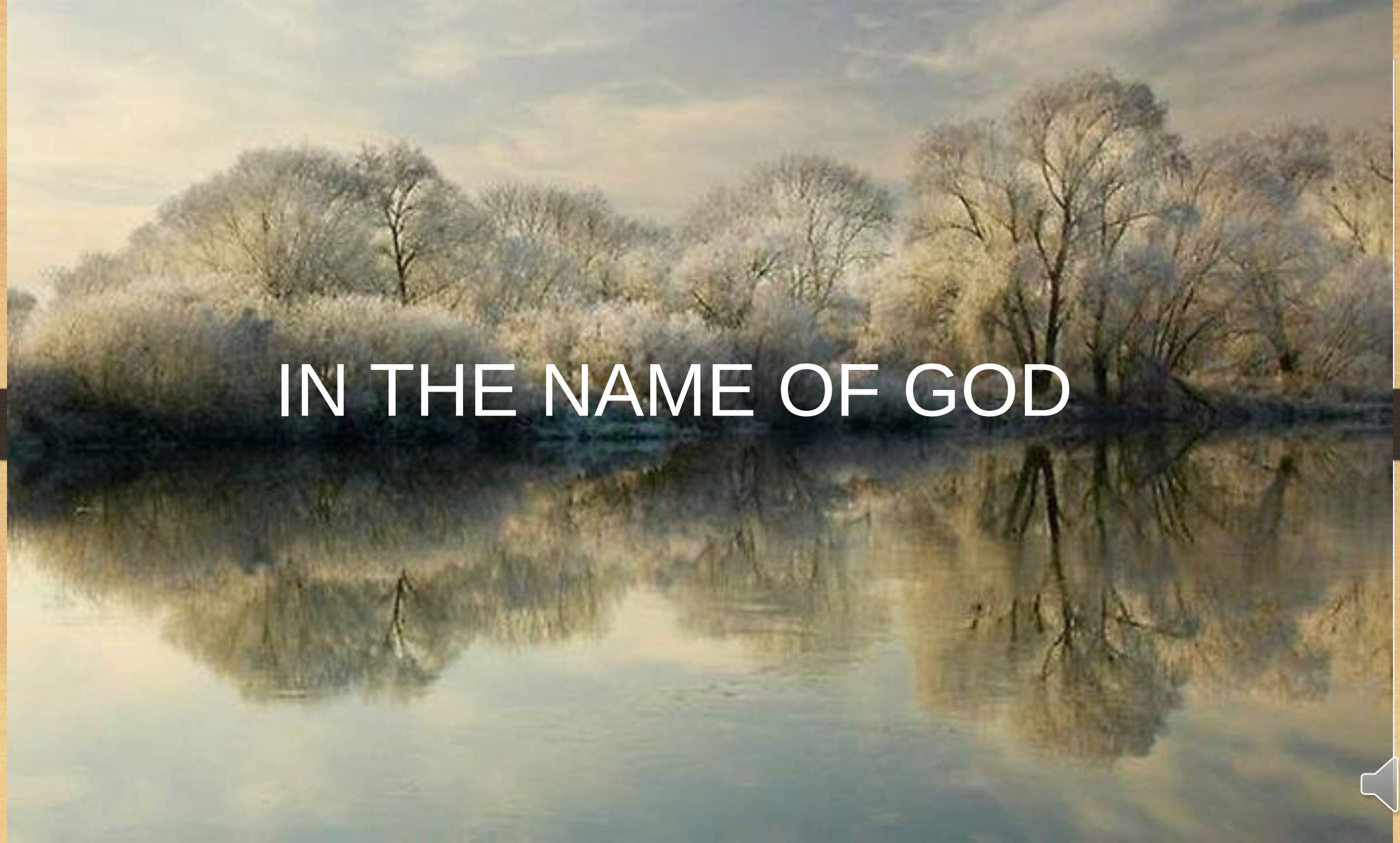
IN THE NAME OF GOD

Management of antiplatelet therapy in patients undergoing elective procedures

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Antiplatelet agents

- Antiplatelet agents (APAs) are prescribed to prevent arterial thrombosis and especially the recurrence of thrombotic events.
- any patients receiving long-term antiplatelet therapy will at some time require an elective invasive procedure.
- This setting requires specific management of antiplatelet therapy.
- The discontinuation of antiplatelet therapy to perform an invasive procedure increases the risk of thrombotic events while the continuation increases the bleeding risk during the procedure.
- These two risks must be assessed sequentially to determine the optimal management for the planned invasive procedure, and to choose between continuation, discontinuation or modification of antiplatelet therapy, or postponement of the procedure \

risk due to continuation or discontinuation of antiplatelet therapy during an invasive procedure

- Continuing antiplatelet therapy in the periprocedural period is likely to increase the risk of bleeding intra- and postoperatively depending on the invasive procedure and the type of APA.
- The risk of bleeding due to antiplatelet therapy varies from one invasive procedure to another and includes not only the volume of bleeding and transfusion requirement but also the onset of a haematoma in the event of functional surgery or the need for surgical revision.

Duration of APA discontinuation and substitutes (Miller 2020)

- Since 10% of platelets are turned over every 24 hours, and about 50,000/mm3 of normal functioning platelets are needed to control surgical bleeding, but not always sufficient for full correction of platelet functions it is likely that aspirin need only be stopped 3 days before surgery to mitigate risks of increased bleeding.
- invasive procedures carrying a high risk of bleeding such as neurosurgery should be performed only after five days of aspirin washout. goal is to completely correct the platelet functions inhibited by aspirin.
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- patients who discontinued antiplatelet therapy for any reason had an absolute risk increase in stroke recurrence or a cardiovascular EVENT
- *Withdrawing* aspirin itself has important theoretical risks with respect to a rebound hypercoagulable state and increased cardiac risk,
- Continuation of aspirin is not a contraindication to performance of neuraxial blocks

- Although in most patients the maximal effect on platelets is achieved with 75 mg o.d., for various reasons a higher dose may be given.
- Since the bleeding risk is not greater with 300 than 75–100 (but for gastrointestinal bleeding), there is no reason to change the chosen regimen perioperatively.

$P2Y_{12}$ inhibitors

- The HAS recommends that
- clopidogrel, for5- 7 day
- prasugrel for 7 day
- ticagrelor for 5 days,
- Ticlopidine for 14 day before the procedure

- Specifically, aspirin should be continued in any patient with a prior PCI, high-grade IHD, or high-risk CVD (e.g., stroke within prior 9 months).
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- as a general rule, the bleeding risk due to clopidogrel is lower than that with the new $P2Y_{12}$ receptor inhibitors, prasugrel and ticagrelor, and is greater with dual therapy (aspirin + $P2Y_{12}$ inhibitor) than with monotherapy (most often aspirin).
- The aspirin-induced bleeding risk could be lower than that with clopidogrel, since thromboxane A_2 plays a lesser role in platelet activation than ADP
- The $P2Y_{12}$ inhibitors carry a greater risk of bleeding than aspirin.
- Cases of peri-medullary haematoma have been reported with clopidogrel. Spinal anaesthesia is not advisable with these APAs but Continuation of aspirin is not a contraindication to performance of neuraxial blocks

Bridging therapy

- refers to the administration of a therapeutic dose of a short-acting drug , during the interruption of a longer-acting drug,
- Patients receiving antiplatelet agents alone do not require bridging therapy.
- Patients on combination antiplatelet therapy are a high risk group and require specialist input from the specialist managing the antiplatelet agents

- vessel injury, especially destruction of the endothelium. This makes the area prone to thrombosis.
- It takes about 2–3 weeks for the vessel to reendothelialize after balloon angioplasty.
- After bare-metal stent placement, reendothelialization can take up to 6 weeks, and a drug-eluting stent may not be completely endothelialized even after a full 1 year.
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Continuation of Dual Antiplatelet Therapy

- should be continued for *at least 6 weeks* after bare-metal stent placement and *1 year* after drug-eluting stent placement.
- If dual antiplatelet therapy must be stopped, at least the aspirin portion of the therapy should be continued.
- Aspirin should be stopped before elective surgery only when absolutely indicated. For patients taking dual antiplatelet therapy, generally aspirin can be continued
- Although less than 6 weeks after bare-metal stent placement and less than 1 year after drug-eluting stent placement is considered a highly vulnerable period for stent thrombosis, stent thrombosis can occur at any time

LOW/VERY LOW RISK	MODERATE RISK	HIGH RISK
• Dental extractions (1 or 2 teeth), endodontic (root canal) procedure, • Subgingival scaling or other cleaning • Cataract surgery • Dermatologic procedures (e.g. biopsy) • Gastroscopy or colonoscopy without biopsies • Coronary angiography • Permanent pacemaker insertion or internal defibrillator placement (if bridging anticoagulation is not used) • Selected procedures (e.g. thoracentesis, paracentesis, arthrocentesis)	• Other intra-abdominal surgery (e.g. laparoscopic cholecystectomy, hernia repair, colon resection) • Other general surgery (e.g. breast) • Other intrathoracic surgery • Other orthopedic surgery • Other vascular surgery • Non-cataract ophthalmologic surgery • Gastroscopy or colonoscopy with biopsies • Selected procedures (e.g. bone marrow biopsy, lymph node biopsy) • Complex dental procedure (e.g. multiple tooth extractions)	• Any surgery or procedure with neuraxial (spinal or epidural) anesthesia • Neurosurgery (intracranial or spinal) • Cardiac surgery (e.g. CABG, heart valve replacement) • Major intra-abdominal surgery (e.g. intestinal anastomosis) • Major vascular surgery (e.g. aortic aneurysm repair, aortofemoral bypass) • Major orthopedic surgery (e.g. hip or knee replacement) • Lung resection surgery • Urological surgery (e.g. prostatectomy, bladder tumour resection) • Extensive cancer surgery (e.g. pancreas, liver) • Reconstructive plastic surgery • Selected procedures (e.g. kidney biopsy, prostate biopsy, cervical cone biopsy, pericardiocentesis, colonic polypectomy)

Management of antiplatelet agents (APA) in patients undergoing elective invasive procedures

Thrombotic risk of the patient			Procedure-associated bleeding risk *To assess with the surgeon or the operator*		
			Low	Moderate	High
	Aspirin for primary prevention		Stop or Continue	Stop	Stop
	APA for secondary prevention *(Cardiovascular prevention, Lower extremity artery disease , History of ischemic stroke)*	Aspirin monotherapy	Continue	Continue	Stop
		Clopidogrel monotherapy	Continue	Stop and bridge with aspirin	Stop
	Dual antiplatelet therapy for coronary artery disease *postponed until completion of the full course of DAPT if no major life-threatening or functional risk*	• Stent <1 month • Stent <6 months with high thrombotic risk* • MI<6 months	Postpone Non-deferrable surgery: Continue both APAs	Postpone Non-deferrable surgery: Continue aspirin and stop $P2Y_{12}$ inhibitor	Postpone Non-deferrable surgery: Stop both APAs**
		None of the previous criteria	Continue both APAs	Continue aspirin and stop $P2Y_{12}$ inhibitor	Stop both APAs

Procedure-associated bleeding risk
Low: feasible in patients on dual antiplatelet therapy (ex: cataract)
Moderate: feasible in patients on aspirin alone (ex: colectomy)
High: not feasible in patients on APAs (ex: ampullectomy)

Duration of APA discontinuation: last intake of:
aspirin on D-3 (D0 = day of procedure)
clopidogrel and ticagrelor on D-5
prasugrel on D-7
(Add 2 more days for intracranial neurosurgery)

Resume postoperatively as soon as possible according to the postoperative bleeding risk

*** Stent with high-thrombotic risk**
- Chronic kidney disease (i.e. ClCr < 60 mL/min)
- Diffuse multivessel disease especially in diabetic patients
- Prior stent thrombosis on adequate antiplatelet therapy
- Stenting of the last remaining patent coronary artery
- At least 3 stents implanted
- At least 3 lesions treated
- Bifurcation with 2 stents implanted
- Total stent length >60 mm
- Treatment of a chronic total occlusion

** For stent <1 month, discuss bridging with intravenous APAs

Drug	When to Stop			When to Restart
	High-Risk Procedures	Intermediate-Risk Procedures	Low-risk Procedures	
ASA and ASA Combinations	Primary prophylaxis: 6 days Secondary prophylaxis: shared assessment and risk stratification	Shared assessment and risk stratification [a,b]	No	24 hr
NSAIDs	5 half-lives	No[c]	No	24 hr
Diclofenac	1 day			
Ketorolac	1 day			
Ibuprofen	1 day			
Etodolac	2 days			
Indomethacin	2 days			
Naproxen	4 days			
Meloxicam	4 days			
Nabumetone	6 days			
Oxaprozin	10 days			
Piroxicam	10 days			
Phosphodiesterase inhibitors				
Cilostazol	2 days	No	No	24 hr

neuraxial anaesthesia

- Spinal epidural haematoma is a very rare but potentially catastrophic complication of central neuraxial anaesthesia ,which includes spinal anaesthesia and epidurals with or without catheters [
- . Risk factors include haemostatic disorders, traumatic punctures and female gender .
- The risk is greater for epidural anaesthesia, especially with a catheter, than for spinal anaesthesia [3].
- The risk of spinal epidural haematoma related to aspirin seems very low.

APAs and peripheral nerve blocks

- Peripheral nerve blocks can be divided into two groups according to the degree of bleeding risk:
- 1-low bleeding risk peripheral blocks where, if bleeding occurs, it is easily controllable, and the area of bleeding can be compressed
- These include superficial blocks such as the femoral nerve block, the axillary plexus block and the popliteal sciatic nerve block.
- These blocks could be performed in patients on APA treatment if the benefit/risk ratio is favourable and justified [

- high bleeding risk blocks where, in the event of bleeding, the area cannot be compressed or the consequences of the bleeding are potentially serious
- These include deep blocks such as the infraclavicular brachial block, the para-sacral sciatic block, and the posterior lumbar plexus block.
- These blocks are contraindicated in patients on $P2Y_{12}$ inhibitors
- These blocks could be performed in patients on aspirin if the benefit/risk ratio is favourable and justified

- In a bleeding patient, platelets can be administered to counteract the effects of antiplatelet drugs, but the effectiveness of the platelet infusions will depend on the timing of the last dose of antiplatelet drug. For example, platelet transfusions can be administered as soon as 4 hours after discontinuation of clopidogrel, but they will be most effective 24 hours after the last dose of clopidogrel.

referance

- This clinical guideline is intended to assist clinicians with the inpatient and outpatient management of adult patients (over 16 years of age) undergoing procedures* who are taking antiplatelet therapy.
- Guidelines on Perioperative Management of Anticoagulant and Antiplatelet Agents | Clinical Excellence Commission December 2018
- Guidelines Management of antiplatelet therapy in patients undergoing elective invasive procedures. Proposals from the French Working Group on perioperative haemostasis (GIHP) and the French Study Group on thrombosis and haemostasis (GFHT). In collaboration with the French Society for Anaesthesia and Intensive Care Medicine (SFAR)
- Miller 2020
- Coexist 2018
- ASRA Guidline

carefully