Impact of telemedicine evaluation among ischemic stroke patients transferred for endovascular thrombectomy: data from the OPTIMISE registry

Justin Barrette*1, Mohamed A. Tarek2, Grégory Jacquin1, Rick H. Swartz3, Aristeidis H. Katsanos2, Jai Shankar4, Jennifer Mandzia5, Samuel Yip6, Steve Verreault7, Grant Stotts8, Catherine Legault9, Alexandre Y. Poppe1

1Department of Neurosciences, Université de Montréal and Centre Hospitalier de l'Université de Montréal. 2Division of Neurology, Department of Medicine, McMaster University. 3Division of Neurology, Department of Medicine, Sunnybrook Health Sciences Centre. 4Division of Neurology, Department of Medicine, University of Manitoba. 5Division of Neurology, Department of Medicine, Western University. 6Division of Neurology, Department of Medicine,, University of British Columbia. 7Division of Neurology, Department of Medicine, CHU de Québec, Hôpital de l'Enfant-Jésus. 8Division of Neurology, Department of Medicine, The Ottawa Hospital. 9Department of Neurology and Neurosurgery, McGill University.

Background:

- Telemedicine evaluation for treatment of acute stroke patients with IV thrombolysis has been shown to be beneficial. (1)
- Its usefulness for the evaluation of patients transferred from a primary stroke centre (PSC) to a comprehensive stroke centre (CSC) for endovascular thrombectomy (EVT) is less well defined. (2)

Methods:

- We retrospectively analyzed the **Canadian OPTIMISE registry** which included data from 20 comprehensive stroke centers across Canada between January 1, 2018, and December 31, 2022.
- We compared **treatment metrics** and **early outcomes** between **two groups**: 1) patients evaluated by telemedicine (TM) and 2) patients evaluated in person (non-TM) at the PSC prior to CSC transfer.

We used mixed-effects logistic regression models to compare the likelihood for symptomatic intracerebral hemorrhage (sICH), good functional outcome (defined as a modified Ranking Scale [mRS] score of 0-2), or all-cause mortality at 90 days between the two groups

- All models were **adjusted for predefined confounders** (age - baseline ASPECTS - baseline NIHSS - onset to groin puncture time - final TICI - anesthesia type - IV-tPA - carotid stenting - participating centre).

Results:

- We included 3289 patients who were transferred from a PSC to a CSC: 888 TM and 2401 non-TM.
- There were no major differences in baseline characteristics, including IV thrombolysis administration, though the TM group included more men and a slightly lower baseline ASPECTS.
- In unadjusted analyses, outcomes of successful recanalization (TICI≥ 2b) and functional outcome were similar between TM and non-TM. However, we found that TM patients had **longer onset-to-puncture times** (355 vs 310 minutes, p<0.001), **higher sICH rates** (6.8% vs 3.3%, p<0.001) and **higher risk for all-cause mortality at 90 days** (39.6% vs 29.4%, p<0.001). (Table 1)

Table 1 : Time metrics and outcomes using telemedicine or not

	No telemedicine (N=2401)	Telemedicine (N=888)	P-value
Onset_needle (Median [IQR])	131 [99,184]	139 [98,187]	0.280
Door_needle (Median [IQR])	31 [23,42]	34 [29,39]	0.418
Onset_puncture (Median [IQR])	310 [224,485]	355 [255,526]	<0.001
Door_puncture (Median [IQR])	39 [21,70]	37 [24,58]	0.026
Puncture_reperfusion (Median [IQR])	26 [17,40]	25 [16,36]	0.100
Succesful reperfusion (TICI≥2b)	1960 (84.8%)	736 (85.7%)	0.562
sICH	79 (3.3%)	60 (6.8%)	<0.001
Discharge mRS 0-2	300 (20.9%)	188 (23.4%)	0.172
Discharge mortality	271 (18.9%)	121 (15.1%)	0.022
90-day mRS 0-2	670 (39.5%)	185 (34.8%)	0.050
90-day mortality	524 (29.4%)	216 (39.6%)	<0.001

- In adjusted analyses (mixed effect logistic regression model), **there were no differences** for sICH, 90-day mRS≤2 and all-cause mortality at 90 days between TM and non-TM patients. (Table 2)

Table 2 : Mixed effect logistic regression model for sICH, 90-day

	*aOR	95% confidence interval
sICH	1.803	0.82 – 3.99
90-day mRS≤2	0.813	0.51 – 1.30
90-day mortality	1.384	0.86 – 2.24

Conclusions:

- Patients transferred to a CSC for EVT first evaluated by TM had similar characteristics to those evaluated in person at the PSC, but longer treatment times and worse outcomes.
- The higher risk for unfavourable outcomes did not persist after adjustment for confounders, including treatment time.
- It is likely that TM patients had longer treatment delays because TM is more commonly used for more distant and rural sites, contributing to a higher risk of worse outcomes.
- There is a need for quality improvement initiatives to optimize the workflow of patients receiving telemedicine consultation prior to CSC transfer for EVT from more remote PSCs.

References:

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CHUM Centre hospitalier de l'Université de Montréal

McMaster University

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