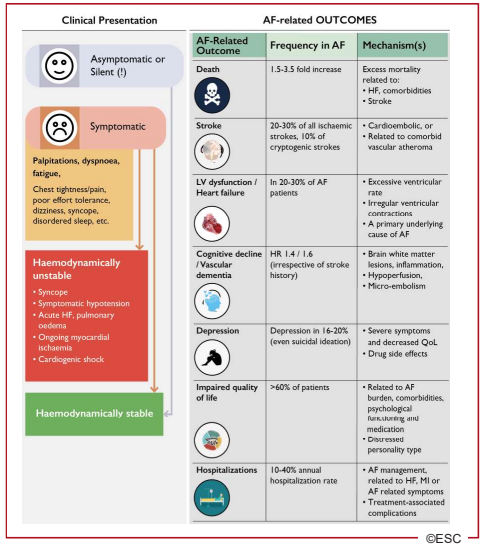

Figure 4 Clinical presentation of AF and AF-related outcomes

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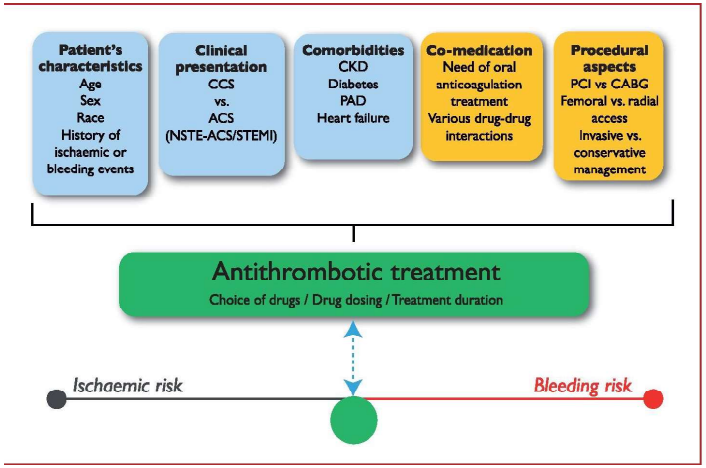
2020 ESC Guidelines for the diagnosis and management of atrial fibrillation (European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

Patients with atrial fibrillation and coronary artery disease

- The combination of AF and CAD is not only a common clinical scenario, it is also a complex setting to combine anticoagulation and antiplatelet therapy.
- AF patients with relevant CAD have at least a CHA_2DS_2-VASc score of 1 (and mostly higher due to the presence of other cardiovascular risk factors) and hence an indication for OAC.
- The convention is that a period of DAPT (i.e. aspirin and a $P2Y_{12}$ inhibitor) is necessary to prevent stent thrombosis or recurrent events after an ACS and/or stenting for CAD—but that this is not sufficient for stroke prevention.
- Conversely, NOACs are essential for stroke prevention but on their own insufficient for preventing new coronary events in the immediate phase after ACS or stenting. The choice of antithrombotic drug combinations therefore represents a demanding clinical task: **too little and risk a coronary event and/or stroke, too much and risk a bleeding event.**

Determinants of antithrombotic treatment in coronary artery disease.



Eur Heart J, Volume 42, Issue 14, 7 April 2021, Pages 1289–1367

Table 9 factors for bleeding with OAC and antiplatelet therapy

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Non-modifiable	Potentially modifiable	Modifiable	Biomarkers
Age >65 years	Extreme frailty ± excessive risk of falls[a]	Hypertension/elevate SBP	GDF-15
Previous major bleeding	Anaemia	Concomitant antiplatelet/NSAID	Cystatin C / CKD-EPI
Severe renal impairment (on dialysis or renal transplant)	Reduced platelet count or function	Excessive alcohol intake	cTnT-hs
Severe hepatic dysfunction (cirrhosis)	Renal impairment with CrCl <60 mL/min	Non-adherence to OAC	Von Willebrand factor (+ other coagulation markers)
Malignancy	VKA management strategy[b]	Hazardous hobbies / occupations	
Genetic factors (e.g., CYP 2C9 polymorphisms)		Bridging therapy with heparin	
Previous stroke, small-vessel disease, etc.		INR control (target 2.0–3.0), target TTR >70%[c]	
Diabetes mellitus		Appropriate choice of OAC and correct dosing[d]	
Cognitive impairment/dementia			

[a]Walking aids; appropriate footwear; home review to remove trip hazards; neurological assessment where appropriate. [b]Increased INR monitoring, dedicated OAC clinicals, self-monitoring/self-management, educational/behavioural interventions. [c]For patients receiving VKA treatment. [d]Dose adaptation based on patient's age, body weight, and serum creatinine level.

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2020 ESC Guidelines for the diagnosis and management of atrial fibrillation (European Heart Journal 2020-doi/10.1093/eurheartj/ehaa612)

Typical situation

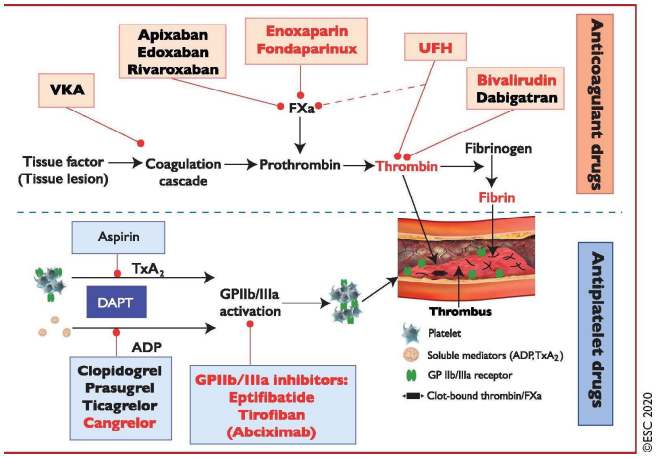
- A 68-years old patient undergoes elective coronary artery stenting on January 1st 2021. He is discharged on aspirin and clopidogrel. Uneventful interval. LV-EF is normal.
- Arterial hypertension, prediabetes, hypercholesterolemia
- On July 1st, 2021, he is diagnosed with new onset AF.
- It was determined to administer long-term OAC (CHA_2DS_2-VASc-Score >3)
- Strategy?
- Aspirin was stopped, and the patient is treated with OAC plus clopidogrel for one year
- At that time antithrombotic therapy will be re-evaluated.

2021 European Heart Rhythm Association Practical Guide on the Use of Non-Vitamin K Antagonist Oral Anticoagulants in Patients with Atrial Fibrillation

Jan Steffel, Ronan Collins, Matthias Antz, Pieter Cornu, Lien Desteghe, Karl Georg Haeusler, Jonas Oldgren, Holger Reinecke, Vanessa Roldan-Schilling, Nigel Rowell, Peter Sinnaeve, Thomas Vanassche, Tatjana Potpara, A. John Camm, and Hein Heidbüchel

EP Europace, Volume 23, Issue 10, October 2021, Pages 1612–1676
https://doi.org/10.1093/europace/euab065
Published:
25 April 2021

Pharmacological targets for antithrombotic treatments



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NOACs vs. VKA in dual vs. triple therapy (1)

- Four dedicated prospective RCTs have addressed the issue of using a NOAC or VKA in a variety of combinations with antiplatelet agents to reduce bleeding events after PCI and/or an ACS in patients with AF.
- In essence, these trials focused on bleeding as the primary endpoint, with coronary events and stroke as important secondary outcomes.
- On aggregate, these studies showed that dual therapy with a NOAC plus a P2Y12 inhibitor reduced the risk of bleeding compared to triple therapy with VKA, aspirin and a P2Y12 inhibitor (mostly clopidogrel).
- This bleeding risk reduction appeared to be driven by both receiving a NOAC instead of VKA as well as by omitting aspirin, and this benefit was also observed in medically managed ACS/PCI patients with AF

NOAC dosing in AF patients post-ACS/PCI

	Standard dose	Comments/dose reduction
Apixaban[244]	5 mg BID	Dose reduction as for SPAF
Dabigatran[247]	150 mg BID or 110 mg BID	110mg as for SPAF[403]
Edoxaban[245]	60 mg QD	Dose reduction as for SPAF
Rivaroxaban[246]	15 mg QD	Dose reduction to 10 mg QD if CrCl 30–49 mL/min

In addition to single/dual antiplatelet therapy, where applicable.
BID, twice daily; CrCl, creatinine clearance; QD, once daily; SPAF, stroke prevention in atrial fibrillation.

Choice of anticoagulant therapy and initiation

Indication for anticoagulation and choice between VKA and NOAC

- After the indication for OAC is established, **NOACs are preferred** over VKAs in all NOAC-eligible AF patients
- When starting a NOAC, **knowledge of current kidney and liver function** is required as all NOACs are eliminated to some extent via the kidneys, and renal function affects NOAC dosing. Importantly, kidney function should be assessed using the Cockcroft–Gault formula as it was used in the four pivotal phase III trial. Indeed, use of other formulas including 'Modification of Diet in Renal Disease' (MDRD) and 'Chronic Kidney Disease—Epidemiology Collaboration' (CKD-EPI) may overestimate kidney function particularly in older patients and in those with low body weights.
- A **baseline haematological** profile should be obtained for reference during future follow-up.
- **Bleeding risk**, as estimated using the HAS-BLED score, **is not in itself a reason to deny OAC** to AF patients at risk of stroke or reduce the dose of the NOAC. Instead, particularly patients at high bleeding risk (e.g. HAS-BLED ≥3) should have their modifiable bleeding risk factors identified and addressed, and should be scheduled for an earlier and more frequent clinical follow-up.
- Similarly, **frailty, cognitive decline and risk of falling** should not generally be a reason not to anticoagulate patients. Care needs to be taken to minimize the risk of falling and to ensure optimal compliance and adherence. This topic is dealt with in detail in the 'NOACs in advanced age and frailty' section.

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Initiation and structured follow-up of patients on NOACs

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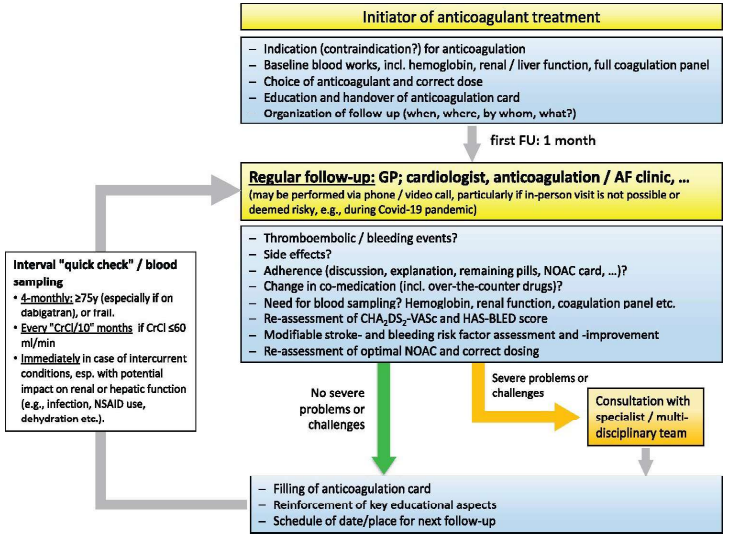

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Absorption and metabolism of the different NOACs

	Dabigatran[106,376]	Apixaban[517]	Edoxaban[518]	Rivaroxaban[519,520]
Bioavailability	3–7%	50%	62%	15 mg/20 mg: 66% without food, 100% with food
Prodrug	Yes	No	No	No
Clearance non-renal/renal of absorbed dose	20%/80%	73%/27%	50%/50%	65%/35%
Plasma protein binding	35%	87%	55%	95%
Dialysability	50–60%	14%	NA	NA
	(In part dialysable)	(Not dialysable)	(Not dialysable)	(Not dialysable)
Metabolism	Glucoronic acid conjugation	CYP3A4 (25%), CYP1A2, CYP2J2, CYP2C8, CYP2C9 CYP2C19	CYP3A4 (<4% of elimination)	CYP2A4 (18%)[519], CYP2J2
Absorption with food	No effect	No effect	6–22% more; minimal effect on exposure	+39% more (see above)
Absorption with H2B/PPI	−12% to 30% (not clinically relevant)	No effect	No effect	No effect
Time to peak levels (h)	3	3	2–4	2–4
Elimination half-life (h)	12–17	12	10–14	5–9 (young) 11–13 h (elderly)

Use of NOACs according to renal function

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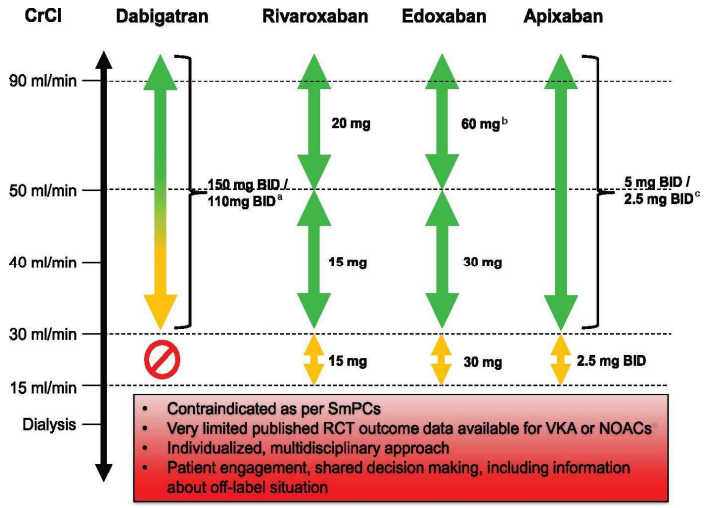

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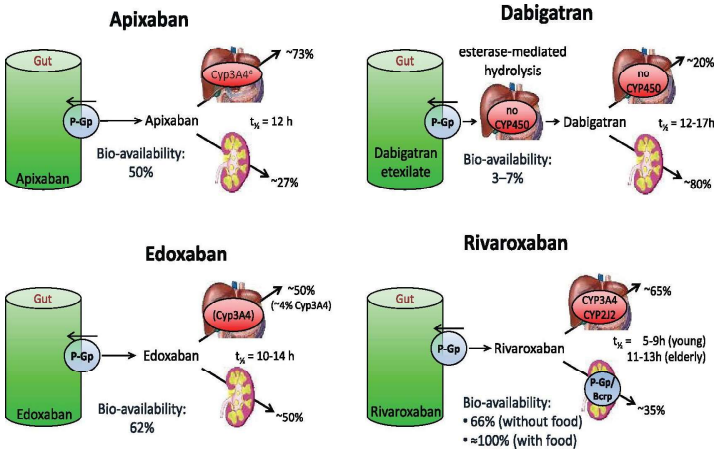
Absorption and metabolism of the different NOACs



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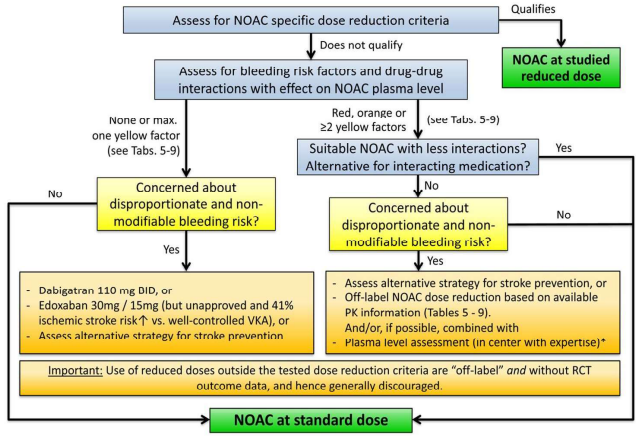
NOAC selection based on drug–drug interactions and/or risk of bleeding.



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Dosing Errors

Even in settings with optimal patient education dosing errors are common in daily practice, and patients need to be informed on what to do in such cases.

Missed dose

- A **forgotten dose** may be taken until half of the dosing interval has passed. Hence, for NOACs with **a twice daily** (*BID*) *dosing regimen* (i.e., intake every 12 h), a forgotten full dose can be taken up **until 6 h after the scheduled intake**. For NOACs with a **once daily** (*QD*) *dosing regimen*, a forgotten dose can be taken up **until 12 h after the scheduled intake**. After these time points, the dose should be skipped, and the next scheduled dose should be taken.

Double dose

- For NOACs with a *BID dosing regimen*, the next planned dose (i.e. after 12 h) **may be skipped**, with the regular BID dosing regimen restarted 24 h after the double dose intake.
- For NOACs with a *QD dosing regimen*, the patient should continue **the normal dosing regimen**, i.e. without skipping the next daily dose.

Dosing Errors

Uncertainty about dose intake

- For NOACs with a *BID dosing regimen*, it is generally advisable **to not take another** tablet/capsule, but to continue with the regular dose regimen, i.e. starting with the next dose at the 12 h interval.

- For NOACs with a *QD dosing regimen*, when **thromboembolic risk** is high (CHA_2DS_2-VASc ≥3), it may generally be advisable **to take another tablet** 6–8 h after the original (uncertain) intake and then continue the planned dose regimen. In case the thromboembolic risk is low (CHA_2DS_2-VASc ≤2) we advise **to wait** until the next scheduled dose.

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Choice of P2Y12 inhibitor

- In the 2020 ESC AF guidelines, the use of ticagrelor or prasugrel as part of a triple therapy regimen is discouraged.
- Ticagrelor increases bleeding risk in patients on dual therapy when compared to clopidogrel (RE-DUAL PCI trial).
- Although only few patients have been included with a P2Y12-inhibitor other than clopidogrel into the above-mentioned RCTs, the benefit in terms of reduced bleeding risk with NOAC-based dual therapy compared to VKA-based triple therapy appears to be maintained regardless of the type of P2Y12 inhibitor
- In post-ACS patients at high coronary thrombotic risk and low bleeding risk in whom otherwise a VKA- or NOAC-based triple therapy would be warranted, dual therapy with a NOAC plus ticagrelor could be considered instead. Further data, including dedicated RCTs, are warranted in this area. Indeed, up to 40% of patients on clopidogrel may reach insufficient platelet inhibition.

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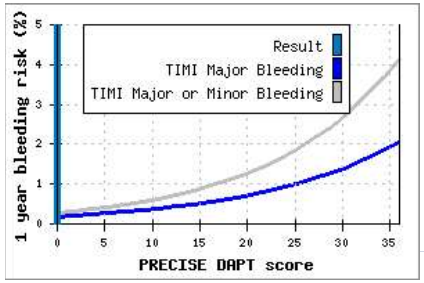
	PRECISE-DAPT-Score	DAPT-Score	
Score-Berechnung	Score-Nomogramm 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 Punkte ≥12,0 11,5 11,0 10,5 ≤10,0 Hämoglobin (g/dl) ≤5 8 10 12 14 16 18 ≥20 Leukozyten (x 10^3 Zellen/µl) ≤50 60 70 80 ≥90 Alter (Jahre) ≥100 80 60 40 20 0 Kreatinin-Clearance (ml/min) Nein Ja Frühere Blutung	Alter ≥ 75 65 bis < 75 < 65 Rauchen Diabetes mellitus ACS bei Präsentation Vorausgegangenes ACS oder PCI Paclitaxelfreisetzender Stent Stentdiameter < 3 mm Herzinsuffizienz oder LVEF < 30% Stent in Venenbypass	 −2 Punkte −1 Punkt 0 Punkte +1 Punkt +1 Punkt +1 Punkt +1 Punkt +1 Punkt +1 Punkt +1 Punkt +2 Punkte +2 Punkte
Score-Bereich	0 bis 100 Punkte	−2 bis 10 Punkte	
Cut-off-Werte	Score ≥ 25 → kurze DAPT Score < 25 → Standard-/lange DAPT	Score ≥ 2 → lange DAPT Score < 2 → Standard-DAPT	
Kalkulator	www.precisedaptscore.com	www.daptstudy.org	

Abbildung 1: Risikoscores, validiert für die Dauer der dualen antithrombozytären Therapie (DAPT; ACS: akutes Koronarsyndrom, PCI: perkutane Koronarintervention, LVEF: linksventrikuläre Ejektionsfraktion): Für die Berechnung des PRECISE-DAPT-Scores wird das Score-Nomogramm verwendet. Jeder Wert der 5 Variablen wird markiert, von der Markierung wird eine vertikale Linie zum Nomogramm gezogen und der entsprechende Wert bestimmt. Die Summe aller 5 Variablen ergibt den PRECISE-DAPT-Score (modifiziert nach Valgimigli et al. [2]).

PRECISE DAPT

PREdicting bleeding Complications In patients undergoing Stent implantation and subsEquent Dual Anti Platelet Therapy



- Haemoglobin Values collected in close proximity to the index procedure (es. 12 g/dL)
- Age (years)
- White blood cells Values collected in close proximity to the index procedure
- Creatinine Clearance (ml/min) Values collected in close proximity to the index procedure (es. 75 ml/min)
- Prior Bleeding History of spontaneous bleeding requiring medical attention

Risk criteria for extended treatment with a second antithrombotic agent

High thrombotic risk (Class IIa)	Moderate thrombotic risk (Class IIb)
Complex CAD and at least 1 criterion	**Non-complex CAD and at least 1 criterion**
Risk enhancers	
Diabetes mellitus requiring medication	Diabetes mellitus requiring medication
History of recurrent MI	History of recurrent MI
Any multivessel CAD	Polyvascular disease (CAD plus PAD)
Polyvascular disease (CAD plus PAD)	CKD with eGFR 15–59 mL/min/1.73 m^2
Premature (<45 years) or accelerated (new lesion within a 2-year time frame) CAD	
Concomitant systemic inflammatory disease (e.g. human immunodeficiency virus, systemic lupus erythematosus, chronic arthritis)	
CKD with eGFR 15–59 mL/min/1.73 m^2	
Technical aspects	
At least 3 stents implanted	
At least 3 lesions treated	
Total stent length >60 mm	
History of complex revascularization (left main, bifurcation stenting with ≥2 stents implanted, chronic total occlusion, stenting of last patent vessel)	
History of stent thrombosis on antiplatelet treatment	

Suggested strategies to reduce bleeding risk related to percutaneous coronary intervention

•Anticoagulant doses adjusted to body weight and renal function, especially in women and older patients

•Radial artery approach as default vascular access

•Proton pump inhibitors in patients on DAPT at higher-than-average risk of gastrointestinal bleeds (i.e. history of gastrointestinal ulcer/haemorrhage, anticoagulant therapy, chronic non-steroidal anti-inflammatory drugs/corticosteroid use, or two or more of:

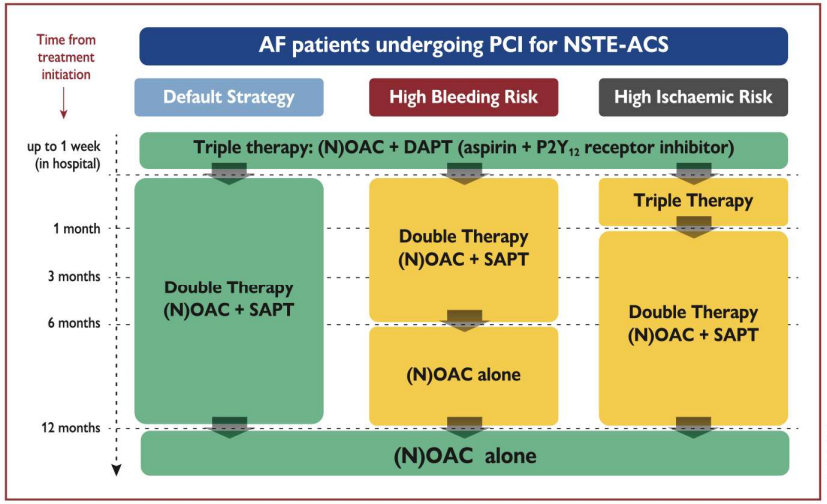
- Age ≥65 years
- Dyspepsia
- Gastro-oesophageal reflux disease
- *Helicobacter pylori* infection
- Chronic alcohol use

•In patients on OAC

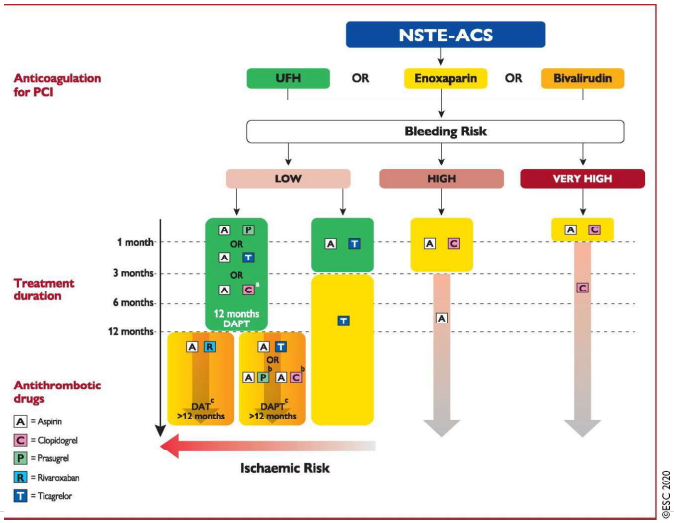
- PCI performed without interruption of VKAs or NOACs
  - In patients on VKAs, do not administer UFH if INR >2.5
  - In patients on NOACs, regardless of the timing of the last administration of NOACs, add low-dose parenteral anticoagulation (e.g. enoxaparin 0.5 mg/kg i.v. or UFH 60 IU/kg)

•Aspirin is indicated but avoid pre-treatment with $P2Y_{12}$ receptor inhibitors

Algorithm for antithrombotic therapy in non-ST-segment elevation acute coronary syndrome patients with atrial fibrillation undergoing percutaneous coronary intervention or medical management.



Algorithm for antithrombotic therapy in non-ST-segment elevation acute coronary syndrome patients without atrial fibrillation undergoing percutaneous coronary intervention.



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Duration of triple therapy after ACS/PCI

- According to the current 2020 ESC guidelines for AF as well as for non-ST-elevation acute coronary syndrome (NSTE-ACS), a short course of triple therapy is recommended for up to 1 week in all patients with AF **undergoing PCI**
- In **medically managed** NST-ACS patients, combination of a NOAC with only a single antiplatelet agent (preferably clopidogrel) is recommended from the event onwards
- However, the time frame of inclusion for the four aforementioned NOAC RCTs ranged from several hours after PCI up to >10 days. As such, a selection bias towards lower-risk patients cannot be excluded; furthermore, a variable course of triple therapy may have been given to a substantial number of patients subsequently randomized to NOAC-based dual therapy
- Finally, although bleeding events were consistently reduced across the four NOAC trials by NOAC-based dual therapy this did not translate into a reduction in all-cause mortality (as compared to VKA-based triple therapy). Therefore, a low threshold for prolonging triple therapy with DAPT and a NOAC up to 30 days may be advisable in patients **with a high athero-thrombotic risk**, including those **after a complex PCI** or with a **history of stent thrombosis**. In contrast, continuation of triple therapy beyond 30 days rarely seems warranted.

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NOAC use in frail patients

Very Fit	People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.
Well	People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.
Managing Well	People whose medical problems are well controlled but are not regularly active beyond routine walking.
Vulnerable	While not dependent on others for daily help, often symptoms limit activities. A common complaint is being "slowed up", and/or being tired during the day.
Mildly Frail	These people often have more evident slowing and need help in high order with ADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.
Moderately Frail	People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.
Severely Frail	Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).
Very Severely Frail	Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.
Terminally Ill	Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

The 'Canadian Study of Health and Aging' (CHSA) Clinical Frailty Scale, based on comprehensive geriatric assessment including structured interview

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NOACs in under- and overweight patients

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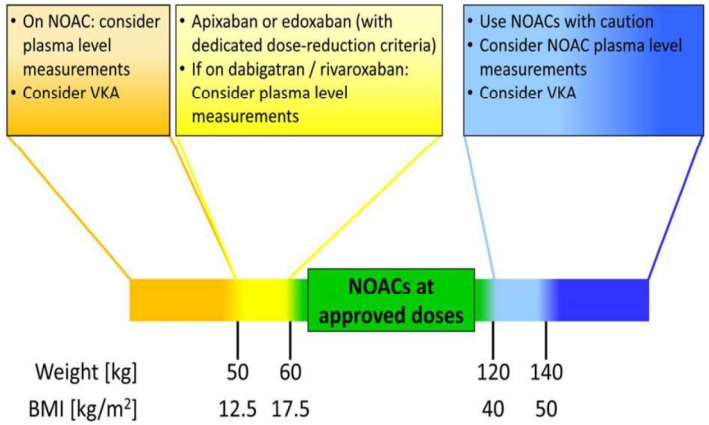

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NOACs in patients with thrombocytopenia

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1. Reason for thrombocytopenia?
- Decreased production (bone marrow disorder, liver disease)
- Chronic liver disease +/- hypersplenism
- Drug-induced (incl. HIT / HITT)
- Immune thrombocytopenia (ITP)
- Autoimmune disorders
- Others (incl. infection, alcohol, malignancy, pregnancy)

2. Platelet count and dynamics?

3. Bleeding risk?
- Recent major bleeding
- H/o hematopoietic stem cell transplant
- Coagulation abnormalities
- Platelet function defects
- General bleeding risk factors (e.g., HAS-BLED score)

< 20'000 / µl
- Avoid (N)OAC therapy
- Risk of spontaneous bleeding

20'000-50'000 / µl
- Proceed with great caution
- Very close clinical + platelet count monitoring
- Consider half-dose NOAC, esp. if ≥1 bleeding risk factor
- Multidisciplinary team evaluation

> 50'000 / µl
- Proceed with caution
- Close clinical + platelet count monitoring

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Management of bleeding in patients taking NOACs

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Bleeding while using a NOAC
- Inquire about NOAC, dose, and time of last intake
- Inquire about co-medication (including antiplatelets, NSAIDs, OTC drugs, ...)
- Blood sampling to determine creatinine (clearance), hepatic function, WBC
- **Rapid coagulation assessment, incl. plasma drug levels (if available)**

Mild bleeding
- Delay or discontinue next dose
- Reconsider concomitant medication
- Reconsider choice of NOAC & dosing

Non-life-threatening major bleeding

Supportive measures:
- Mechanical compression
- Endoscopic hemostasis if gastrointestinal bleed
- Surgical hemostasis
- Fluid replacement; RBC / platelet substitution
- Consider adjuvant tranexamic acid
- Treatment of factors / comorbidities contributing to bleeding

For dabigatran:
- Consider idarucizumab / hemodialysis (if idarucizumab is not available)

Life-threatening- or bleeding into critical site
- For dabigatran-treated patients: Idarucizumab 5g i.v.
- For FXa inhibitor -treated patients: Andexanet alpha (Dosing: See Fig. 10)

Otherwise, consider:
- PCC 50 U/kg; +25 U/kg if indicated
- aPCC 50 U/kg; max 200 U/kg/day

Post-bleeding management
- Discuss impact of bleeding on patient's consideration of risks and benefits of anticoagulation
- Assess risk of repeat bleeding
- Re-evaluate modifiable bleeding risk factors
- Review correct choice and dosing of NOAC

→ **Re-initiate anticoagulation in the absence of absolute contraindication (shared decision making).**

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Treatment of patients with chronic coronary syndrome

- The Japanese multi-centre, open-label 'Atrial Fibrillation and Ischemic Events with Rivaroxaban in Patients with Stable Coronary Artery Disease' (AFIRE) trial demonstrated that **continuing rivaroxaban 15 mg QD monotherapy** beyond 1 year after a revascularization procedure in AF patients **not only decreased the risk of ISTH bleeding** (primary safety outcome) but also demonstrated non-inferiority for the **primary composite endpoint of cardiovascular events** (stroke, systemic embolism, MI, unstable angina requiring revascularization) or death from any cause compared with the combination of rivaroxaban and antiplatelet therapy.

- Indeed, the trial was stopped prematurely due to an increased mortality in the combination therapy arm. Although it is formally unclear if these results translate to other NOACs, other doses, and other populations, these data suggest that most AF patients with chronic CAD should be transitioned to NOAC monotherapy without an antiplatelet agent as recommended in current ESC AF guidelines

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Acute management of elective PCI or ACS in AF patients treated with NOAC

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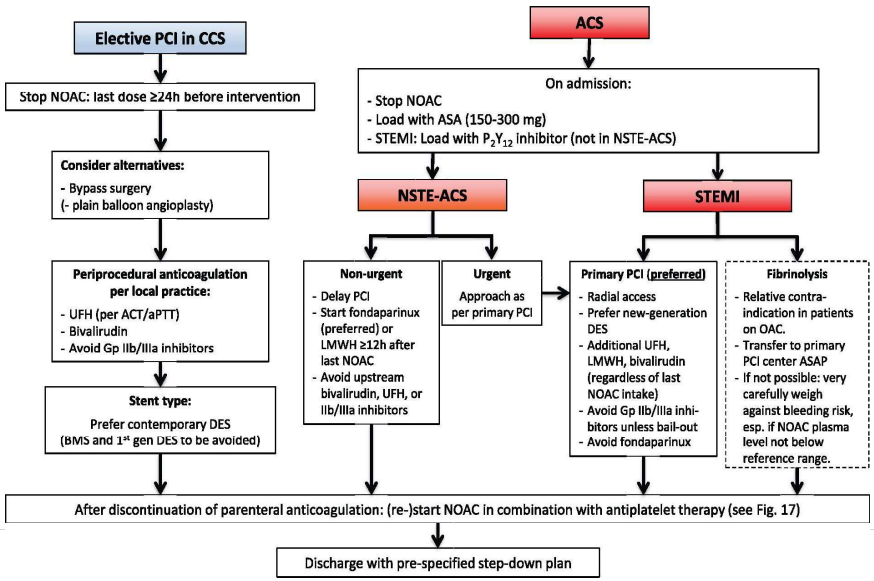

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Scenario 1: coronary interventions in atrial fibrillation patients on non-vitamin K antagonist oral anticoagulants (1)

- Performing a PCI (scheduled or not) under NOAC is different than under VKA for several reasons, and various aspects and uncertainties need to be taken into consideration, including:
  - timepoint of the last dose, adherence, and renal function;
  - variability in renal function in an acute setting;
  - singular factor II or Xa blockade vs. multifactor antagonism;
  - uncertainty about the extent of anticoagulation in the absence of established tests, and hence
  - uncertainty about stacking of additional periprocedural anticoagulants, etc.

- Temporary discontinuation of the short-acting NOACs may allow for safe initiation of antiplatelet therapy and standard local anticoagulation practices peri-procedurally.
- In contrast, NOACs should be continued in non-invasively managed ACS patients.

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Scenario 1: coronary interventions in atrial fibrillation patients on non-vitamin K antagonist oral anticoagulants (2)

- New-generation drug-eluting stents are preferred to shorten exposure to dual or triple therapy after the procedure but also to avoid the need for repeat interventions.

- Sole balloon angioplasty or bypass surgery should always be considered as an alternative in patients in need for chronic anticoagulation since they can reduce the need for long-term dual or triple therapy.

- There is no longer a reason to opt for a bare metal stent as a strategy to reduce DAPT duration.

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Scenario 2:
management of the patient with a recent acute coronary syndrome (<1 year) who develops new-onset atrial fibrillation

- ACS guidelines recommended DAPT for up to 1 year after the acute event in patients without indication for OAC, and high-risk patients might require an even longer DAPT duration.
- In high bleeding-risk ACS patients, however, current ESC guidelines allow for shorter DAPT durations (3–6 months).
- If AF develops during the first year after an ACS and there is an indication for anticoagulation, a NOAC should be started and the need for continuing DAPT should be carefully weighed against the increased bleeding risk. Beyond 1 month after the event, aspirin can be stopped in the majority of such patients as discussed above.

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Scenario 3:
a chronic coronary syndrome patient (acute coronary syndrome ≥1 year ago) develops atrial fibrillation

- Patients with a CCS **developing AF** should receive anticoagulation, depending on their CHA_2DS_2-VASc score (which per definition will be ≥1).
- A **NOAC without any antiplatelet agent** appears to be the preferred strategy for these patients as discussed above, based on the results of the four landmark NOAC trials (which included up to 15–20% of patients with a prior MI) and the 'Atrial Fibrillation and Ischaemic Events with Rivaroxaban in Patients with Stable Coronary Artery Disease' (AFIRE) trial.
- An additional antiplatelet agent should only be considered in individual patients with a **very high ischaemic** and **low bleeding risk**.

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Treatment of left ventricular thrombus after myocardial infarction in patients with atrial fibrillation

- In the absence of randomized studies, it **remains uncertain** whether a NOAC is effective in the treatment of left ventricular thrombi complicating a large infarction. One observational study suggests that NOACs were associated with a **higher incidence** of thromboembolic events compared to VKA in (mostly non-AF) patients with a left ventricular thrombus, while others showed a similar rate of thrombus resolution.
- Although residual confounding can never be excluded in these settings, **VKA should be viewed as standard of care** for the treatment of patients with LV thrombus until more data are available.
- **Only in very special situations** (e.g. no VKA monitoring possible, no stable INR despite maximal efforts, etc.) NOACs may be evaluated after clear communication and consent from the patient about the lack of data and the off-label situation.

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Summary

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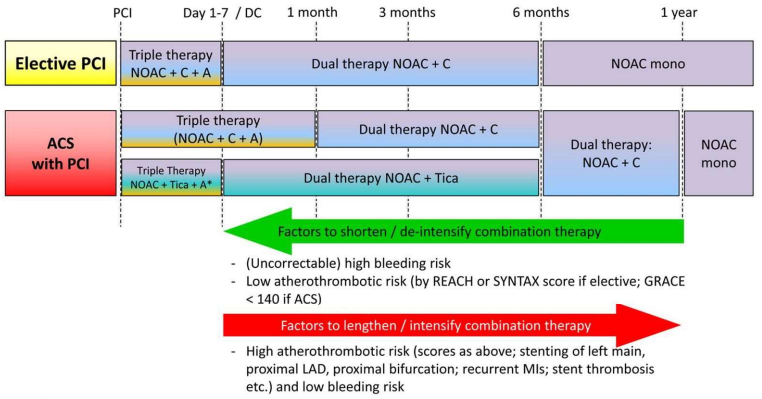
Anticoagulation therapy after elective PCI or ACS in patients with AF



In all patients:

- Avoid use of BMS / first generation DES
- Use PPI if on triple / dual therapy
- Minimize bleeding risk by assessing and treating modifiable bleeding risk factors (e.g., hypertension, etc.)
- Close follow-up; check for signs of (occult) bleeding

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Thank you for your attention