

THE UNIVERSITY OF TEXAS
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Timing of Elective Surgery After Stroke

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DISCLOSURE: Consultant Baxter International Inc.

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Previous Stroke and Elective Surgery

- Previous stroke increases postoperative neurological and cardiac complications with significant increase in mortality
- Optimal timing of elective surgery after neurological event remains controversial
- Historically, it was recommended delaying elective surgery for at least 3 months after neurological event (TIA/stroke)

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Previous Stroke and Risk of Major Adverse Cardiovascular Events and Mortality

- Danish nationwide cohort study of adult patients (n=481,183) undergoing elective non-cardiac surgeries (2005-2011)
- Risk of postoperative adverse outcomes (ischemic stroke, acute MI, and cardiovascular mortality and all-cause mortality) was highest within the first 3 months of previous stroke
- Low- and intermediate-risk surgeries posed the same relative risk of MACE compared with high-risk surgery
- Associated risk leveled off after 9 months
- Authors recommend delaying surgery for 9 months

Jorgensen ME, et al: JAMA 2014; 312: 269-77

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Previous Stroke and Elective Surgery

AHA and ESC recommends waiting at least 6 months

Perioperative Neurological Evaluation and Management to Lower the Risk of Acute Stroke in Patients Undergoing Noncardiac, Nonneurological Surgery
A Scientific Statement From the American Heart Association/American Stroke Association
The American Academy of Neurology affirms the value of this statement as an educational tool for neurologists.
The American Association of Neurological Surgeons/Congress of Neurological Surgeons Cerebrovascular Section affirms the educational benefit of this document.
Benesch C, et al: Circulation. 2021;143:e923-e946

2022 ESC Guidelines on cardiovascular assessment and management of patients undergoing non-cardiac surgery
Developed by the task force for cardiovascular assessment and management of patients undergoing non-cardiac surgery of the European Society of Cardiology (ESC)
Endorsed by the European Society of Anaesthesiology and Intensive Care (ESAIC)
Eur Heart J 2022; 43: 3826-924

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Preoperative Stroke and Postoperative Ischemic Stroke After Elective Surgery

- Medicare patients (n=5,841,539, mean age 74 years) undergoing elective non-neurologic, non-cardiac surgeries (2011-2018), of these 0.9% had previous stroke
- Surgery performed within 30 days of stroke (vs. no stroke) was associated with higher odds of peri-operative stroke and 30-day all-cause mortality
- Odds of stroke were similar at 61-90 days (vs. 181-360 days)
- Authors recommend delaying surgery for at least 3 months

Glance LG, et al: JAMA Surg 2022; 157: e222236

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Peri-operative Considerations

- Optimize risk factors: Hypertension, DM, ESRD
- Manage anticoagulant/antiplatelet therapy
- Anesthetic technique
 - No difference between regional and general anesthesia
 - No difference between inhalation anesthesia and TIVA
- Lung protective ventilation
 - Maintain normocapnia (ETCO₂ ~40 mmHg)
- Blood pressure management
 - Specific thresholds remains controversial
 - Most recommend maintaining MAP >70 mmHg

Eur Heart J 2022; 43: 3826-3924

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**Carbon Dioxide,
Blood Pressure, and
Perioperative Stroke:
A Retrospective
Case-Control Study**

Philip F. Winkler, M.D., Graciela Meritz, Ph.D.,
Alexis M. Lee, M.S.,
Douglas Cotofano, M.B.Ch.B., M.Sc., M.P.H.,
Jonathan McBride, M.S., Shikun I. Noh, M.B.Ch., M.S.C.R.,
Lauren K. Dunn, M.D., Ph.D., Michael F. Aziz, M.D.,
Kamila Vagnerova, M.D., Clint Christensen, M.D.,
Nathan L. Pace, M.D., M.Stat., Jeffrey Horn, M.D.,
Kenneth Cummings II, M.D., Jacek Cywinski, M.D.,
Armenarie Akwemans, M.D., Sachin Khetarpal, M.D.,
Laurel E. Moore, M.D., George A. Mashour, M.D., Ph.D.
Anesthesiology 2022; 137:434-45

- Multicenter, retrospective case-control study: (n=1,244,881), 1702 positive for stroke
- Patients with confirmed stroke (n=126) matched with corresponding controls (n=500)
- Hypocarbica, hypercarbica, and hypotension were each independently associated with postoperative stroke
- No synergistic interaction between hypotension and either hypo- or hypercarbica
- MAP<55 mmHg and ETCO₂ >45 mmHg associated with increased odds of stroke