

Curriculum Vitae

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Present Position

- Clinical Professor of Radiology and Clinical Neurosciences, University of Calgary
- Heart and Stroke Foundation Chair in Stroke Research
- Staff Neuroradiologist (Diagnostic and Interventional Neuroradiology), Foothills Medical Centre, Calgary
- Director, Imaging and Intervention, Calgary Stroke Program
- Partner, EFW Radiology
- Fellow, American Heart Association
- Fellow, Canadian Association of Radiology
- Fellow, European Stroke Organization
- Fellow, Canadian Academy of Health Sciences

Summary

Peer Reviewed Manuscripts: 285 (including NEJM, Lancet Neurology, Radiology, Circulation, ANJR, Stroke).

Editorials: 29

Abstracts: >300

Invited Lectureships: >180

International Scientific Meetings organized: 4

Citations: 39177

h-index: 73

i10 index: 380 (google scholar Jan 2021)

GRANTS

- PI ESCAPE trial (published in NEJM)
- PI SWIFT-PRIME trial (published in NEJM)
- Co PI PROVE-IT study (funded by CIHR)
- PI and Chair: HERMES (meta-analysis of the 5 recently published NEJM papers, published in Lancet)
- PI: ESCAPE NA1 (published in Lancet)
- PI: UNMASK EVT: a study in stroke decision making
- Co PI EVOLVE study (funded by CIHR)
- Co PI TEMPO 2 (funded by CIHR)
- Co PI ESCAPE NEXT
- PI ESCAPE MeVO (funded by CIHR and industry)

SIGNIFICANT CONTRIBUTIONS

Publications

- **Goyal M**, Demchuk AM, Menon BK, Eesa M, Rempel JL, Thornton J, Roy D, Jovin TG, Willinsky RA, Sapkota BL, Dowlathshahi D, Frei DF, Kamal NR, Montanera WJ, Poppe AY, Ryckborst KJ, Silver FL, Shuaib A, Tampieri D, Williams D, Bang OY, Baxter BW, Burns PA, Choe H, Heo JH, Holmstedt CA, Jankowitz B, Kelly M, Linares G, Mandzia JL, Shankar J, Sohn SI, Swartz RH, Barber PA, Coutts SB, Smith EE, Morrish WF, Weill A, Subramaniam S, Mitha AP, Wong JH, Lowerison MW, Sajobi TT, Hill MD; the ESCAPE Trial Investigators. Randomized Assessment of Rapid Endovascular Treatment of Ischemic Stroke. *N Engl J Med.* 2015 Mar 12;372(11):1019-30.
Citations: >3700

- Hill MD, **Goyal M (co-first author)**, Menon BK, Nogueira R, McTaggart R, Demchuk A, Poppe AY, Buck B, Field TS, Dowlathshahi D, van Adel BA, Swartz R, Shah RA, Sauvageau E, Zerna C, Ospel JM, Joshi M, Almekhlafi MA, Ryckborst K, Lowerison M, Heard K, Garman D, Haussen D, Cutting

SM, Coutts SB, Roy D, Rempel J, Rohr A, Iancu D, Sahlas DJ, Yu AY, Devlin TG, Hanel RA, Puetz V, Silver F, Campbell BCV, Chapot R, Teitelbaum J, Mandzia JL, Kleinig TJ, Turkel-Parrella D, Heck D, Kelly ME, Bharata A, Bang O, Jadhav A, Gupta R, Frei DF, Tarpley JW, McDougall CG, Holmin S, Rha J, Puri AS, Camden M, Thomalla G, Choe H, Phillips S, Schindler JL, Thornton J, Nagel S, Heo J, Sohn S, Psychogios M, Budzik RF, Starkman S, Martin CO, Murphy S, Lopez G, English J, Tymianski M, on behalf of the ESCAPE-NA1 Investigators. Neuroprotection with Nerinetide in Acute Ischemic Stroke. *Lancet*, 2020; 395 (10227), 878-887.

Citations: 1

- Saver JL, **Goyal M (co-first author)**, van der LA, Menon BK, Majoie CB, Dippel DW, Campbell BC, Nogueira RG, Demchuk AM, Tomasello A, Cardona P, Devlin TG, Frei DF, du Mesnil dR, Berkhemer OA, Jovin TG, Siddiqui AH, van Zwam WH, Davis SM, Castano C, Sapkota BL, Franssen PS, Molina C, van Oostenbrugge RJ, Chamorro A, Lingsma H, Silver FL, Donnan GA, Shuaib A, Brown S, Stouch B, Mitchell PJ, Davalos A, Roos YB, Hill MD; HERMES Collaborators. Time to Treatment with Endovascular Thrombectomy and Outcomes from Ischemic Stroke: A Meta-analysis. *JAMA*, 2016; 316(12):1279-88.
Citations: > 800
- **Goyal M**, Menon BK, van Zwam WH, Dippel DW, Mitchell PJ, Demchuk AM, Davalos A, Majoie CB, van der LA, de Miquel MA, Donnan GA, Roos YB, Bonafe A, Jahan R, Diener HC, van den Berg LA, Levy EI, Berkhemer OA, Pereira VM, Rempel J, Millan M, Davis SM, Roy D, Thornton J, Roman LS, Ribo M, Beumer D, Stouch B, Brown S, Campbell BC, van Oostenbrugge RJ, Saver JL, Hill MD, Jovin TG. Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials. *Lancet*, 2016; 387(10029):1723-31.
Citations: > 2100
- Saver JL, **Goyal M (co-first author)**, Bonafe A, Diener HC, Levy EI, Pereira VM, Albers GW, Cognard C, Cohen DJ, Hacke W, Jansen O, Jovin TG, Mattle HP, Nogueira RG, Siddiqui AH, Yavagal DR, Baxter BW, Devlin TG, Lopes DK, Reddy VK, du Mesnil de Rochemont R, Singer OC, Jahan R; SWIFT PRIME Investigators. Stent-retriever thrombectomy after intravenous t-PA vs. t-PA alone in stroke. *N Engl J Med*. 2015 Jun 11;372(24):2285-95.
Citations: > 3000
- Menon BK, d'Esterre CD, Qazi EM, Almekhlafi M, Hahn L, Demchuk AM, **Goyal M**. Multiphase CT Angiography: A New Tool for the Imaging Triage of Patients with Acute Ischemic Stroke. *Radiology* 2015; 275(2):510-20.

Citations: > 300

Awards (recent)

- Outstanding contributions in research award: American Society of Neuroradiology; 2020
- Lifetime contribution award: Canadian Association of Radiology; 2018
- ASTECH (Alberta Science and Technology) Innovation Award: 2017
- President's Excellence Award: Research 2016. Alberta Health Services
- Researcher of the year: Clinical faculty. Cumming School of Medicine. 2015
- Contributions to Innovation in the field of Neurointervention. Society of Vascular and Intervention Neurology, 2015.

Education and teaching

- Chair of the Calgary Stroke Program 5T course (Teamwork, Technique, Transport, Technology and Training)
- Founder aspectsinstroke.com (free online educational website on acute stroke imaging; over 5000 registered users from 48 countries)
- Worldwide teaching network; visiting professor in more than 25 countries and more than 100 stroke centers

Innovation

- Developed a new technique for efficient stroke imaging: multiphase CTA. This was used in the ESCAPE trial.
- Developed an Acute Stroke Kit (BRISK: Brisk Recanalization Ischemic Stroke Kit) which has now been widely implemented across Canada
- Developed a mathematical model for decision making in acute stroke
- Developed a new combined mechanical thrombectomy technique (BALloon guide with large bore Distal access catheter with Dual Aspiration with Stent-retriever as Standard Approach [BADDASS])

Peer Reviewed Scientific Publications *(last 10 years, reverse chronological order):*

1. Albers GW, Lansberg MG, Brown S, Jadhav AP, Haussen DC, Martins SO, Rebello LC, Demchuk AM, **Goyal M**, Ribo M, Turk AS, Liebeskind DS, Heit JJ, Marks MP, Jovin TG, Nogueira RG. Assessment of Optimal Patient Selection for Endovascular Thrombectomy Beyond 6 Hours After Symptom Onset: A Pooled Analysis of the AURORA Database.

JAMA Neurol, 2021.

2. Almekhlafi MA, **Goyal M**, Dippel DWJ, Majoie CBLM, Campbell BCV, Muir KW, Demchuk AM, Bracard S, Guillemin F, Jovin TG, Mitchell P, White P, Hill MD, Brown S, Saver JL. Healthy Life-Year Costs of Treatment Speed From Arrival to Endovascular Thrombectomy in Patients With Ischemic Stroke: A Meta-analysis of Individual Patient Data From 7 Randomized Clinical Trials. *JAMA Neurol*, 2021; 78(6):709-17.
3. Berndt MT, **Goyal M**, Psychogios M, Kaesmacher J, Boeckh-Behrens T, Wunderlich S, Zimmer C, Friedrich B, Maegerlein C. Endovascular stroke treatment using balloon guide catheters may reduce penumbral tissue damage and improve long-term outcome. *Eur Radiol*, 2021; 31(4):2191-8.
4. Cimflova P, Kappelhof M, Singh N, Kashani N, Ospel JM, McDonough R, Demchuk AM, Menon BK, Sakai N, Chen M, Fiehler J, **Goyal M**. Factors influencing thrombectomy decision making for primary medium vessel occlusion stroke. *J Neurointerv Surg*, 2021.
5. Ganesh A, Ospel JM, Marko M, van Zwam WH, Roos YBWE, Majoie CBLM, **Goyal M**. From Three-Months to Five-Years: Sustaining Long-Term Benefits of Endovascular Therapy for Ischemic Stroke. *Front Neurol*, 2021; 12:713738.
6. Ganesh A, Ospel JM, Kromm J, **Goyal M**. Ignorance is not bliss: managing uncertainty in acute stroke treatment in the COVID-19 era. *Neuroradiology*, 2021; 63(1):3-6.
7. **Goyal M**, Kappelhof M, Ospel JM, Bala F. Balloon guide catheters: use, reject, or randomize? *Neuroradiology*, 2021; 63(8):1179-83.
8. **Goyal M**, Orlov K, Jensen ME, Taylor A, Majoie C, Jayaraman M, Liu J, Milot G, Brouwer P, Yoshimura S, Albuquerque F, Arthur A, Kallmes D, Sakai N, Fraser JF, Nogueira R, Yang P, Dorn F, Thibault L, Fiehler J, Chapot R, Ospel JM. Correction to: A DELPHI consensus statement on antiplatelet management for intracranial stenting due to underlying atherosclerosis in the setting of mechanical thrombectomy. *Neuroradiology*, 2021; 63(8):1391-2.
9. **Goyal M**, Orlov K, Jensen ME, Taylor A, Majoie C, Jayaraman M, Liu J, Milot G, Brouwer P, Yoshimura S, Albuquerque F, Arthur A, Kallmes

D, Sakai N, Fraser JF, Nogueira R, Yang P, Dorn F, Thibault L, Fiehler J, Chapot R, Ospel JM. A DELPHI consensus statement on antiplatelet management for intracranial stenting due to underlying atherosclerosis in the setting of mechanical thrombectomy. *Neuroradiology*, 2021; 63(4):627-32.

10. **Goyal M**, Ospel JM, Hill MD. Will there be a rapid change towards an EVT-only paradigm? *Interv Neuroradiol*, 2021;15910199211011880.
11. **Goyal M**, McDonough R, Ospel JM. What is the appropriate control arm when testing usefulness of mobile stroke units in improving stroke outcomes? *Interv Neuroradiol*, 2021;15910199211011865.
12. **Goyal M**, Ospel JM. Adapting pre-hospital stroke triage systems to expanding thrombectomy indications. *Neuroradiology*, 2021; 63(2):161-6.
13. **Goyal M**, Ospel JM, Kappelhof M, Ganesh A. Challenges of Outcome Prediction for Acute Stroke Treatment Decisions. *Stroke*, 2021; 52(5):1921-8.
14. **Goyal M**, Ganesh A, Tymianski M, Hill MD, Ospel JM. Iatrogenic Diffusion-Weighted Imaging Lesions: What Is Their Impact and How Can It Be Measured? *Stroke*, 2021; 52(5):1929-36.
15. **Goyal M**, Kappelhof M, McDonough R, Ospel JM. Secondary Medium Vessel Occlusions: When Clots Move North. *Stroke*, 2021; 52(3):1147-53.
16. **Goyal M**, McDonough R. Eudaimonia and the Future Radiologist. *Acad Radiol*, 2021.
17. **Goyal M**, Ospel JM, Demchuk A, McDonough RV. Intraparenchymal haemorrhages as a primary outcome measure. *Lancet Neurol*, 2021; 20(8):595.
18. **Goyal M**, Ospel JM, Ganesh A, Marko M, Fisher M. Rethinking Consent for Stroke Trials in Time-Sensitive Situations: Insights From the COVID-19 Pandemic. *Stroke*, 2021; 52(4):1527-31.
19. **Goyal M**, Cimflova P, Ospel JM, Chapot R. Endovascular treatment of anterior cerebral artery occlusions. *J Neurointerv Surg*, 2021.

20. **Goyal M**, Marko M. Optimising prehospital stroke triage in a changing landscape. *Lancet Neurol*, 2021; 20(3):166-8.
21. Joundi RA, Rebchuk AD, Field TS, Smith EE, **Goyal M**, Demchuk AM, Dowlatshahi D, Poppe AY, Williams DJ, Mandzia JL, Buck BH, Jadhav AP, Pikula A, Menon BK, Hill MD. Health-Related Quality of Life Among Patients With Acute Ischemic Stroke and Large Vessel Occlusion in the ESCAPE Trial. *Stroke*, 2021; 52(5):1636-42.
22. Kaesmacher J, Meinel TR, Kurmann C, Zaidat OO, Castonguay AC, Zaidi SF, Mueller-Kronast N, Kappelhof M, Dippel DWJ, Soudant M, Bracard S, Hill MD, **Goyal M**, Strbian D, Heiferman DM, Ashley W, Anadani M, Spiotta AM, Dobrocky T, Piechowiak EI, Arnold M, Goeldlin M, Seiffge D, Mosimann PJ, Mordasini P, Gralla J, Fischer U. Safety and efficacy of intra-arterial fibrinolytics as adjunct to mechanical thrombectomy: a systematic review and meta-analysis of observational data. *J Neurointerv Surg*, 2021.
23. Kappelhof M, Tolhuisen ML, Treurniet KM, Dutra BG, Alves H, Zhang G, Brown S, Muir KW, D'Ávalos A, Roos YBWE, Saver JL, Demchuk AM, Jovin TG, Bracard S, Campbell BCV, van der LA, Guillemin F, White P, Hill MD, Dippel DWJ, Mitchell PJ, **Goyal M**, Marquering HA, Majoie CBLM. Endovascular Treatment Effect Diminishes With Increasing Thrombus Perviousness: Pooled Data From 7 Trials on Acute Ischemic Stroke. *Stroke*, 2021;STROKEAHA120033124.
24. Kappelhof M, Ospel J, Kashani N, Cimflova P, Singh N, Almekhlafi MA, Menon BK, Fiehler J, Chen M, Sakai N, **Goyal M**. Influence of intravenous alteplase on endovascular treatment decision-making in acute ischemic stroke due to primary medium-vessel occlusion: a case-based survey study. *J Neurointerv Surg*, 2021.
25. Kuang H, Qiu W, Boers AM, Brown S, Muir K, Majoie CBLM, Dippel DWJ, White P, Epstein J, Mitchell PJ, D'Ávalos A, Bracard S, Campbell B, Saver JL, Jovin TG, Rubiera M, Khaw AV, Shankar JJ, Fainardi E, Hill MD, Demchuk AM, **Goyal M**, Menon BK. Computed Tomography Perfusion-Based Machine Learning Model Better Predicts Follow-Up Infarction in Patients With Acute Ischemic Stroke. *Stroke*, 2021; 52(1):223-31.
26. Marko M, Cimflova P, Poppe AY, Kashani N, Singh N, Ospel J, Mayank A, van Adel B, McTaggart RA, Nogueira RG, Demchuk AM, Rempel JL, Joshi M, Zerna C, Menon BK, Tymianski M, Hill MD,

Goyal M, Almekhlafi MA. Management and outcome of patients with acute ischemic stroke and tandem carotid occlusion in the ESCAPE-NA1 trial. *J Neurointerv Surg*, 2021.

27. Muram S, Eesa M, Belanger BL, Almekhlafi M, **Goyal M**, Morrish W, Wong JH, Gomez-Paz S, Akamatsu Y, Salem MM, Robinson TM, Moore JM, Thomas AJ, Ogilvy CS, Mitha AP. A Novel Parameter to Predict Supraclinoid Aneurysm Persistence After Flow Diversion with the Pipeline Embolization Device. *World Neurosurg*, 2021; 145:e216-e223.
28. Ng FC, Yassi N, Sharma G, Brown SB, **Goyal M**, Majoie CBLM, Jovin TG, Hill MD, Muir KW, Saver JL, Guillemin F, Demchuk AM, Menon BK, San Roman L, Liebeskind DS, White P, Dippel DWJ, Davalos A, Bracard S, Mitchell PJ, Wald MJ, Davis SM, Sheth KN, Kimberly WT, Campbell BCV. Cerebral Edema in Patients With Large Hemispheric Infarct Undergoing Reperfusion Treatment: A HERMES Meta-Analysis. *Stroke*, 2021;STROKEAHA120033246.
29. Ohara T, Menon BK, Al Ajlan FS, Horn M, Najm M, Al Sultan A, Puig J, Dowlathshahi D, Calleja Sanz AI, Sohn SI, Ahn SH, Poppe AY, Mikulik R, Asdaghi N, Field TS, Jin A, Asil T, Boulanger JM, Letteri F, Dey S, Evans JW, **Goyal M**, Hill MD, Almekhlafi M, Demchuk AM. Thrombus Migration and Fragmentation After Intravenous Alteplase Treatment: The INTERRSeCT Study. *Stroke*, 2021; 52(1):203-12.
30. Ospel J, Mayank A, Qiu W, Almekhlafi M, Menon B, McTaggart R, Nogueira R, Demchuk A, Joshi M, Zerna C, Chapot R, Bharatha A, Jadhav A, Nagel S, Poppe A, Tymianski M, Hill M, **Goyal M**. Clinical outcomes of isolated deep grey matter infarcts after endovascular treatment of large vessel occlusion stroke. *Neuroradiology*, 2021.
31. Ospel JM, Kappelhof M, Kashani N, Menon BK, Campbell BCV, San Roman L, Demchuk AM, Dippel DWJ, Saver JL, Jovin TG, Mitchell P, Bracard S, Muir K, White P, Guillemin F, Majoie CBLM, Hill MD, Brown S, **Goyal M**. Effect of age and baseline ASPECTS on outcomes in large-vessel occlusion stroke: results from the HERMES collaboration. *J Neurointerv Surg*, 2021; 13(9):790-3.
32. Ospel JM, Singh N, Almekhlafi MA, Menon BK, Butt A, Poppe AY, Jadhav A, Silver FL, Shah R, Dowlathshahi D, O'Hare AM, Demchuk AM, **Goyal M**, Hill MD. Early Recanalization With Alteplase in Stroke Because of Large Vessel Occlusion in the ESCAPE Trial. *Stroke*, 2021;

52(1):304-7.

33. Ospel JM, **Goyal M**. A review of endovascular treatment for medium vessel occlusion stroke. *J Neurointerv Surg*, 2021; 13(7):623-30.
34. Ospel JM, Hill MD, Kappelhof M, Demchuk AM, Menon BK, Mayank A, Dowlatshahi D, Frei D, Rempel JL, Baxter B, **Goyal M**. Which Acute Ischemic Stroke Patients Are Fast Progressors?: Results From the ESCAPE Trial Control Arm. *Stroke*, 2021; 52(5):1847-50.
35. Ospel JM, Hill MD, Demchuk A, Menon BK, Thornton J, Rempel J, Almekhlafi MA, Ganesh A, Kappelhof M, Singh N, Cimflova P, Kashani N, Bala F, Kim BJ, McTaggart R, Poppe A, Nogueira RG, Tymianski M, **Goyal M**. Clinical impact of EVT with failed reperfusion in patients with acute ischemic stroke: results from the ESCAPE and ESCAPE-NA1 trials. *Neuroradiology*, 2021.
36. Ospel JM, Menon BK, **Goyal M**. Questions on Predicting Early Neurological Deterioration in Patients With Minor Stroke and Large-Vessel Occlusion. *JAMA Neurol*, 2021; 78(8):1020.
37. Ospel JM, Qiu W, Menon BK, Mayank A, Demchuk A, McTaggart R, Nogueira RG, Poppe AY, Jayaraman M, Buck B, Haussen D, Roy D, Joshi M, Zerna C, Almekhlafi M, Tymianski M, Hill MD, **Goyal M**. Radiologic Patterns of Intracranial Hemorrhage and Clinical Outcome after Endovascular Treatment in Acute Ischemic Stroke: Results from the ESCAPE-NA1 Trial. *Radiology*, 2021; 300(2):402-9.
38. Ospel JM, McDonough R, Kunz WG, **Goyal M**. Is concurrent intravenous alteplase in patients undergoing endovascular treatment for large vessel occlusion stroke cost-effective even if the cost of alteplase is only US\$1? *J Neurointerv Surg*, 2021.
39. Ospel JM, Menon BK, Qiu W, Kashani N, Mayank A, Singh N, Cimflova P, Marko M, Nogueira RG, McTaggart RA, Demchuk AM, Poppe AY, Zerna C, Joshi M, Almekhlafi MA, Haussen D, Cutting S, Coutts SB, Roy D, Rohr A, Iancu D, Tymianski M, Hill MD, **Goyal M**. A Detailed Analysis of Infarct Patterns and Volumes at 24-hour Noncontrast CT and Diffusion-weighted MRI in Acute Ischemic Stroke Due to Large Vessel Occlusion: Results from the ESCAPE-NA1 Trial. *Radiology*, 2021; 300(1):152-9.

40. Ospel JM, Brown S, Kappelhof M, van Zwam W, Jovin T, Roy D, Campbell BCV, Mitchell P, Roos Y, Guillemin F, Buck B, Muir K, Bracard S, White P, du Mesnil dR, **Goyal M**. Comparing the Prognostic Impact of Age and Baseline National Institutes of Health Stroke Scale in Acute Stroke due to Large Vessel Occlusion. *Stroke*, 2021;STROKEAHA120032364.
41. Ospel JM, **Goyal M**. Keeping Late Thrombectomy Imaging Protocols Simple to Avoid Analysis Paralysis. *Clin Neuroradiol*, 2021.
42. Qiu W, Kuang H, Ospel JM, Hill MD, Demchuk AM, **Goyal M**, Menon BK. Automated Prediction of Ischemic Brain Tissue Fate from Multiphase Computed Tomographic Angiography in Patients with Acute Ischemic Stroke Using Machine Learning. *J Stroke*, 2021; 23(2):234-43.
43. Rajashekar D, Hill MD, Demchuk AM, **Goyal M**, Fiehler J, Forkert ND. Prediction of Clinical Outcomes in Acute Ischaemic Stroke Patients: A Comparative Study. *Front Neurol*, 2021; 12:663899.
44. Sevick LK, Demchuk AM, Shuaib A, Smith EE, Rempel JL, Butcher K, Menon BK, Jeerakathil T, Kamal N, Thornton J, Williams D, Poppe AY, Roy D, **Goyal M**, Hill MD, Clement F. A Prospective Economic Evaluation of Rapid Endovascular Therapy for Acute Ischemic Stroke. *Can J Neurol Sci*, 2021;1-8.
45. Singh N, Ospel J, **Goyal M**. Assessment of Nonstenotic Carotid Plaques. *J Am Coll Cardiol*, 2021; 77(8):1145-6.
46. Sporns PB, Fiehler J, Ospel J, Safouris A, Hanning U, Fischer U, **Goyal M**, McTaggart R, Brehm A, Psychogios M. Expanding indications for endovascular thrombectomy-how to leave no patient behind. *Ther Adv Neurol Disord*, 2021; 14:1756286421998905.
47. Thanh NX, Jeerakathil T, Stang J, Halabi ML, Mann B, Buck BH, Rempel JL, **Goyal M**, Demchuk AM, Valaire S, Wasylak T, Hill MD. Return on Investment in Endovascular Care: The case of Endovascular Reperfusion Alberta. *Can J Neurol Sci*, 2021;1-22.
48. van Voorst H, Kunz WG, van den Berg LA, Kappelhof M, Pinckaers FME, **Goyal M**, Hunink MGM, Emmer BJ, Mulder MJHL, Dippel DWJ, Coutinho JM, Marquering HA, Boogaarts HD, van der LA, van Zwam WH, Roos YBWE, Buskens E, Dijkgraaf MGW, Majoie CBLM.

Quantified health and cost effects of faster endovascular treatment for large vessel ischemic stroke patients in the Netherlands. *J Neurointerv Surg*, 2021.

49. Venema E, Roozenbeek B, Mulder MJHL, Brown S, Majoie CBLM, Steyerberg EW, Demchuk AM, Muir KW, Dávalos A, Mitchell PJ, Bracard S, Berkhemer OA, Lycklama Æ Nijeholt GJ, van Oostenbrugge RJ, Roos YBWE, van Zwam WH, van der LA, Hill MD, White P, Campbell BCV, Guillemin F, Saver JL, Jovin TG, **Goyal M**, Dippel DWJ, Lingsma HF. Prediction of Outcome and Endovascular Treatment Benefit: Validation and Update of the MR PREDICTS Decision Tool. *Stroke*, 2021;STROKEAHA120032935.
50. Yu AYY, Hill MD, Asdaghi N, Boulanger JM, Camden MC, Campbell BCV, Demchuk AM, Field TS, **Goyal M**, Krause M, Mandzia J, Menon BK, Mikulik R, Moreau F, Penn AM, Swartz RH, Coutts SB. Sex Differences in Diagnosis and Diagnostic Revision of Suspected Minor Cerebral Ischemic Events. *Neurology*, 2021; 96(5):e732-e739.
51. Zerna C, Rogers E, Rabi DM, Demchuk AM, Kamal N, Mann B, Jeerakathil T, Buck B, Shuaib A, Rempel J, Menon BK, **Goyal M**, Hill MD. Sex Differences in Endovascular Treatment for Stroke: A Population-based Analysis. *Can J Neurol Sci*, 2021; 48(4):479-86.
52. d'Esterre CD, Sah RG, Assis Z, Talai AS, Demchuk AM, Hill MD, **Goyal M**, Lee TY, Forkert ND, Barber PA. Defining reperfusion post endovascular therapy in ischemic stroke using MR-dynamic contrast enhanced perfusion. *Br J Radiol*, 2020; 93(1116):20190890.
53. **Goyal M**, Ospel JM, Menon B, Almekhlafi M, Jayaraman M, Fiehler J, Psychogios M, Chapot R, van der LA, Liu J, Yang P, Agid R, Hacke W, Walker M, Fischer U, Asdaghi N, McTaggart R, Srivastava P, Nogueira RG, Moret J, Saver JL, Hill MD, Dippel D, Fisher M. Challenging the Ischemic Core Concept in Acute Ischemic Stroke Imaging. *Stroke*, 2020; 51(10):3147-55.
54. Kaesmacher J, Ospel JM, Meinel TR, Boulouis G, **Goyal M**, Campbell BCV, Fiehler J, Gralla J, Fischer U. Thrombolysis in Cerebral Infarction 2b Reperfusion: To Treat or to Stop? *Stroke*, 2020; 51(11):3461-71.
55. Kashani N, Assis Z, Ospel JM, **Goyal M**. Approaches to Improving Teaching of Neurovascular Anatomy and Stroke Imaging in the Digital

Age. *Stroke*, 2020; 51(10):e276-e279.

56. Kunz WG, Hunink MG, Almekhlafi MA, Menon BK, Saver JL, Dippel DWJ, Majoie CBLM, Jovin TG, Davalos A, Bracard S, Guillemin F, Campbell BCV, Mitchell PJ, White P, Muir KW, Brown S, Demchuk AM, Hill MD, **Goyal M**. Public health and cost consequences of time delays to thrombectomy for acute ischemic stroke. *Neurology*, 2020; 95(18):e2465-e2475.
57. Menon BK, Ospel JM, McTaggart RA, Nogueira RG, Demchuk AM, Poppe A, Rempel JL, Zerna C, Joshi M, Almekhlafi MA, Field TS, Dowlatshahi D, van Adel BA, Sauvageau E, Tarpley J, Moreira T, Bang OY, Heck D, Psychogios MN, Tymianski M, Hill MD, **Goyal M**. Imaging criteria across pivotal randomized controlled trials for late window thrombectomy patient selection. *J Neurointerv Surg*, 2020.
58. Ospel J, Kappelhof M, Groot AE, LeCouffe NE, Coutinho JM, Yoo AJ, Yo LSF, Beenen LFM, van Zwam WH, van der LA, Postma AA, Roos YBWE, **Goyal M**, Majoie CBLM. Combined Effect of Age and Baseline Alberta Stroke Program Early Computed Tomography Score on Post-Thrombectomy Clinical Outcomes in the MR CLEAN Registry. *Stroke*, 2020; 51(12):3742-5.
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Editorials and Opinion pieces

1. **Goyal M**, Ospel JM. Letter by Goyal and Ospel Regarding Article, "Direct Transfer to Angio-Suite Versus Computed Tomography-Transit in Patients Receiving Mechanical Thrombectomy: a Randomized Trial". *Stroke*, 2021; 52(1):e26-e27.
2. **Goyal M**, Ospel JM. Letter by Goyal and Ospel Regarding Article, "Multimodal Predictive Modeling of Endovascular Treatment Outcome for Acute Ischemic Stroke Using Machine-Learning". *Stroke*, 2021; 52(2):e83-e84.
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14. **Goyal M**, Ospel JM. About antifragility and the challenge of dealing with endovascular therapy trials that fail to show a positive result. *J Neurointerv Surg*, 2020 Mar;12(3):229-232
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Scientific Presentations (selected)

Last 12 months

International Stroke Conference (ISC). Honolulu, Hawaii, USA. (02/2019)

1. Brown S, Liebeskind DS, Hill MD, Dippel DW, Campbell BC, Muir KW, Demchuk AM, Bracard S, Davalos A, Guillemin F, Jovin TG, Menon BK, Mitchell PJ, White P, Majoie CB, Saver JL, **Goyal M**. Poor reperfusion after endovascular therapy is associated with worse outcomes than no intervention in the HERMES analysis of seven randomized trials [poster presentation WMP7]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.
2. Chau D, Garman D, Adams C, Zhang Y, Rizwan A, Ryckborst KJ, **Goyal M**, Hill MD, Christenson J, Tymianski M. Senior Clinical Project Leader [poster presentation TP394]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.
3. Singh RJ, Najm M, Menon BK, Demchuk AD, **Goyal M**, Hill MD, Almekhlafi MA. Hemispheric white matter sparing and neurological outcome after recanalization treatment in ESCAPE Trial [poster presentation WP84]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.
4. Almekhlafi MA, Kunz W, McTaggart R, Najm M, Shankar JJ, Khaw A, Fainardi E, Barcelone MR, Jayaraman MV, Hill MD, Demchuk A, **Goyal M**, Menon BK. Collateral- vs Perfusion-Based Selection Paradigm of Late Window (6-24 hours) Patients With Acute Ischemic Stroke a Comparative Study of Decision Making Using Multi-Phase CTA and CT Perfusion [poster presentation TP77]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.
5. Saposnik G, Wilson A, Almekhlafi M, Kashani M, Kunz W, Baxter B, Pillai S, Campbell B, Mitchell P, Fisher U, Rabinstein A, Yoshimura S, Heo JH, Kim BM, Cherian M, Turjman F, Foss M, Hill MD, Menon B, **Goyal M**. Which characteristics determine the decision to proceed with endovascular therapy in acute stroke patients: results from an international multidisciplinary study [poster presentation WP4]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.
6. Francis MJ, Kamal N, Lau M, Zhu L, Malik F, **Goyal M**, Holodinsky JK. DESTINE: Interactive software modeling best transport option for ischemic stroke patients to access EVT using a novel 2-dimensional temporal spatial visualization [poster presentation WP370]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.

7. Venema E, Mulder MJ, Roozenbeek B, Brown S, Majoie CB, Demchuk A, Muir K, Davalos A, Mitchell PJ, Bracard S, Hill MD, White P, Campbell BC, Guillemin F, Saver JL, Jovin T, **Goyal M**, van der Lugt A, Dippel DW, Lingsma HF. Improving selection of patients for endovascular treatment of acute ischemic stroke: external validation of a clinical decision tool in data from the HERMES collaboration [poster presentation WP9]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.
8. Alaka SA, Brobbey A, Menon BK, Williamson T, **Goyal M**, Demchuk AM, Hill MD, Sajobi T. Machine learning models are more accurate than regression-based models for predicting functional impairment risk in acute ischemic stroke [poster presentation WP182]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.
9. Coutts SB, Kenney C, Kelly P, Parsons M, **Goyal M**, Hill M. Tempo-2: TNK-tPA for minor ischemic stroke with proven acute symptomatic occlusion Trial-2 [poster presentation CTP14]. International Stroke Conference (ISC). Honolulu, Hawaii, USA. February 06-08, 2019.

2019 American Academy of Neurology (AAN) Annual Meeting,
Advancing Neurology, Advancing You. Philadelphia, Pennsylvania, USA.
(05/2019)

10. Ganesh A, Menon B, Assis Z, Demchuk AM, Al-Ajlan FS, Almekhlafi M, Rempel J, Baxter B, Thornton J, Kashani N, Hill MD, **Goyal M**. Factors associated with discrepancy between post-treatment infarct volume and 90-day functional outcome in the ESCAPE randomized controlled trial [scientific session S47.008]. 2019 American Academy of Neurology (AAN) Annual Meeting, Advancing Neurology, Advancing You. Philadelphia, Pennsylvania, USA. May 04-10, 2019.

American Society of Neuroradiology (ASNR) 57th Annual Meeting
Connection Science & Practice. Boston, MA, USA. (05/2019)

11. Podlasek A, Al Sultan A, **Goyal M**, Almekhlafi M. The safety and efficacy of Ticagrelor or Prasugrel in intracranial flow-diverting stents - a systematic review and meta-analysis [ASNR abstract 3023 presentation]. American Society of Neuroradiology (ASNR) 57th Annual Meeting Connection Science & Practice. Boston, MA, USA. May 18-23, 2019.
12. **Goyal M**. Imaging and patient selection in acute stroke: what do we know? [ASNR presentation]. American Society of Neuroradiology (ASNR) 57th Annual Meeting Connection Science & Practice. Boston, MA, USA. May 18-23, 2019.

5th European Stroke Organization Conference (ESOC). Milan, Italy.
(05/2019)

13. Tsigoulis G, Katsanos A, Malhotra K, Goyal N, Arhur A, Schellinger P, Kohrmann M, Krogias C, Turc G, Magoufis G, Leys D, Ahmed N, Khatri P, **Goyal M**, Alexandrov AV. Bridging therapy versus direct mechanical thrombectomy in acute ischemic stroke patients with large vessel occlusion: a systematic review and meta-analysis [ESOC scientific communication]. 5th European Stroke Organization Conference (ESOC). Milan, Italy. May 22-24, 2019.
14. Ng F, Kimberly WT, Sharma G, Brown S, **Goyal M**, Majoie CBLM, Jovin T, Hill M, Muir K, Saver J, Guillemin F, Demchuk A, White P, Dippel D, Davalos A, Bracard S, Mitchell P, Wald M, Sheth K, Campbell B. Cerebral edema in patients presenting with large hemispheric ischemic stroke undergoing endovascular thrombectomy versus medical therapy: a meta-analysis of individual patient data [ESOC scientific communication]. 5th European Stroke Organization Conference (ESOC). Milan, Italy. May 22-24, 2019.
15. Teleg E, Al Sultan A, Horn M, Kasickova L, Marzoughi S, Ohara T, Kulkarni G, Bobyn A, Neweduk A, Rodriguez-Luna D, **Goyal M**, Menon B, Demchuk A. Quantification of the leak rate of the spot sign in multiphase CT angiogram strongly predicts intracranial haemorrhage growth [ESOC e-poster discussion]. 5th European Stroke Organization Conference (ESOC). Milan, Italy. May 22-24, 2019.
16. Muir KW, White P, Brown BS, Campbell BCV, Mitchell P, Demchuk AM, Hill MD, Jovin TG, Davalos A, Guillemin F, Bracard S, Saver JL, Albers G, Majoie C, Dippel DWJ, **Goyal M**. Imaging selection criteria and treatment effect of endovascular thrombectomy in endovascular treatment trials [ESOC scientific communication]. 5th European Stroke Organization Conference (ESOC). Milan, Italy. May 22-24, 2019.
17. Kaesmacher J, Christoph K, Noel J, Breiding P, Lang MF, Meier R, Dobrocky T, Piechowiak E, Zibold F, Bellwald S, Heldner MR, Mordasini P, Arnold M, Mosimann P, **Goyal M**, Gralla J, Fischer U. Infarct in new territory after endovascular stroke treatment: a diffusion-weighted imaging study [ESOC e-poster discussion]. 5th European Stroke Organization Conference (ESOC). Milan, Italy. May 22-24, 2019.
18. **Goyal M**. Collateral imaging: pretty pictures or useful for decision making? [ESOC presentation]. 5th European Stroke Organization Conference (ESOC). Milan, Italy. May 22-24, 2019.

5T Stroke Conference. Kananaskis, Alberta, Canada. (06/2019)

19. **Goyal M**, Demchuk A. Decision-making in the extended time window [5T moderator]. 5T Stroke Conference. Kananaskis, Alberta, Canada. June 7-9, 2019.
20. Milot G, **Goyal M**, Nogueira R, Frei D. Optimizing first pass TICI 2c-3 [5T presentation]. 5T Stroke Conference. Kananaskis, Alberta, Canada. June 7-9, 2019.
21. **Goyal M**. What we don't know [5T presentation]. 5T Stroke Conference. Kananaskis, Alberta, Canada. June 7-9, 2019.
22. **Goyal M**. Conference Chair. 5T Stroke Conference. Kananaskis, Alberta, Canada. June 7-9, 2019.

Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting.
Miami Beach, Florida, USA. (07/2019)

23. Almekhlafi M, **Goyal M**, Kuczynski A. The feasibility and efficacy of Trans-radial access for mechanical thrombectomy in ischemic stroke: a systematic review of the literature [poster presentation]. Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting. Miami Beach, Florida, USA. July 22-25, 2019.
24. Kashani N, Ospel JM, Wilson AT, Fischer U, Campbell BCV, Sylaja PN, Yoshimura S, Rabinstein A, Turjman F, Mitchell PJ, Kim BM, Cherian M, Heo JH, Baxter B, Podlasek A, Foss M, Menon BK, Almekhlafi M, Demchuk AM, Hill MD, Saposnik G, **Goyal M**. Endovascular treatment decision in acute stroke: Which patients? Insights from UNMASK EVT, an international multidisciplinary survey [poster presentation]. Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting. Miami Beach, Florida, USA. July 22-25, 2019.
25. Kashani N, Ospel JM, Wilson AT, Fischer U, Campbell BCV, Sylaja PN, Yoshimura S, Rabinstein A, Turjman F, Mitchell PJ, Kim BM, Cherian M, Heo JH, Baxter B, Podlasek A, Foss M, Menon BK, Almekhlafi M, Demchuk AM, Hill MD, Saposnik G, **Goyal M**. Geographic variations in endovascular stroke treatment: Insights from UNMASK EVT, an international multidisciplinary survey [poster presentation]. Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting. Miami Beach, Florida, USA. July 22-25, 2019.
26. **Goyal M**, Saposnik G, Menon BK, Kashani N, Wilson AT, Yoshimura S, Campbell BCV, Baxter B, Rabinstein A, Turjman F, Fischer U, Ospel JM, Mitchell PJ, Sylaja PN, Cherian M, Kim BM, Heo JH, Podlasek A, Almekhlafi M, Foss M, Demchuk AM, Hill MD. Factors associated with the decision-making on endovascular thrombectomy for the management of acute ischemic stroke [oral presentation]. Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting. Miami Beach, Florida, USA. July 22-25, 2019.

27. Ospel JM, Kashani N, **Goyal M**, Menon BK, Campbell BCV, Fischer U, Turjman F, Mitchell PJ, Yoshimura S, Podlasek A, Rabinstein A, Wilson AT, Kim BM, Baxter B, Cherian M, Heo JH, Foss M, Sylaja PN, Hill MD, Saposnik G, Almekhlafi M. Time of day and endovascular treatment decision in acute stroke with relative endovascular treatment indication - Insights from UNMASK EVT [poster presentation]. Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting. Miami Beach, Florida, USA. July 22-25, 2019.
28. Ospel JM, Kashani N, Wilson AT, Fischer U, Campbell BCV, Sylaja PN, Yoshimura S, Rabinstein A, Turjman F, Mitchell PJ, Kim BM, Cherian M, Heo JH, Baxter B, Podlasek A, Foss M, Menon BK, Almekhlafi M, Demchuk AM, Hill MD, Saposnik G, **Goyal M**. Endovascular treatment decision in acute stroke: Does physician sex matter? Insights from UMASK EVT, an international multidisciplinary survey [poster presentation]. Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting. Miami Beach, Florida, USA. July 22-25, 2019.
29. Ospel JM, Kashani N, Wilson AT, Fischer U, Campbell BCV, Sylaja PN, Yoshimura S, Rabinstein A, Turjman F, Mitchell PJ, Kim BM, Cherian M, Heo JH, Baxter B, Podlasek A, Foss M, Menon BK, Almekhlafi M, Demchuk AM, Hill MD, Saposnik G, **Goyal M**. Endovascular treatment decision in acute stroke in patients with severe co-morbidities: Insights from UNMASK EVT, an international multidisciplinary survey [poster presentation]. Society of NeuroInterventional Surgery (SNIS) 16th Annual Meeting. Miami Beach, Florida, USA. July 22-25, 2019.

15th Congress of the World Federation of Interventional and Therapeutic Neuroradiology (WFITN 2019). Naples, Italy. (10/2019)

30. **Goyal M**. Which patients should not be treated? [oral presentation]. 15th Congress of the World Federation of Interventional and Therapeutic Neuroradiology (WFITN 2019). Naples, Italy. October 21-24, 2019.
31. **Goyal M**. Plenary Session 2: Stroke B [Chair]. 15th Congress of the World Federation of Interventional and Therapeutic Neuroradiology (WFITN 2019). Naples, Italy. October 21-24, 2019.

DIRECT-MT Conference. Shanghai, China. (11/2019)

32. **Goyal M**. Current evidence and unresolved questions [oral presentation]. DIRECT-MT Conference. Shanghai, China. November 01-04, 2019.

Advanced Live Interventional Course of Essen (ALICE). Essen, Germany. (11/2019)

33. **Goyal M.** What is the ischemic core? [oral presentation]. Advanced Live Interventional Course of Essen (ALICE). Essen, Germany. November 06-08, 2019.
34. **Goyal M.** Which studies are to come? [oral presentation]. Advanced Live Interventional Course of Essen (ALICE). Essen, Germany. November 06-08, 2019.
35. Cognard C, **Goyal M**, O'Hare A, Mohlenbruch M, Nogueira R, Stracke P, van Zwam W, Chapot R. Round table discussion coordinated by Adnan Siddiqui [discussion]. Advanced Live Interventional Course of Essen (ALICE). Essen, Germany. November 06-08, 2019.

Radiological Society of North America Annual Meeting. Chicago, United States (12/2019)

36. Kunz WG, Almekhlafi M, Hunink M, **Goyal M.** Cost-Effectiveness of Thrombectomy for Ischemic Stroke Patients Presenting Beyond 6 Hours of Last Known to Be Well Based on the AURORA Meta-Analysis
37. Ospel JM, Volny O, Qui W, Najm M, Kashani N, **Goyal M**, Menon BK. Optimizing Collateral Evaluation and Distal Vessel Occlusion Detection in Acute Stroke with Colorized Multiphase CTA Summation Maps
38. Joshi M, Brisson AM, Ospel JM, **Goyal M**, Kashani N, Eesa M, Almekhlafi MA, Menon BK. Multiphase CTA - More than Just CTA: A Multiuse Tool in Acute Stroke Imaging and Decision Making
39. **Goyal M**, Ospel JM. Understanding the Variance of Decision Making in Acute Stroke Based on the Principles of Neuroeconomics

International Stroke Conference. Los Angeles, United States (02/2020)

40. Al Sultan A, Teleg E, Horn M, Ojha P, Kasickova L, Marzoughi S, Ohara T, Banerjee A, Kulkarni G, Bobyn A, Neweduk A, Horn K, Rodriguez-Luna D, **Goyal M**, Menon BK, Demchuk AM. 77 - Ongoing leakage revealed by second phase spot sign volume expansion in multi-phase computed tomography angiography strongly predicts intracranial hemorrhage growth [oral abstract]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
41. **Goyal M.** NIT2 - Optimizing EVT [moderator]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
42. **Goyal M.** Optimizing in-hospital workflow [presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-

- 21, 2020.
43. **Goyal M.** Case 1: Randomize in a trial [presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
 44. Kashani N, Ospel JM, Almekhlafi M, Menon B, Singh R, Saposnik G, Hill MD, **Goyal M.** WP31/P31 - Endovascular treatment decision making in Octo- and Nonagenarians: insights from UNMASK EVT, an international multidisciplinary study [poster presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
 45. Ospel JM, Kashani N, Almekhlafi M, Menon B, Singh R, Fischer U, Saposnik G, **Goyal M,** Hill MD. TP53/P53 - How do physicians approach intravenous alteplase treatment in acute ischemic stroke patients? Insights from UNMASK EVT, an international multidisciplinary study [poster presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
 46. Ospel JM, Kashani N, Menon B, Almekhlafi M, Singh R, Saposnik G, Hill MD, **Goyal M.** TP56/P56 - Endovascular treatment decisions in acute ischemic stroke patients with low baseline aspects: insights from an international multidisciplinary survey [poster presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
 47. Podlasek A, Jewett G, Shahein A, **Goyal M,** Almekhlafi MA. WP8/P8 - Procedural times and first pass tici-3 with direct aspiration vs retrievable stents vs for treatment of large vessel occlusion stroke: a systematic review and meta-analysis [poster presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
 48. Psychogios M, Maier I, Tsogkas I, Hesse A, Brehm A, Behme D, Schnieder M, Schregel K, Papageorgiou I, Liebeskind D, **Goyal M,** Liman J. TMP3/MP3 - One-stop management of 230 consecutive acute stroke patients report of procedural times and clinical outcome [poster presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
 49. van Kranendonk KR, Kappelhof M, Chalos V, Treurniet KM, van Zwam W, van Oostenbrugge RJ, Lingsma HF, Dippel DW, van der Lugt A, Mitchell PJ, Hill MD, Jovin TG, Davalos A, Campbell BC, Saver JL, White

- P, Bracard S, Guillemin F, Demchuk A, Brown S, Muir K, Roos YB, Marquering HA, **Goyal M**, Majoie CB. 75 - Hemorrhagic transformation after acute ischemic stroke due to a large vessel occlusion is associated with less treatment benefit [oral abstract]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.
50. Zerna C, Rogers E, Rabi DM, Demchuk AM, Kamal N, Mann B, Jeerakathil T, Buck B, Shuaib A, Rempel J, Menon BK, **Goyal M**, Hill MD. TP39/P39 - Comparative effectiveness of endovascular treatment for acute ischemic stroke: a population-based analysis [poster presentation]. International Stroke Conference (ISC) 2020. Los Angeles, California, USA. February 19-21, 2020.

Invited lectures:

1. Controversies in Acute Stroke: A three-way Debate. International Stroke Conference. Los Angeles, USA. February 2020.
2. Optimizing In-hospital Workflow. International Stroke Conference. Los Angeles, USA. February 2020.
3. Advances in treatment of acute ischemic stroke through image guided interventional revascularization therapy. 4th Annual Stroke and Cerebrovascular Conference. Kansas City, USA. June 2018.
4. HERMES update. ABC-WIN. Val d'Isere, France. January 2018.
5. Organization of stroke care. ABC-WIN. Val d'Isere, France.
6. January 2018. Planning future stroke trials: what to watch out for. ABC-WIN. Val d'Isere, France. January 2018.
7. Acute stroke: past, present and future. University Hospital. Essen, Germany. February 2018.
8. Acute stroke: past, present and future. University Hospital. Goettingen, Germany. February 2018.
9. Acute stroke: past, present and future. University Hospital. Freiburg, Germany. February 2018.

10. Collaterals: what did we learn from the recent trials. ISC. Los Angeles, CA. January 2018.
11. Acute stroke: past, present and future. University Hospital. Hamburg, Germany. February 2018.
12. Workflow in acute stroke: how to optimize it in light of time is brain. Japanese Neurosurgical Society. Nagoya, Japan. November 2017.
13. Imaging in acute stroke. WFITN. Budapest, Hungary. October 2017.
14. Organization of stroke care. Invited speaker. 19th Nordic Congress of Cerebrovascular Diseases. Aarhus, Denmark. August 2017.
15. Approach, protocols with interactive case discussions; Imaging in acute stroke in the light of current evidence; Penumbra status is the future of acute stroke imaging selection for revascularization; Speed in acute stroke: what does the data show? Monsoon Summit 2017 -- International Update in Neurology. Kochi, India. July 2017.
16. Changing acute stroke: a journey. University of Massachusetts Medical School. Worcester, Massachusetts, USA. May 2017.
17. Guest faculty speaker. 8th Annual Baylor Stroke Conference. Dallas, Texas, USA. May 2017.
18. Stroke prevention and management guidelines forum. Munich, Germany. April 2017.
19. Best imaging strategy for selecting ELVO patients for endovascular therapy-ASPECTS/CTA collateral score. American Society of Neuroradiology. Long Beach, California, USA. April 2017.
20. Guest faculty attendee. Society of Therapeutic Neurointerventions Conference 2017. Tamil, Nadu, India. March 2017.
21. Acute stroke: past, present and future. Dinner symposium. Melbourne, Australia, Feb 2017
22. Imaging in acute stroke. Stroke rounds. Melbourne, Australia, Feb 2017

23. Acute stroke: past, present and future. Dinner symposium. Brisbane, Australia, Feb 2017.
24. Acute stroke: past, present and future. Neuroscience rounds. Sydney, Australia, Feb 2017.
25. Acute stroke: past, present and future. Neuroscience rounds, Gold Coast, Australia, Feb 2017.
26. Collaterals in Asia. Los Angeles, CA, USA. November 2016.
27. TBA, (2016 Denis Melancon Neuroradiology Conference, Invited speaker.) Montreal, QC, Canada. October 2016.
28. Hyperacute ischemic stroke therapy (endovascular recanalization therapy): past, current and future. Jeju, South Korea. September 2016.
29. Initial hospital (achieving the 30-60 metrics.) Boston, MA, USA. July 2016.
30. Changing acute stroke: an ongoing journey. Toronto, ON. March 2016.
31. Imaging in acute stroke. Indian Society of Neuroradiology. Indore, India. Oct 2015.
32. Changing acute stroke: a journey (Keynote speaker). Indore, India. Oct 2015.
33. Patient Selection: Clinical, Multimodal Imaging or Just a CT and CTA? SVIN meeting. Bonita Springs, Florida. Oct 2015.
34. Changing acute stroke: a journey (Keynote speaker). Dinner symposium. New Orleans. Oct 2015.
35. Patient Selection post IV tPA: Who and When? Do You Wait or Take Everyone to the Lab? SVIN meeting. Bonita Springs, Florida. Oct 2015.
36. Embolectomy: How To Speed Things up: The Canadian Approach. SVIN meeting. Bonita Springs, Florida. Oct 2015.

37. Summary of recent trials. Stroke symposium. Kuala Lumpur. Oct 2015.
38. Mothership vs. drip and ship: what does the data show. Stroke symposium. Kuala Lumpur. Oct 2015.
39. Decision making and organization in acute stroke. APSO congress. Kuala Lumpur. Oct 2015.
40. Imaging and decision making in acute stroke. Stroke symposium. Kuala Lumpur. Oct 2015.
41. Parallel processing and workflow in acute stroke. Stroke symposium. Kuala Lumpur. Oct 2015.
42. Planning the procedure on a CT angiogram. Stroke symposium. Kuala Lumpur. Oct 2015.
43. Table and patient preparation. Stroke symposium. Kuala Lumpur. Oct 2015.
44. Economic analysis: SWIFT PRIME. Stroke symposium. Kuala Lumpur. Oct 2015.
45. Future of stroke research. Stroke symposium. Kuala Lumpur. Oct 2015.
46. Stroke management and the results of recent trials. Mumbai, India. July 2015
47. Stroke management and the results of recent trials. Dinner symposium, Bangalore, India. July 2015
48. Changing acute stroke: a journey NIMHANS special guest lecture. Bangalore. July 2015.
49. Results of recent stroke trials and its impact on stroke care. Teleradiology Solutions. Bangalore. July 2015.
50. Stroke management and the results of recent trials. Dinner symposium, New Delhi, India. July 2015

51. Stroke management and the results of recent trials. Chennai, India. July 2015
52. Imaging, workflow and intervention in acute stroke. Bologna, Italy. July 2015.
53. Imaging, workflow and intervention in acute stroke. Las Palmas Gran Canarias. July 2015
54. Imaging, workflow and intervention in acute stroke. Lyon, France. July 2015.
55. Practical imaging and decision making in acute stroke. Dinner symposium. Lyon, France. July 2015.
56. ESCAPE trial: design, imaging and workflow. SLIVE LIVE STROKE COURSE, Nice, France, Sep 2015.
57. Workflow in acute stroke. SLIVE LIVE STROKE COURSE, Nice, France, Sep 2015.
58. Practical Imaging in acute stroke. SLIVE LIVE STROKE COURSE, Nice, France, Sep 2015.
59. Changing acute stroke: a journey: Miami, Florida. May 2015.
60. Stroke Workflow. Irish Society of Neuroradiology. Dublin. May 2015.
61. Changing acute stroke: a journey: Irish Society of Neuroradiology. Dublin. May 2015.
62. ESCAPE trial: design, imaging and workflow. ISC. Nashville, 2015.
63. Implications of recent trials on future of acute stroke. Covidien Satellite symposium. ISC. Nashville, 2015.
64. ESCAPE: primary results. ISC. Nashville, 2015.
65. SWIFT PRIME: primary results. ISC. Nashville, 2015.
66. Streamlining protocols for endovascular stroke care. National Neuroscience Institute, Tan Tock Seng, Singapore. October 05,

2015.

67. Acute stroke imaging and intervention. West Palm Beach. Apr 2014
68. Acute stroke imaging and Intervention. Neurointervention meeting. Temple University. Philadelphia. Apr 2014
69. Acute stroke imaging. Yonsei University. Seoul, South Korea. Apr 2014
70. Acute stroke intervention. Daegu University, Daegu, South Korea, Apr 2014
71. From evidence to practice: advancing systems of care in acute ischemic stroke. Taipei, Taiwan. Sep 2014
72. Critical success factors in establishing ideal systems of care in ischemic stroke. Asia Pacific Stroke Conference, Taipei, Taiwan, Sep 2014
73. Imaging and intervention in acute stroke. National Neuroscience Institute. Singapore. Sept 2014
74. New paradigms in stroke care. Understanding EVT for ischemic stroke. Clinical Neuroscience Society of Singapore, Singapore. Sep 2014.
75. Imaging in acute stroke. Singapore General Hospital. Singapore. Sep 2014.
76. Intervention in acute stroke: future directions. National University of Singapore, Singapore, Sep 2014.
77. Imaging and intervention in acute stroke. Prince of Wales Hospital, HongKong, Sept 2014
78. AIS management. HongKong Society of Interventional Radiology, HongKong, Sep 2014.
79. Efficient imaging in acute stroke. International Conference on Intracranial Atherosclerosis. Chengdu, Sichuan, China, Sept 2014.

80. Optimizing stroke workflow. International Conference on Intracranial Atherosclerosis. Chengdu, Sichuan, China, Sept 2014.
81. Update of stroke imaging and intervention since MR-RESCUE: focusing on imaging strategy (CT and/or MR). Korean Congress of Radiology, Seoul, South Korea, Oct 2014.
82. Changing acute stroke: a journey. Korean Society of Neurointervention. Seoul, South Korea, Oct 2014.
83. IV vs IA is not the argument: Revascularization needs to be fast. AIM VEITH symposium. New York, NY, Nov 2014.
84. CT and CTA Best imaging triage: The Calgary way. AIM VEITH symposium. New York, NY, Nov 2014.
85. Ultrafast door to groin puncture times. AIM VEITH symposium. New York, NY, Nov 2014.
Acute stroke workflow and organization. SWIFT PRIME Investigators meeting. Feb 2014. San Diego.
86. Acute stroke imaging and intervention. West Palm Beach. Apr 2014
87. Acute stroke imaging and Intervention. Neurointervention meeting. Temple University. Philadelphia. Apr 2014
88. Acute stroke imaging. Yonsei University. Seoul, South Korea. Apr 2014
89. Optimizing acute stroke workflow. Covidien Satellite symposium. Feb 2014. San Diego.
90. Workflow in Acute stroke. SNIS meeting. Feb 2014. San Diego
91. Getting to angio fast: lessons learnt from ESCAPE trial. International Stroke Conference. Feb 2014. San Diego
92. Lessons from IMS3 and moving forward with the next trial. Ottawa Hospital - Civic Campus. Dec 2013
93. Extracting maximum information from imaging in the least amount of time in acute stroke. RSNA 2013

94. Planning for the ESCAPE trial. Neurovascular rounds. Halifax. Nov 2013.
95. Lessons from IMS3: Grand rounds. Sunnybrook hospital. Toronto. Nov 2013
96. Optimizing CT imaging in Stroke: RSNA. Chicago. Nov 2013
97. Brag and Steal: Fast imaging in acute stroke. Canadian Stroke Congress, Montreal 2013
98. Improving workflow in acute stroke. Canadian Stroke Congress, Montreal 2013
99. The future of acute stroke treatment after IMS3. Stroke symposium. Seattle, Washington. Oct 2013
100. The future of acute stroke treatment after IMS3. Stroke symposium. Portland, Oregon. Oct 2013
101. IMS3 and the ESCAPE TRIAL: overcoming the limitations and building for the future. Neuroscience Grand Rounds, London, ON. Sep 2013
102. IMS3 and the ESCAPE TRIAL: overcoming the limitations and building for the future. Neuroscience Grand Rounds, London, ON. Sep 2013
103. IMS3: what did we learn? Neurointervention symposium, Toronto, Sep 2013
104. Imaging in acute stroke. Emergency stroke care symposium. Neurointervention symposium, Toronto, Sep 2013
105. Imaging in acute stroke. Emergency stroke care symposium. New York. June 2013
106. Lessons from IMS3. National neurointervention symposium. Delhi, India August 2013
107. Efficient workflow in acute stroke. National neurointervention symposium. Delhi, India August 2013

108. Efficient workflow in acute stroke. National neurointervention symposium. Delhi, India August 2013
109. Imaging in acute stroke. National neurointervention symposium. Delhi, India August 2013
110. Efficient workflow in acute stroke. Tiantan stroke meeting, Beijing. June 2013
111. Imaging in acute stroke. Tiantan stroke meeting, Beijing. June 2013
112. How to do stroke imaging fast. GE Symposium. Milwaukee. June 2013
113. Imaging of Acute Stroke. Canadian Neurological Sciences Federation 48th Annual Congress; Montreal, Quebec, June 2013
114. Tough Stroke Cases. SNIS Stroke meeting. Honolulu, Feb 2013.
115. Workflow in acute stroke. SWIFT PRIME symposium. Honolulu. Feb 2013
116. Future of stroke trials. Neuroscience Rounds. Copenhagen. Nov 2012
117. Imaging and intervention in acute stroke. Swedish Medical Centre. Denver, Colorado, Nov 2012.
118. Treatment of acute stroke. Symposium of Interventional Neuroradiology Society of Delhi, New Delhi, India. Sep 2012.
119. Imaging and Intervention in acute stroke. Satellite symposium. SNIS. San Diego. July 2012.
120. Tips and Tricks for acute stroke intervention. AST Los Angeles. June 2012.
121. Imaging and intervention in acute stroke. Edmonton. June 2012.
122. SWIFT results. AST Los Angeles. June 2012.

123. Stroke protocols. Dinner symposium at AST Los Angeles. June 2012.
124. Tips and Tricks for acute stroke intervention. AST Chicago. May 2012.
125. SWIFT results. AST Chicago. May 2012.
126. Stroke protocols. Dinner symposium at AST Chicago. May 2012.
127. Carotid stenting: emerging technologies. SNIS annual meeting, San Diego. July 2012.
128. Imaging and Intervention in acute stroke. Neuroscience Grand Rounds. University Hospital, Edmonton June 2012.
129. Imaging and Intervention in acute stroke. Neuroscience Grand Rounds. St. Michael's Hospital. Toronto. May 2012
130. Imaging and Intervention in acute stroke. Neuroscience Grand Rounds. Toronto Western Hospital. May 2012.
131. Workflow in acute stroke. SNIS stroke symposium. New York. April 2012
132. IA thrombolysis. Annual meeting of ASNR. April 2012
133. Retrieval devices. Annual meeting of SNIS. Seattle. May 2011
134. Acute stroke intervention: how do I do it? Annual meeting of SNIS. Seattle. May 2011
135. Recent advances in stroke treatment. Washington University, St. Louis. Nov 2011
136. Recent advances in stroke treatment. Massachusetts General Hospital August 2011.
137. Recent advances in stroke treatment. Stroke day organized by Alberta Provincial Stroke Strategy. May 2011.
138. Recent advances in neuroimaging. Neuroscience Grand rounds. Calgary April 2011

139. Recent advances in stroke imaging and intervention. Annual meeting of Indian Radiology and Imaging Association. New Delhi, India. Feb 2011.
140. Imaging and intervention in acute stroke. CCNS, Quebec City, June 2010.
141. Stroke devices. ISACON, New Delhi, India, March 2010
142. CT in acute stroke. ISACON, New Delhi, India, March 2010
143. Imaging and intervention in acute stroke. Neuroscience grand rounds. All India Institute of Medical Sciences, New Delhi, India, Dec 2009
144. How to make recanalization in acute stroke treatment more efficient – where are the limitations. Canadian Neurointerventional Symposium. Toronto Sep 2009.
145. CEA – Stenting Controversy in Symptomatic Carotid Stenosis: International Stroke Update 2009. Trivandrum, Kerala India. January 2009
146. Interventional Treatment of Acute Stroke-Interventional Perspective: International Stroke Update 2009. Trivandrum, Kerala India. January 2009
147. MRI in Acute Stroke: International Stroke Update 2009. Trivandrum, Kerala India. January 2009
148. Current state of retrieval devices. Annual Neurointervention symposium. Toronto, Sep 2008
149. Venous thrombosis: Role of Neurointervention. Annual meeting of Canadian Neuroscience Federation, Victoria, BC, June 2008
150. Difficult decision making in acute stroke. Canadian Association of Radiology annual meeting, Ottawa, May 2008.
151. The future of imaging research in Calgary. GE Medical Solutions, Milwaukee. Feb 2008

152. Current state of imaging research in Calgary. Joint meeting between University of Calgary and National Research Council. October, 2007.
153. Management of Ischemic manifestations of dissection. Annual Neurointerventional Meeting. Toronto, September 2006.
154. Interpreting the CT scan during an Acute Stroke and subtle non-stroke CT scans you don't want to miss. National Stroke Conference, Ottawa, September 2006.
155. Imaging and intervention in acute stroke. Guest lecture. All India Institute of Medical Sciences, New Delhi, India. July 2006
156. Interventional Neuroradiology in Stroke. ICU Critical care week. Ottawa, October 2005
157. Interventional Neuroradiology in Stroke. Annual meeting of Canadian congress of Critical Care Nursing. Ottawa, October 2005
158. Panel Case Discussion. Annual meeting of Eastern Neuroradiology Society, Ottawa, August 2005
159. Management of intracranial dissecting aneurysms. Annual Neurointerventional meeting. Toronto, September 2005
160. Interventional Neuroradiology in 2005. Radiology Grand Rounds. Ottawa Hospital. September 2005
161. Current status of retrieval and protection devices. Annual Neurointerventional Meeting, Toronto September 2004
162. Interventional neuroradiology: where it presently stands. Corporate Clinical Review Day, National Defence Medical Centre, Ottawa May 2004
163. Interventional neuroradiology: where it presently stands. Corporate Clinical Review Day, National Defence Medical Centre, Ottawa May 2004
164. Neurointerventional techniques. Ottawa Chapter of Canadian Association of Neuroscience Nurses. Ottawa, May 2004

165. Invited to attend a thrombolysis focus session at the Annual Meeting of Interventional Radiology at Niagara-on-the-lake in April 2003.
166. Endovascular management of intracranial aneurysms: presented at Anesthesia rounds, Ottawa Hospital, Ottawa in September 2003.
167. Recent advances in diagnosis of intracranial aneurysms: presented at the Annual meeting of the Canadian Congress of Neurological Sciences, Quebec City in June 2003.
168. Carotid stenting: where we stand: presented at Neuroscience rounds, Ottawa Hospital, Ottawa in January 2003
169. Endovascular management of intracranial aneurysms: presented at Neuroscience rounds, Ottawa Hospital, Ottawa in September 2002
170. Endovascular management of carotid disease: presented at the Heart Institute, Ottawa in December 2002
171. Neuroradiology quiz. Annual meeting of the Eastern Society of Neuroradiology, New York, September 2001.
172. Imaging of acute stroke: why, when and how. Presented at St. Joseph's Hospital, Hamilton at Medical Grand Rounds in March 2000
173. Acute stroke intervention. Daegu University, Daegu, South Korea, Apr 2014 Imaging of acute stroke: why, when and how. Presented at the Ottawa Hospital – Civic Campus at Neuroscience Rounds in December 99.
174. International Symposium and Workshops in Cardiovascular and Interventional Radiology November 1997 'Current Trends in Imaging and Intervention in Extracranial Carotid Arteries'

Professional contributions and responsibilities:

- Member of Canadian Society of Neuroradiology
- President of Eastern Neuroradiology Society 2005

- Member of Canadian Stroke Consortium
- Senior Member of Society of Neurointerventional Surgery
- Member American Stroke Association
- Member Radiological Society of North America
- Member of Canadian Neuro-Interventional Group (CING)
- Member of American Society of Neuroradiology (ASNR)
- Member, Neuroradiology focus group setup to investigate the future of Interventional Neuroradiology in Ontario by the Ontario Council of teaching Hospitals
- Elected treasurer of Eastern Neuroradiological Society for 2002-2003.
- Elected vice-president of Eastern Neuroradiological Society for 2003-2004.
- Organized a 'Workshop on Neurointervention' in December, 1996 at the Department of Neuroradiology, All India Institute of Medical Sciences; New Delhi. It included lectures on various topics of Interventional Neuroradiology and live demonstration of cases.
- Editorial board: Stroke
- Founding editor of section on 'Solutions and Innovations' in journal Stroke
- Editorial board: Neuroradiology
- Fellow of American Heart Association

Knowledge Translation

- Multiphase CTA. This is a technique of imaging of acute stroke patients developed by me. Subsequently it was used in the ESCAPE trial and has shown usefulness in acute stroke decision making in multiple ways: a. Saves approximately 20 minutes as compared to an imaging algorithm based on CT perfusion (Time is brain in acute stroke) b. is less vulnerable to patient motion c. can be performed on any CT scanner d. does not require complex post-processing and e. potentially leads to better decision making. This technique is now being used at many stroke centres across Canada and is slowly spreading across the world with implementation in South Korea, Spain, India etc.
- Stroke Kit: BRISK (Brisk Recanalization Ischemic Stroke Kit). This was a methodology I developed to pre-organize the angiography suite that leads to more efficient workflow during treatment of an acute stroke patient. Once we were comfortable with it in Calgary, in the process of running the ESCAPE trial I implemented this across the ESCAPE sites in Canada. Consequently, of all the acute stroke trials, ESCAPE was by far the fastest. This has now been implemented in South Korea as well.
- Escapetrial.org. This is a website we developed at the end of the ESCAPE trial. The trial was widely covered in the media including in the Wall Street Journal. As a consequence, because of the level of interest and the number of questions, we developed this website that provides all the educational material including slides, protocols, results, publications and techniques.
- Aspectsinstroke.com. I developed this educational website to train other sites and stroke centres on how to effectively and accurately interpret acute stroke imaging using the ASPECTS score (that was also developed in Calgary) and collateral imaging.
- 5tstroke.ca. I am the chair of this Calgary Stroke Program stroke course. The first one is in Banff in Feb 2016. We are expecting a worldwide audience. One of the main purposes is knowledge translation: teach other centres all that we have collectively learnt during the running of the ESCAPE trial and effectively manage acute stroke patients.

Scientific Reviewer

- New England Journal 2015 onwards
- Lancet 2015 onwards
- Lancet Neurology 2015 onwards
- Annals of Neurology 2015 onwards
- Stroke 2012 onwards
- European Journal of Neurology 2011 onwards
- American Journal of Neuroradiology 2011 onwards
- International Stroke Meeting 2011 onwards
- Journal of Neurointerventional Surgery 2010 onwards
- Radiology 2010 onwards
- Neuroradiology 2009 onwards
- Interventional Neuroradiology - 2009 onwards
- International Journal of Cardiovascular Imaging - 2009 onwards
- PSI Foundation 2005 onwards
- Canadian Coordinating Office for Health Technology Assessments (CCOHTA) 2005
- American Society of Neuroradiology 43rd Annual Meeting 2005 onwards
- Canadian Journal of Neurological Sciences 2005 onwards
- World Neurosurgery Journal 2014 onwards
- Journal of Interventional Neurology 2015 onwards

Administrative and Leadership roles

Alberta Health Services and University of Calgary

- Medical Director: Seaman Family MR Research Centre (2007-2017).
- Director of Imaging and Intervention, Calgary Stroke Program (2014 onwards)
- Director Research, Department of Radiology 2008-2012
- Scientific committee: evaluation of research proposals: Seaman Family MR Research Centre (2008-2017)
- Call compensation committee (2010)
- Neuroradiology Fellowship training committee (2012 onwards)
- Advisor on research to Radiology Residency training committee (2010 onwards)
- Neuroradiology Fellowship Director 2007-2008
- Neurointervention Fellowship training committee (2007 to present)
- Member of Neuro MR protocol committee (2009 onwards)
- Member of the Provincial committee to optimize stroke imaging (2015 onwards)
- Member of the HASTE project to optimize stroke workflow (2012 onwards)

Nationally and Internationally

1. Leading international trials/collaborations
 - a. ESCAPE
 - Worldwide randomized controlled trial
 - Published in NEJM
 - 22 sites
 - We managed an extensive continuous quality improvement program across all the 22 sites.
 - In addition, I led a training program across all the sites and helped each site achieve the aggressive time metrics set by the trial. As a consequence the workflow metrics in the trial were the fastest of all the recent trials and faster by over 3 hours compared to the older trials.
 - b. SWIFT PRIME
 - 39 sites across North America and Europe
 - Results published in NEJM

- Similar to ESCAPE, I ran an extensive quality improvement program for workflow and imaging across all the sites.
- c. SEER
- i. As a consequence of the ESCAPE and SWIFT PRIME (and other trials), there has been a change in the standard of care for acute ischemic stroke. Four of the recent trials (ESCAPE, REVASCAT, SWIFT PRIME, EXTEND IA) used the Solitaire device. I am spearheading a group to accomplish a patient level pooled analysis, that would help towards establishing the use of the newer generation stroke devices for acute ischemic stroke.
 - ii. . We have already put together the dataset from across 4 continents and over 10 countries and analyzed the data.
 - iii. Published in *Stroke*.
- d. HERMES
- i. There were five recent trials that showed the benefit of endovascular treatment. Four of these were stopped prematurely but still showed overwhelming benefit of endovascular treatment. Given the small sample size, the confidence intervals were quite wide for the sub-groups. This led to the creation of the HERMES collaboration to create a patient level pooled analyses to answer some of the unanswered questions. In addition, the pooling of data is also likely to allow a more detailed analysis of the importance of time and details of imaging criteria.
 - ii. I am chairing this collaboration. It has resulted in multiple high impact publications including in Lancet, JAMA, Lancet Neurology.
- e. UNMASK EVT
- i. In order to determine factors that influence the decision-making in acute ischemic stroke treatment, I used my international connections to lead a worldwide survey with more than 600 physicians that are involved in acute stroke care.
 - ii. The results have been published in numerous papers (see Appendix) and provided valuable insights for policymakers and hospital administrations
- f. DELPHI
- i. This was a worldwide expert group I initiated to develop a consensus statement for antiplatelet management for stent-assisted coiling and flow diversion in the setting of ruptured intracranial aneurysm treatment

- ii. The statement paper is in preparation and will be endorsed by numerous societies (SNIS, ESMINT, JSNET)
 - g. ESCAPE-ALICE
 - i. This was a survey I initiated with more than 200 participants in order to explore current treatment approaches in unruptured brain arteriovenous malformations and controversial stroke cases. The survey also identified current weak spots in neurovascular treatment infrastructures in different countries.
 - ii. The survey results have been published in numerous papers and created a basis for future discussion and a starting point for improvement of endovascular treatment infrastructures.
- 2. Providing core lab services to international trials/collaborations
 - a. IMS3
 - b. ALIAS2
 - c. ESCAPE
 - d. SWIFT PRIME
 - e. HERMES
 - f. ESCAPE NA1
- 3. Organizing conferences
 - a. Canadian Stroke conference
 - b. 5T stroke course
 - c. Calgary stroke program stroke course
 - d. SNIS stroke course
- 4. Advisor role to departments in Singapore, Beijing and Vietnam to help them organize acute stroke services.

Research Support:

TEMPO-2 - A randomized controlled trial of TNK-tPA versus standard of care for minor ischemic stroke with proven occlusion.

Granting Agency/Program: Canadian Institute of Health Research, Bridge funding.

Nominated Principal applicant: Shelagh B. Coutts

Principal Applicants: Michael D. Hill, Mayank Goyal

Co-applicants: Andrew Demchuk, Stefan Greisenegger, Peter Kelly, Bijoy Menon, Keith Muir, Mark Parsons

September 2016-2017

“Precise and Rapid assessment of collaterals using multi-phase CTA in the triage of patients with acute ischemic stroke for IA Therapy (PRove-IT)”

Granting Agency: Canadian Institutes of Health Research (CIHR)

Status: Completed

Principal Investigator: B.K. Menon

Co-Principal Investigator: M. Goyal

Co-Investigators: A. Demchuk, M.D. Hill, R. Frayne, T. Sajobi, T. Lee

March 2014 to February 2017

“Identifying New approaches to optimize Thrombus characterization for predicting Early Recanalization and Reperfusion with iv tPA using Serial CT angiography (INTERRSeCT).”

Granting Agency: Canadian Institutes of Health Research (CIHR) (Bridge Funding)

Status: Completed

Principal Investigator: A. Demchuk

Co-Investigators: D. Dowlatahahi, M.D. Hill, M. Goyal, B. Menon

March 2012 to February 2014

“Endovascular treatment for Small Core and Anterior circulation Proximal occlusion with Emphasis on minimizing CT to recanalization times”

Granting Agency: Covidien

Status: Completed

Principal Investigator: M. Goyal, M. Hill

Co-Investigator(s): A. Demchuk, P. Barber, T. Watson, G Klein, S. Coutts, E. Smith, B. Menon, S. Subramaniam, M. Eesa, A. Mitha, W. Morrish, J.

Wong

June 2012 to June 2014

“Identifying New approaches to optimize Thrombus characterization for predicting Early Recanalization and Reperfusion with iv tPA using Serial CT angiography (INTERRSeCT).”

Granting Agency: Canadian Institutes of Health Research (CIHR)

Status: Completed

Principal Investigator: A. Demchuk

Co-Investigators: D. Dowlatahahi, M.D.Hill, M. Goyal, B. Menon

October 2012 to September 2015

24hour Infarct Volume on Non-contrast CT as a Predictor of Functional Outcome at 90 day: study from the ALIAS 2 dataset

Granting agency: Canadian Radiological Foundation

Principal Investigators: D Bai. M Goyal

July 2015 -

“SWIFT PRIME trial”

<p>Granting Agency: Covidien Status: Completed Principal Investigator: J Saver, M. Goyal, A Bonafe, E Levy, V Mendes, H Diener June 2012 to June 2015</p>
<p>“Interventional Management Study -3” Granting Agency: National Institutes of Health- NINDS Status: Completed Principal Investigator: J. Broderick Co-investigators: 50+ investigators A Demchuk, M Goyal CT/MRI Core Lab PI July 2005 - June 2012</p>
<p>“CT And MRI in the Triage of TIA and minor Cerebrovascular events to identify High risk patients (CATCH)” Granting Agency: Canadian Institutes for Health Research (CIHR) Status: Completed Principal Investigator: S.B. Coutts Co-investigators: A. Demchuk, M. Goyal October 2008 - September 2011</p>
<p>‘REVASCAT TRIAL’ Granting agency: (Fundació Ictus Malaltia Vascular, www.fundacioictus.com/es) Status: completed Principal Investigator: Tudor Jovin, Antoni Davalos Cross sectional imaging core lab: M Goyal, A Demchuk</p>
<p>“HERMES collaboration” Granting Agency: Covidien Status: Funded, ongoing, multiple publications Principal Investigator: M. Goyal, Co-investigators: J Saver, T Jovin, B Campbell, P Mitchell, A Davalos, C Majoie, D Diederik, M Hill, A Demchuk June 2015 -</p>
<p>TEMPO-2 - A randomized controlled trial of TNK-tPA versus standard of care for minor ischemic stroke with proven occlusion. Granting Agency/Program: Canadian Institute of Health Research Nominated Principal applicant: Shelagh B. Coutts Principal Applicants: Michael D. Hill, Mayank Goyal Co-applicants: Andrew Demchuk, Stefan Greisenegger, Peter Kelly, Bijoy Menon, Keith Muir, Mark Parsons September 2018-</p>
<p>Magnetic Resonance Imaging Evaluation of NA1 Neuroprotection on Infarct Growth Following Endovascular Treatment for Acute Ischemic Stroke. Granting Agency/Program: Canadian Institute of Health Research Nominated Principal applicant: Philip Barber Co-applicants: Michael D. Hill, Mayank Goyal, Andrew Demchuk, Stefan Greisenegger, Peter Kelly, Bijoy Menon, Keith Muir, Mark Parsons September 2018-</p>
<p>Efficacy and Safety of NA-1 in Subjects Undergoing Endovascular Thrombectomy for Stroke (ESCAPE NA1) Granting Agency/Program: Canadian Institute of Health Research</p>

<p>Nominated Principal applicant: Michael D. Hill Principal Applicants: Mayank Goyal</p>
<p>Efficacy and Safety of NA-1 in Subjects Undergoing Endovascular Thrombectomy for Stroke (ESCAPE NA1) Granting Agency/Program: NoNO Inc. Nominated Principal applicant: Michael D. Hill Principal Applicants: Mayank Goyal</p>
<p>UNMASK EVT: Factors Associated With the Decision-Making on Endovascular Thrombectomy for the Management of Acute Ischemic Stroke Granting Agency/Program: Stryker Inc. Nominated Principal applicant: Mayank Goyal Principal Applicants: Mayank Goyal</p>
<p>iASPECTS: Improving Endovascular Treatment Decision-Making and Outcome Prediction in Acute Ischemic Stroke Through a Modified ASPECTS Score Granting Agency/Program: Medtronic Nominated Principal applicant: Mayank Goyal Principal Applicants: Mayank Goyal</p>
<p>EVOLVE: Evaluating oral peri-operative acetylsalicylic acid in patients undergoing endovascular coiling-only of unruptured brain aneurysms Granting Agency/Program: Cerenovus Nominated Principal applicant: Mohammed Almekhlafi Principal Applicants: Mayank Goyal</p>

Updated: September 17, 2021