Periprocedural antithrombotic management for lumbar puncture: Association of British Neurologists 2026 guideline update

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Introduction

This 2026 update revises the previous 2018 ABN clinical guideline on periprocedural antithrombotic management for lumbar puncture [1]. This document focuses on the risk assessment and management of bleeding risk in the context of lumbar puncture. The off-setting of that risk against the clinical indications for, urgency and impact of a lumbar puncture being performed is at the discretion of the primary treating clinician and dependent on the individual clinical setting.

For ease of use, the recommendations are summarised, followed by the methods and explanation of current literature leading to these recommendations.

Recommendations

Clinical Context:

- *It is vital to include consideration of potential harm from delaying an LP.*
- *Urgent indications for LP include strong clinical suspicion of bacterial meningitis (after initial immediate antibiotics), viral encephalitis, and central nervous system vasculitis.*

Investigations and Procedures:

- *Platelet counts should generally be checked prior to LP, usually within 24 hours of procedure; coagulation screen is only required in those with risk factors for coagulopathy.*

- *Platelet count should ideally be >40 x 10^9/L. We would recommend discussion with the local haematology service if the platelet count is below this or if falling rapidly.*
- *Where possible, INR should be <1.5 prior to lumbar puncture.*
- *In those with very high thrombosis risk and a higher target INR, LP may be considered with an INR of <2.0.*
- *Anti-factor Xa assays are available for those on LMWH and DOACs at high risk of accumulation but are not routinely recommended.*
- *Atraumatic needles should be the favoured lumbar puncture method.*
- *Consider image guided lumbar puncture if the bleeding risk is felt to be very high.*

Antiplatelets:

- *Aspirin (at any dose) can be continued and should not delay LP.*
- *If an LP is urgent (such as strong clinical suspicion of bacterial meningitis or viral encephalitis) then antiplatelet agents including DAPT can be continued and should not delay LP.*
- *In an elective or semi-elective setting, the indication for DAPT and risk of stopping therapy must be weighed against the potential risk of haematoma. In those with very high risk of thrombosis (e.g. drug eluting stent <12 months or complex cardiac history), continuation of DAPT may be appropriate. If the thrombosis risk is low, then Clopidogrel / Prasugrel / Ticagrelor should be stopped for 3-7 days (see table 1/infographic), with consideration given to aspirin monotherapy cover (whether on DAPT or single agent originally).*

Anticoagulation:

- *Warfarin should be withheld for 5 days, until the INR is <1.5 (<2.0 in those with very high thrombosis risk).*
- *Bridging therapy should be considered in those at high risk of thrombosis when a vitamin K antagonist is interrupted.*
- *DOACs should be withheld for 2 days prior to LP (in the context of normal renal function); in renal impairment (CrCl<30 ml/min for rivaroxaban/apixaban/edoxaban, or CrCl<50 ml/min for dabigatran) consider anti-factor Xa assays and seek specialist advice.*
- *If the LP is urgent, consult haematology regarding reversal of anticoagulants.*
- *Prophylactic LMWH should ideally be stopped for 12 hours, treatment-dose for 24 hours, prior to LP.*
- *Prophylactic dose fondaparinux should be withheld for 2-4 days prior to the procedure; if the LP is urgent, or if the patient is on treatment dose fondaparinux, or an anticoagulant not mentioned here, then seek specialist advice.*

Method

This update was commissioned by the ABN. Members of the headache and the neuroinflammatory advisory groups were invited to contribute to authorship, and the guidance has been circulated to these advisory groups as well as the ABN services and standards committee and the British Society of Haematology (BSH) Haemostasis and Thrombosis Task Force. Literature review was undertaken to identify papers published since 2018 based on searching for the MeSH (medical subject headings) terms "lumbar puncture" or "neuraxial anaesthesia", with "platelets", "anticoagulants", or "haematoma". We also consulted relevant updated guidelines including the BSH guideline on the assessment and management of bleeding risk prior to invasive procedures, updated in 2024, and the Society of Interventional Radiology Consensus Guidelines for the Periprocedural Management of Thrombotic and Bleeding Risk in Patients Undergoing Percutaneous Image-Guided Interventions (parts I and II) from 2019 [2,3].

The evidence was reviewed and summarised, and then guidance was reached by consensus. A summary infographic has been created.

Clinical Context

It is vital to consider the potential harm that may arise from delaying a lumbar puncture. Urgent indications include strong clinical suspicion of bacterial meningitis (after initial immediate antibiotics), viral encephalitis or central nervous system vasculitis. Other indications that are less critical and may not alter immediate, or even longer term, management of a patient might include possible Guillain-Barre syndrome or multiple sclerosis. These considerations must ultimately be integrated into a balanced assessment of the individual's haemorrhagic and thrombosis risk.

Investigations and procedures

Laboratory values

Lumbar puncture poses a risk of spinal epidural haematoma; though the risk is low, it has potentially serious consequences. A Danish nationwide cohort study involving 83,711 individuals undergoing LP reported a spinal haematoma risk of 0.20% in those without coagulopathy compared to 0.23% amongst those with coagulopathy (platelets $<150 \times 10^9$/L, INR>1.4, or APTT>39 seconds) [4]. The BSH guideline recommends pre-procedural platelet count testing in procedures with potentially severe complications, but does not recommend routine coagulation screening prior to all procedures as it does not indicate bleeding risk nor exclude a bleeding disorder [5]. They suggest that for spinal intervention PT/INR, APTT and fibrinogen should be checked in those with: known chronic liver disease, malnutrition, prolonged antibiotic use, or inpatients at risk of coagulopathy (e.g. those with sepsis or on critical care).

The previous ABN guidelines adopted a platelet cut off of $\geq 40 \times 10^9$/L from the 2016 BSH guidelines [6]; there is no evidence to alter this guidance, and it is again specified in the 2024 updated version [5]. However, 2025 clinical practice guidelines from the AABB

(formerly the American Association of Blood Banks) and the International Collaboration for Transfusion Medicine Guidelines recommend platelet transfusion when platelet count is <20 x 10^9/L, in keeping with the 2019 Society of Interventional Radiology Consensus Guidelines [2,3,7]. It is important to recognise that platelet function is also relevant, and there is a distinction between patients with or at risk of rapidly falling platelet counts (e.g. leukaemia) and those with stable thrombocytopenia.

The 2022 guidelines by the Scientific and Standardization Committees of the International Society on Thrombosis and Haemostasis on peri-procedure management of antithrombotic agents and thrombocytopenia for common oncological procedures advise ensuring that the INR is <1.5 [8], whereas the Society of Interventional Radiology Consensus Guidelines accept an INR threshold of ≤2.0-3.0 [2,3]. However, clinical decision making must be individualised and contextualised. It is reasonable to weigh up an individual patient's risk and benefit profile; aiming for an INR<1.5 but allowing < 2.0 when the LP is urgent or in those with a very high thrombosis risk and higher than usual INR target. The BSH guidelines do not recommend vitamin K for liver cirrhosis in isolation but should be considered in those with increased INR secondary to vitamin K deficiency, for example, cholestatic liver disease, malnutrition or prolonged antibiotic use [5].

Other Investigations

Recovery of platelet reactivity following discontinuation of P2Y12 inhibitors (e.g. clopidogrel) is variable between individuals. Point of care platelet function testing is starting to become available to assess bleeding risk. If available, consideration should be given to its inclusion in the assessment of antiplatelet effects.

The anti-Factor Xa assays can be used to assess the effects of LMWH, and direct oral anticoagulants (DOACs) apixaban, rivaroxaban and edoxaban if felt to be at risk of accumulation (e.g. low bodyweight or renal failure). Note that these need to be performed with the drug-specific calibrant. A level of <0.2 IU/mL on heparin anti-Xa assay, or <30 ng/mL on a direct Xa inhibitor assay would be considered safe for a procedure [3,9]. These tests do not need to be routinely performed but are available if there are concerns in individual cases.

Lumbar Puncture Methods

Atraumatic lumbar puncture needles are associated with a lower incidence of post LP headache than conventional cutting needles [10]. Whilst no difference has been seen in the incidence of a traumatic tap, intracranial hypotension following dural puncture may increase the risk of intracerebral subdural haematoma [11].

Image (fluoroscopic / computed tomography / ultrasound) guided LP may confer a lower haemorrhagic risk and should be considered when the bleeding risk is felt to be very high. In one study, ultrasound guidance significantly reduced the risk of a traumatic tap [12].

Antiplatelets

Several large case series examining the risk of haemorrhagic complications of LP have been published since the 2018 guideline. Of particular relevance is the increasing use of dual antiplatelet therapy (DAPT) for large artery atherosclerosis since the previous guideline. A retrospective case series of LPs performed on 100 patients on DAPT found no epidural haematomas, with 4% meeting the criteria for a "bloody" tap . Subsequently, a retrospective review of 635 patients identified no significant differences in rates of haematoma owing to LP between antiplatelet use within 1 week (3%) compared to those who discontinued for more than 4 weeks (5%) . Additionally, they found no difference in bleeding rates between aspirin compared to aspirin plus clopidogrel, though numbers taking DAPT within a week of lumbar puncture were small (n=28). In 2023, a further retrospective study looked at traumatic tap risk in those on adenosine diphosphate receptor antagonists (ADRras; clopidogrel, prasugrel, ticagrelor, ticlodipine) [13]. Of the 159 patients who underwent urgent lumbar puncture on an ADPras, 81 of these were on DAPT, with no spinal haematoma reported. The risk of traumatic tap was 5% (8/159) of those on ADPRas, 5.7% (9/259) of those on aspirin, and 2.5% (4/160) of those without any anti-platelet [13].

There is little data on risk of haemorrhagic complications of LP in relation to high dose aspirin. However, a large meta-analysis in 2019 examined risk of major bleeding associated with aspirin in 164,225 participants of 13 clinical trials [14]. This found that on sensitivity analysis, low dose aspirin (≤100mg/day) had a higher risk of major bleeding outcomes than high dose.

Anticoagulants

Vitamin K antagonists

Warfarin should be held until the INR is <1.5, usually around 5 days. As mentioned above, in those with very high thrombosis risk and a higher target INR, LP may be considered with an INR <2.0. Consideration an individual's thrombotic risk is important. For those on vitamin K antagonists, consideration should be given to bridging when treatment is interrupted, if high risk for thromboembolism [5]:

- Patients with a VTE within the previous 3 months.
- Antiphospholipid syndrome
- High INR target >2.5
- Patients with AF and CHADS2 ≥5 [18]:
    - Congestive heart failure (1 point);
    - Hypertension (>140/90 mmHg or on medication; 1 point);
    - Age>75 years (1 point);
    - Diabetes mellitus (1 point);
    - Stroke or TIA (2 points).

For reversal of warfarin, vitamin K takes 6-12 hours to work, and so PCC should be used in addition to vitamin K for emergency reversal [19].

Direct Oral Anticoagulants

There is variability in guidelines between the length of time to hold DOACs. The American Society of Regional Anaesthesia and Pain Medicine (ASRA) guidance suggest holding DOACs for 72 hours prior to neuraxial anaesthesia [20]. However, the Perioperative Management of Patients With Atrial Fibrillation Receiving a Direct Oral Anticoagulant (PAUSE) study stopped DOACs for just two days prior to high risk procedures (including neuraxial anaesthesia), and had low bleeding rates [21,22]. PAUSE-2, comparing these two strategies in high-bleed-risk surgery and neuraxial anaesthesia has released results of the pilot trial, which show similar pre-operative residual DOAC levels between the two approaches [23]. We propose that, in keeping with the BSH guideline, in patients with normal renal function (creatinine clearance ≥50 mL/min), rivaroxaban, apixaban and dabigatran should be withheld for 2 days pre-procedure (see table 1). Discussion with haematology is recommend for patients on DOACs where the procedure is urgent. In an emergency, dabigatran can be reversed with Idarucizumab [24].

Bridging is not required when DOACs are withheld for the recommended time intervals, although may need to be considered if treatment is withheld for longer than advised due to procedural delays.

Low Molecular Weight Heparin

Low molecular weight heparin (LMWH) should ideally be held for 12 hours prior to procedure when used at prophylactic dose and 24 hours when used at treatment dose.

The manufacturer advises avoiding LP in those on fondaparinux due to risk of drug accumulation [25]. One may therefore consider switching temporarily to an alternative anticoagulant before LP. However, several guidelines suggest that holding prophylactic doses for 2-4 days prior to procedures is generally safe [26,27]. This should be decided on an individual level; in those with high risk of thrombosis 2 days is acceptable, in patients at high risk of accumulation (e.g. renal impairment), a 4-day interval is more appropriate. Treatment dose fondaparinux presents a greater concern due to higher risk of accumulation, and specialist haematology advice is recommended in this situation, but it should usually be held for at least 3 days [5]. If the LP is urgent then seek specialist advice; there is no reversal agent for Fondaparinux, though the BSH guidelines suggest that recombinant FVIIa can be considered for critical bleeding [5]. Fondaparinux can be resumed 6 hours following LP.

Summary

Risks relating to LP should be assessed on an individual basis and consideration given to both bleeding and thrombosis risk, as well as the risk associated with delaying the procedure. These guidelines aim to provide standardised guidance, but complex cases should be discussed with relevant specialists to determine the safest course of action.

Table 1: Timings for Discontinuation

Agent	Withold prior to LP	First dose after LP*	SORT grading	Comments
Antiplatelets				
Aspirin (any dose) / Dipyridamole	Continue	No delay	C	
Clopidogrel	5-7 days with aspirin cover	6 hours	B	Continue if high risk of thrombosis or if LP is urgent
Prasugrel	7 days with aspirin cover	6 hours	B	
Ticagrelor	3-5 days with aspirin cover	6 hours	B	
Anticoagulants				
Warfarin	5 days, consider LMWH bridging if high thrombosis risk as per infographic**, check INR <1.5***	12 hours	B	If urgent consider reversal
LMWH	Prophylaxis: 12 hours Treatment: 24 hours	4 hours (24 hours if traumatic)	C	
Fondaparinux	Prophylaxis: 2-4 days **** Treatment: seek specialist advice	6-12 hours	C	If LP urgent seek specialist advice
Unfractionated heparin IV	4-6 hours	1 hour	C	
Rivaroxaban / apixaban / edoxaban	2 days (CrCl ≥30 mL/min)	6 hours	B	If LP urgent seek specialist advice
Dabigatran	2 days (CrCl ≥50 mL/min) 4 days (CrCl 30-49 ml/min)	6 hours	B	If LP urgent seek specialist advice

*Assuming no bleeding concerns or complications

**LMWH bridging should be considered in those with high risk of thrombosis.

***INR<2.0 may be appropriate if the LP is urgent of those at very high risk of thrombosis.

**** If there is concern around thrombosis without fondaparinux then 2 days is acceptable, if the patient has high risk of accumulation (e.g. renal impairment) then 4 days is more appropriate.

Abbreviations: CrCl; creatinine clearance, INR; international normalised ratio, IV; intravenous, LMWH; low molecular weight heparin, LP; lumbar puncture, SORT; Strength of Recommendation Taxonomy,

INFOGRAPHIC

Lumbar Puncture and Bleeding Risk 2026 Update

A brief guide to managing antiplatelets and anticoagulation in patients requiring a lumbar puncture (LP)

Full guideline →

Consider individual risk of:

Bleeding

- Evaluate individual risk
- Platelet count ideally should be >40 x 10^9. If below this or falling rapidly seek specialist advice
- Consider checking INR/PT, APTT and fibrinogen if high risk:
  - chronic liver disease
  - malnutrition
  - prolonged antibiotic use
  - inpatients at risk of coagulopathy (e.g. sepsis, critical care)
  - personal/family history of unexplained bleeding
- If INR>1.5 consider vitamin K or PCC in urgent cases

Thrombosis

Warfarin: Hold until INR<1.5 (<2.0 if very high risk for thrombosis)
Consider therapeutic LMWH bridging only for those high risk for thromboembolism:

- VTE <3months
- antiphospholipid syndrome
- high INR target >2.5
- AF and $CHADS_2$ score of ≥5

DOAC: No bridging unless procedure delayed longer than recommended timeframes

Antiplatelets: High risk (continue dual anti-platelet therapy (DAPT)):

- drug eluting stent <12 months
- bare metal stent <1 month
- complex cardiac history

Delaying LP

Consider the potential harm from delaying an LP. Urgent indications include strong clinical suspicion of:

- bacterial meningitis (after immediate antibiotics) / viral encephalitis
- Central nervous system vasculitis

If urgent:

- Consider continuing DAPT / reversing anticoagulants (seek specialist advise) / accepting higher INR and proceed with LP
- Warn patient of increased risk and monitor for neurological symptoms or signs

Witholding common medications for elective LP

Antiplatelets	Withold before LP	First dose after LP
Aspirin / Dipyridamole	Continue	No delay
Clopidogrel / Prasugrel / Ticagrelor	Clopidogrel 5-7 days Prasugrel 7 days Ticagrelor 3-5 days With aspirin cover High risk of thrombosis/ urgent LP: continue	6 hours

Anticoagulants	Withold before LP	First dose after LP
Warfarin	5 days, INR<1.5*	12 hours
LMWH	Prophylaxis: 12 hrs Treatment : 24 hrs Urgent: seek specialist advice	4 hours
Rivaroxaban / Apixaban / Edoxaban / Dabigatran	2 days (normal renal function**) Urgent: seek specialist advice	6 hours

Warfarin bridging if high risk for thrombosis (see above)

Day	-5	-4	-3	-2	-1	LP	1	+2	+3	+4
Warfarin	✗	✗	✗	✗	✗	✗ check INR<1.5*	✓	✓	✓ Check INR	✓ Check INR
LMWH (if high risk, see above)	✗	✓ once INR below target	✓	✓	✗ hold for 24 hrs before	✓ 4 hrs after	✓	✓	✓	? stop when INR in target for 2 days

*INR<2.0 may be appropriate if LP is urgent

**CrCl≥30ml/min , or CrCl≥50ml/min with dabigatran

Abbreviations: AF, atrial fibrillation; APTT, activated partial thromboplastin time; CHADS2, congestive cardiac failure (1 point), hypertension (1 point), age>75 (1 point), diabetes mellitus (1 point), stroke or TIA (2 points); CrCl, creatinine clearance; DAPT, dual anti-platelet therapy; DOAC, direct oral anticoagulant; hrs, hours; INR, international normalised ratio; LMWH, low molecular weight heparin; LP, lumbar puncture; PCC, prothrombin complex concentrate; PT, prothrombin time; VTE, venous thromboembolism.

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