

Local Guideline

Document number: JHH_0xxx

Perioperative care of patients with a history of stroke

Sites where Local Guideline applies	John Hunter Hospital
Target audience	Surgeons, anaesthetists, neurologists, perioperative nurses, doctors.
This Local Guideline applies to:	
1. Adults	Yes
2. Children up to 16 years	No
3. Neonates – less than 29 days	No
Description	This guideline is intended to guide the perioperative care of patients who have a history of stroke and who are scheduled for elective non-cardiac, non-neurologic surgery at the John Hunter Hospital.
Keywords	Stroke, surgery, anaesthetic, perioperative

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Replaces existing document?	No
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Relevant or related Documents, Australian Standards, Guidelines etc:

- NSW Health Policy Directive PD2017_032 [Clinical Procedure Safety](#)
- HNELHD Policy Compliance Procedure PPM Consent:PCP 3 [Consent for Clinical Treatment and Care](#)
- NSW Health Policy Directive PD 2017_013 [Infection Prevention and Control Policy](#)
- [Work Health and Safety Act 2011 no. 10](#)
- NSW Health Policy Directive PD2012_069 [Health Care Records – Documentation and Management](#)
- HNE Health Policy Compliance Procedure PD2009_060: PCP1 [Clinical Handover – ISBAR](#)
- HNELHD Policy Pol 18_03 [Aseptic Technique for Level 1 to Level 2 Procedures Conducted in Clinical Settings](#)
- Local procedure JHH_JHCH_BH_0193 [Standard Aseptic Technique](#)
- NSW Health Policy Directive 2013_049 [Recognition and management of Patients who are Clinically Deteriorating](#)
- HNE LHD Policy Compliance Procedure [Recognition and Management of Patients who are Clinically Deteriorating](#) PD2013_049:PCP 1
- HNE LHD PD2013_049 PCP2 [Vital Sign Observations & Monitoring Frequency 16 Years and Over](#)
- See Reference Section on page 4

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Prerequisites (if required)	Patients must be booked to have elective non-cardiac surgery at the John Hunter Hospital and have a history of stroke.
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Local Guideline note

This document reflects what is currently regarded as safe and appropriate practice. This guideline does not replace the need for the application of clinical judgment in respect to each individual patient. If staff believe that the guideline should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patient's health record.

If this document needs to be utilised outside of the John Hunter Hospital, please liaise with the local neurology or stroke service to ensure the appropriateness of the information contained within the Guideline and Procedure.

Date initial authorisation:	XXX
Authorised by:	Perioperative Service Executive Committee
This document contains advice on therapeutics	No
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PURPOSE AND RISKS

Overt strokes are acute brain infarctions with symptoms lasting more than 24 hours. Covert strokes are brain infarcts that are not recognised acutely due to subtle symptoms, but which are detectable on neuroimaging. Evidence has shown that overt stroke occurs in up to 3% of patients and covert stroke in up to 7% of patients undergoing non-cardiac surgeries.¹

Overt stroke can be a devastating outcome for patients having surgery and is associated with high morbidity and mortality.¹ Covert stroke is associated with increased risk of post-operative delirium, cognitive decline and future stroke in the 12 months following surgery.¹

Risk factors for perioperative stroke include:^{2,3}

- Prior stroke
- Age
- Cardiovascular disease including atrial fibrillation, hypertension, valvular disease and heart failure
- Renal disease
- Diabetes
- Smoker or COPD
- Patent foramen ovale
- Surgical procedures including: vascular, thoracic, endocrine, transplant, otolaryngology and hemicolectomy.
- Presence of intracranial stents

As the history of a prior stroke is a risk factor for perioperative stroke, the preoperative management of patients with history of stroke presenting for non-cardiac surgery should specifically consider the following:

1. Timing of surgery
2. Management of antiplatelet and anticoagulant medications

While this document refers to all patients with a history of stroke, for management of patients with a history of *haemorrhagic stroke* please see the relevant sub-section.

Risk Category: Clinical Care & Patient Safety

GLOSSARY

Acronym or Term	Definition
COPD	Chronic obstructive pulmonary disease
INR	International normalised ratio
PFO	Patent foramen ovale
RFA	Request for admission

John Hunter Hospital / Service Manager Responsibility

- Ensure that the principles and requirements of this procedure are applied, achieved and sustained
- Ensure effective response to, and investigation, of alleged breaches of this procedure.
- Ensure all staff have completed My Health Learning online module Introduction to Safety and Quality (course number 42189807)
- Notify staff of all new and revised local procedures and guidelines through the JHH Newsletter

Line management responsibility

- Notify staff of new and revised policies, procedures and guidelines relevant to the workplace / unit / clinical specialty.
- Post the JHH newsletter (with policy, procedure and guideline updates) in staff rooms
- Identify high clinical risks relevant to patient population of unit/specialty and undertake audits of compliance with relevant policies, procedures or guidelines.

Employee responsibility

Staff must:

- Comply with policies, procedures and guidelines applying to their workplace / unit / specialty
- Report unsafe practices, equipment or environment to line manager

- Escalate any patient safety concerns to line manager, including if it is assessed that policies, procedures or guidelines do not reflect contemporary practice

GUIDELINE

This Guideline does not replace the need for the application of clinical judgment in respect to each individual patient.

Perioperative Care of the Patient with a History of Stroke

Investigation and management of prior stroke

The patient with a prior stroke should have been reviewed by Neurology and appropriate investigation and management of the cause for their stroke should have occurred. This includes management of symptomatic carotid stenosis, consideration of PFO closure and management of atrial fibrillation, as appropriate. Other risk factors listed above should be optimised prior to surgery.

If these steps have not occurred, discuss with the patient's GP or the neurology team. Any delays to surgery **must** be discussed with surgical team.

Timing of surgery

A history of stroke is associated with altered cerebrovascular reactivity, leading to physiologic vulnerability to a perioperative stroke or worsening of existing neurologic deficits. Recent stroke is also associated with a risk of perioperative MACE (major adverse cardiovascular events) and mortality. The risk is highest within 3 months of the initial stroke although it remains permanently elevated compared to a patient who has not had a stroke.^{2,3,5,6,7}

Elective Surgery	Urgent Surgery (e.g. cancer surgery)
Delay for a <i>minimum</i> of 3 months following stroke	Generally, surgery should not be delayed
Carefully consider the risks versus benefits of surgery within 3-6 months	Any consideration of delay requires multidisciplinary discussions between a consultant anaesthetist, the patient, the surgeon and the neurologist
Beyond 6 months, most surgeries may be undertaken however the patient's risk of stroke and MACE remains permanently elevated	
Delays must be discussed with surgical team	

Medication management

All patients requiring cessation or modification of their anticoagulant or antiplatelet medications preoperatively should also have a plan outlined for recommencement of those medications once the bleeding risk has normalised.

Anticoagulants

- Review the surgical bleeding risk, surgical recommendations on the RFA and see the local Perioperative Service guidelines for cessation
- **Warfarin** – if cessation required, stop medication 5 full days preoperatively and consider bridging anticoagulation only for those at high thromboembolic risk.^{8,9} The patient's INR should be checked on the day of surgery
- **Non vitamin-K-antagonist Oral anticoagulant (NOAC) medications** – stop medications 24-72 hours preoperatively dependent upon creatinine clearance, and surgical and anaesthetic plans for day of surgery. Bridging with low molecular weight heparin or unfractionated heparin is not routinely recommended.⁹

Aspirin

- Contentious as limited evidence exists.⁸
- Review surgical recommendations on the RFA.
- Consider continuing aspirin for patients at high risk for perioperative stroke unless there is a high risk of bleeding (eg neurosurgery, prostate surgery).
- If ceasing, stop for ≥ 5 days, although longer periods of cessation are required for some surgeries.⁹

Other antiplatelet medications

- Review surgical recommendations on the RFA
- Consider conversion to aspirin for patients at high risk for perioperative stroke due to previous stroke, unless high risk of bleeding (eg neurosurgery, prostate surgery).
- Stop clopidogrel for ≥ 5 days preoperatively.
- For duration of cessation of other antiplatelets, consult perioperative medication guidelines (eg Prasugel, Ticagrelor, Ticlodopine).⁹

Other medication management

- Continue anti-arrhythmic medications perioperatively
- Continue beta-blocker medications perioperatively

Multidisciplinary involvement

- If you have concerns about the patient's perioperative stroke risk and their antiplatelet/anticoagulant management, discuss with a perioperative anaesthetist before discussing with the neurologist and the surgeon.

Patients with a history of haemorrhagic stroke

With a lower incidence than ischaemic stroke and a high mortality, it is less common to encounter patients with a history of haemorrhagic stroke undergoing preoperative planning for elective surgery.

Aspects for consideration:

- The aetiology, subsequent management and risk of recurrence of the haemorrhagic stroke should be identified where possible.
- **Anticoagulation:**
 - A portion of patients will be therapeutically anticoagulated and may carry a high thrombosis risk. These patients should be discussed with their neurologist or the neurology team.
 - Based on limited evidence, past haemorrhagic stroke is generally not considered a strong contraindication to chemical VTE prophylaxis.¹¹
- **Antiplatelet management:**
 - Aspirin should usually be continued for patients with intracranial stents.
 - Dual antiplatelet therapy, or an antiplatelet agent and an anticoagulant, is often used for 3-6 months after intracranial stenting. Temporary cessation after 6 months when required for surgery is usually appropriate. For earlier cessation times discuss with the neurology or interventional neuroradiology team.
- **Timing of elective surgery:**
 - With a lack of evidence regarding timing in this cohort, is it reasonable to use the recommendations from the literature for ischaemic stroke, i.e. 9 months delay from time of stroke until elective surgery.
 - For time-sensitive procedures it may be reasonable to proceed sooner, ideally after 3 months.
 - Cranioplasty after decompressive craniectomy may be a therapeutic procedure with an expected postoperative improvement in neurologic function and protection of underlying structures.¹² It is reasonable to proceed with these surgeries within an earlier time frame.

For all patients:

- Document a comprehensive care plan in consultation with patient/family including patient goals and preferences, including advance care preferences.
- Ensure patient/family is aware of agreed goals and plan of care and that this is reviewed with patient/family at clinical handover.

REFERENCES

1. Mrkobrada M et al. Perioperative covert stroke in patients undergoing non-cardiac surgery (NeuroVISION): a prospective cohort study. *Lancet*. 2019;394(10203):1022 – 1029. doi: 10.1016/S0140-6736(19)31795-7
2. Vlisides PC et al. Perioperative Care of Patients at High Risk for Stroke During or After Non-cardiac, Non-neurological Surgery: 2020 Guidelines From the Society for Neuroscience in Anesthesiology and Critical Care, *J Neurosurg Anesthesiol*. 2020;32(3):210-226. doi: 10.1097/ANA.0000000000000686
3. Minhas J et al. Pathophysiological and clinical considerations in the perioperative care of patients with a previous ischaemic stroke: a multidisciplinary narrative review: *Br J Anaesth*. 2020;124 (2): 183e196. doi: 10.1016/j.bja.2019.10.021
4. Lindberg AP et al. Perioperative stroke after non-cardiac, non-neurological surgery: *BJA Ed*. 2021;21(2): 59e65. doi: 10.1016/j.bjae.2020.09.003
5. Jorgensen M, et al. Time Elapsed After Ischemic Stroke and Risk of Adverse Cardiovascular Events and Mortality Following Elective Noncardiac Surgery. *JAMA*. 2014;312(3):269-277. doi:10.1001/jama.2014.8165

6. Glance LG, et al. Association of Time Elapsed Since Ischemic Stroke With Risk of Recurrent Stroke in Older Patients Undergoing Elective Nonneurologic, Noncardiac Surgery. *JAMA Surg*. 2022 Aug 1;157(8):e222236. doi: 10.1001/jamasurg.2022.2236.
7. 2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*. 2024 Nov 5;150(19):e351-e442. doi: 10.1161/CIR.0000000000001285. doi: 10.1161/CIR.0000000000001298. PMID: 39316661.
8. Douketis J, et al. Perioperative Bridging Anticoagulation in Patients with Atrial Fibrillation. *N Engl J Med* 2015; 373:823-833 DOI: 10.1056/NEJMoa1501035
9. Clinical Excellence Commission. Guidelines on perioperative management of anticoagulant and antiplatelet agents. March 2024
10. Devereaux P, et al. Aspirin in patients undergoing noncardiac surgery. *N Engl J Med* 2014; 370:1494-1503 DOI: 10.1056/NEJMoa1401105
11. Perry L, et al. Antithrombotic treatment after stroke due to intracerebral haemorrhage. *Cochrane Database Syst Rev* 2017;5:CD012144. DOI: 10.1002/14651858.CD012144.pub2.
12. Shahid M, et al. The effect of cranioplasty following decompressive craniectomy on cerebral blood perfusion, neurological, and cognitive outcome. *J Neurosurg* 2018,128: (1)229-235. DOI: 10.1093/neuros/nyx054