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Intracranial-intracranial bypass strategies for the treatment of complex intracranial aneurysms

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doi: 10.1017/cjn.2025.10320

Background: This study aimed to describe the technical characteristics and clinical efficacy of intracranial-to-intracranial (IC-IC) bypass for the treatment of complex intracranial aneurysms. Methods: We retrospectively reviewed all patients with aneurysms who underwent a preplanned combination of surgical or endovascular treatment and IC-IC bypass at our institution between January 2006 and September 2023. IC-IC bypass techniques included four strategies: type A (end-to-end reanastomosis), type B (end-to-side reimplantation), type C (in situ side-to-side anastomosis), and type D (IC-IC bypass with a graft vessel). Results: We performed the type A strategy on five patients (50.0%), type B on one (10.0%), type C on one (10.0%), and type D on three (30.0%). During a mean period of 68.3 months, good clinical outcomes (modified Rankin Scale score, 0-2) were observed in all patients. Follow-up angiography demonstrated complete aneurysmal obliteration in all patients and good bypass patency in nine of ten patients (90.0%). Conclusions: The treatment of complex aneurysms remains a challenge with conventional surgical or endovascular treatments. IC-IC bypass surgery is a useful technique, associated with favorable clinical outcomes, for treating complex aneurysms.

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Anesthetic strategies for mechanical thrombectomy: a single-center retrospective review

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doi: 10.1017/cjn.2025.10321

Background: Ischemic stroke is a major cause of morbidity and mortality in Canada. Since 2015, mechanical thrombectomy has been the standard of care for eligible large vessel occlusions (LVOs), though anesthetic strategies remain variable. Methods: We conducted a single-center retrospective review of patients undergoing mechanical thrombectomy for anterior circulation LVOs between 2021 and 2023. Patients were categorized by anesthetic strategy (general anesthesia vs. conscious sedation), and outcomes, including time to recanalization, angiographic results (mTICI), and 90-day functional status (mRS), were compared. Statistical analyses included Student's t-test, Mann-Whitney U-test, and Fisher's exact test. Results: Among 226 patients, 177 (78%) received general anesthesia and 49 (22%) underwent conscious sedation. Baseline characteristics including sex, age, NIHSS, ASPECTS, collaterals, and laterality were similar between groups. Conscious sedation was associated with a statistically significant shorter time from arrival to the angiography suite to groin puncture (p=0.007), but no differences in time to recanalization (p=0.893), angiographic outcomes (p=0.987), or 90-day functional status (p=0.795) were observed. Conclusions: Conscious sedation led to faster procedural initiation, though no difference in clinical or radiographic outcome was observed. Anesthetic choice should be individualized based on patient and physician factors in acute mechanical thrombectomy.

Other Multidisciplinary

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Synthetic neurosurgical data generation using large language models

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doi: 10.1017/cjn.2025.10322

Background: Use of neurosurgical data for research and machine learning model development is often constrained by privacy regulations, small sample sizes, and resource-intensive data preprocessing. We explored the feasibility of using the large language model (LLM) GPT-4o to generate synthetic neurosurgical data. Methods: A plain-language prompt instructed GPT-4o to generate synthetic data based on univariate and bivariate statistical properties of 12 perioperative parameters from a real-world open-access neurosurgical dataset ($n = 139$). The prompt was input over independent trials to generate 10 datasets matching the reference size ($n = 139$), followed by an additional dataset representing a ten-fold amplification ($n = 1390$). Fidelity was assessed using *t*-tests, two-sample proportion tests, Jensen-Shannon divergence, two-sample Kolmogorov-Smirnov, and Pearson's product-moment correlation. Results: Generated data preserved distributional characteristics and relationships between desired parameters. In all generations, at least 11/12 (91.67%) parameters showed no statistically significant differences in means and proportions from real data, including the amplified dataset. Five of the synthetic datasets showed no significant differences in all 12 parameters. Conclusions: The findings demonstrate that a zero-shot prompting approach can generate synthetic neurosurgical data and amplify sample sizes with consistent high fidelity compared to real-world data. This underscores LLMs' potential in addressing data availability challenges for neurosurgical research.

Other Neurosurgery

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Trends in the management of scalp aplasia cutis congenita

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doi: 10.1017/cjn.2025.10323

Background: Aplasia Cutis Congenita is a rare congenital abnormality characterized by varying absence of skin and mesodermal tissues. Management remains controversial, with significant inconsistency across specialties and over time. This review

https://doi.org/10.1017/cjn.2025.10322 Published online by Cambridge University Press