Ethical issues in the care of patients with hyperacute stroke

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On behalf of North Western Ontario Regional Stroke Network

NORTHWESTERN ONTARIO Regional Stroke Network

Thunder Bay Regional Health Sciences Centre

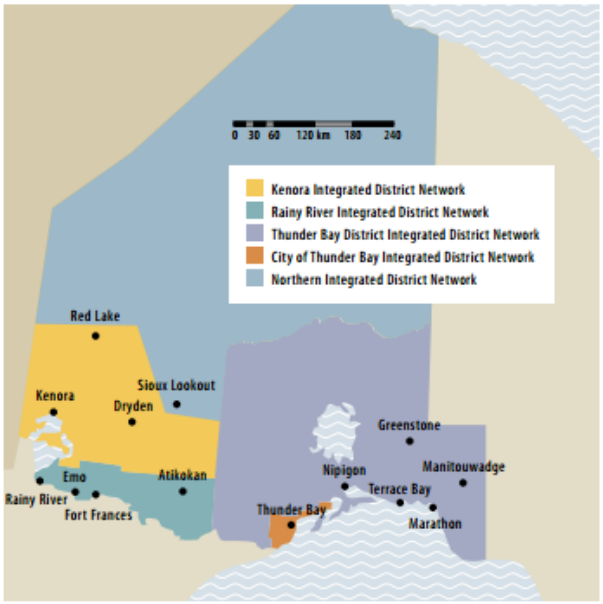
healthy together

Objectives

- Discuss ethical issues around consent for treatment in the setting of acute stroke
- Discuss ethical issues around provision of standard of care when there is a finite amount of time to provide treatment in an geographical area as vast as NWO

North West LHIN

Figure 1: Map of the North West LHIN



North West LHIN
Geography and Population Statistics

Key characteristics

- Largest geographic area,
  - approximately **47%** of Ontario
- Smallest population *(2011 Census),*
  - less than **2%** of the Ontario population at approximately 231,000.

Indicator	Total Pop.
Northern IDN	21,560
Kenora IDN	43,135
Rainy River IDN	20,370
City of Thunder Bay IDN	121,595
Thunder Bay District IDN	24,460
North West LHIN	231,120

(based on 2013 Canadian Community Health Survey data for ages 12 and over),
Population Health Profile December 2014. *NW LHIN Report*

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North West LHIN Population

Key Health Characteristics

Higher proportion of people who:

- Are heavy drinkers
- Are obese (age 18 and over)
- Are smokers
- Have high blood pressure
- Are physically active in leisure time

Lower proportion of people who:

- Have a regular doctor
- Have very good or excellent perceived mental health

(based on 2013 Canadian Community Health Survey data for ages 12 and over), ***Population Health Profile December 2014.*** *NW LHIN Report*

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Stroke in Canada

Most common cause of **adult disability** in Canada

50 000 new stroke patients per year in Canada

Third leading cause of death (~6%)

315 000 Canadians are living with the effects of stroke.

Source: Heart and Stroke; Go et al. Circulation 2013, Statistics Canada, 2012

In Northwestern Ontario, approximately 415 stroke/TIA patients per year.

2/3
will have a non-disabling stroke

1/3
will have a disabling stroke

1
disabling stroke every couple of days in NWO

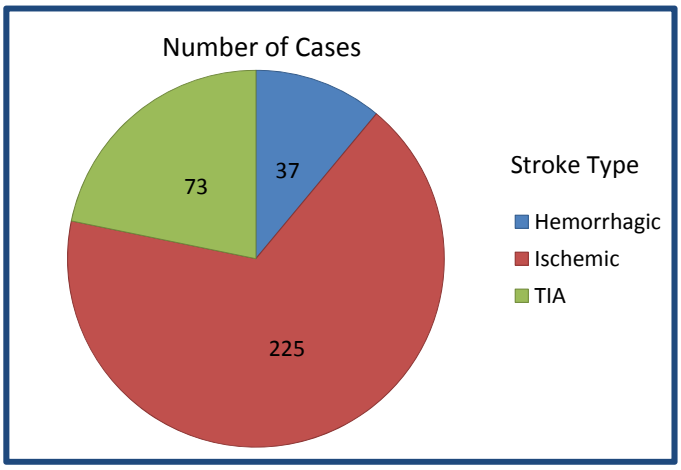
Source: Presentation: Acute Stroke Treatment 2015 Andrew M. Demchuk MD FRCPC Director, Calgary Stroke Program? OSN Report card 2013/2014 CIHI data

NWO Regional Stroke Services

NORTHWESTERN ONTARIO
Regional Stroke Network

TBRHSC FY 2014/15 Statistics

Total Number of Stroke Cases = 335



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Definitions

- **Ischemic stroke**
  - Clinical syndrome characterized by sudden onset of focal neurological deficits, due to a perfusion defect in a vascular territory
- **Hemorrhagic stroke**
  - Sudden onset neurological deficits secondary to intraparenchymal hemorrhage
- **Transient Ischemic Attack**
  - As above with resolution of the focal neurological deficits within 24 hours and no evidence of infarction on imaging
  - Most resolve within 1-2 hours

Cerebrovascular Emergencies

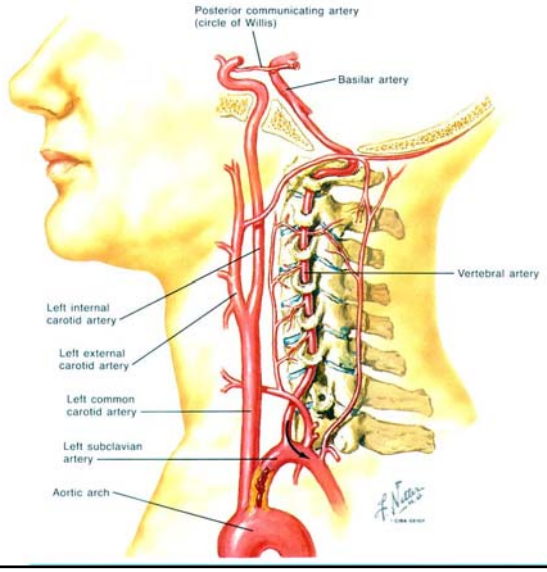
- Ischemic strokes - **87%**
- ICH *(Intracranial hemorrhage)* - **10%**
- SAH *(Subarachnoid hemorrhage)* - **3%**
- TIA *(Transient Ischemic Attack)*
  - **15 000** Canadians experience a TIA / year
  - Risk of recurrent stroke following a TIA at 90 days is **10-20%**

Heart and Stroke; Go et al. Circulation 2013

Hyperacute stroke

- Hyperacute stroke care is challenging
- Often unstructured setting
- Situation rushed by nature
- Pressured environment
- Various health care personnel
- Obtain the essential data without delay
- Surviving acute stroke call = promoting good outcome

Cerebrovascular Anatomy



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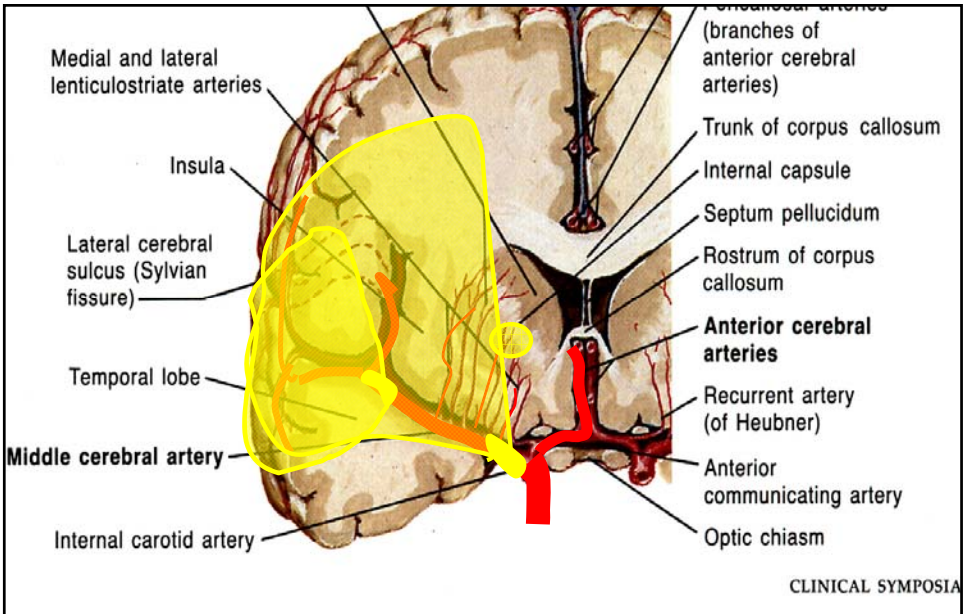
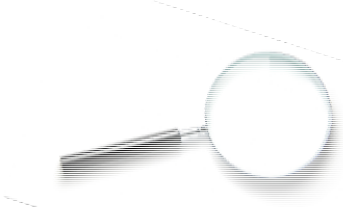
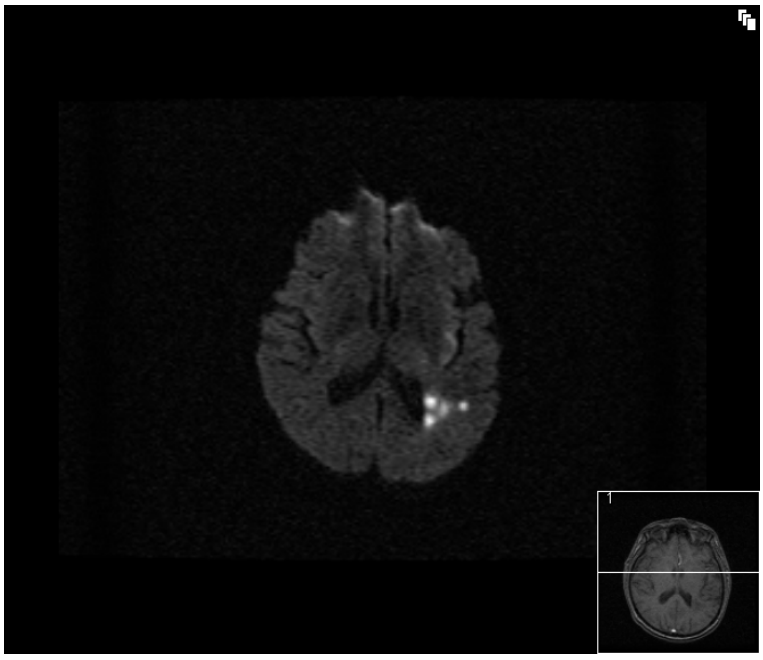


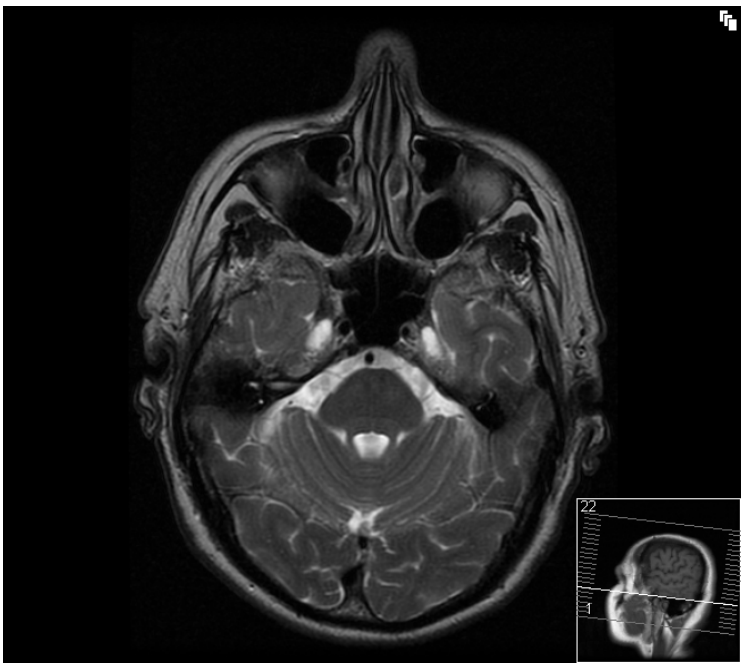
Internal carotid anatomy



Case 1

- 63 yrs old Rt. Handed white male, previously healthy, presented to ER with a sudden onset aphasia after 75 min of onset.
- Past history
  - Hyperlipidemia
  - Drinking 3 beer/ 1 glass of wine daily
- Examination
  - BP135/90
  - Mixed aphasia more receptive

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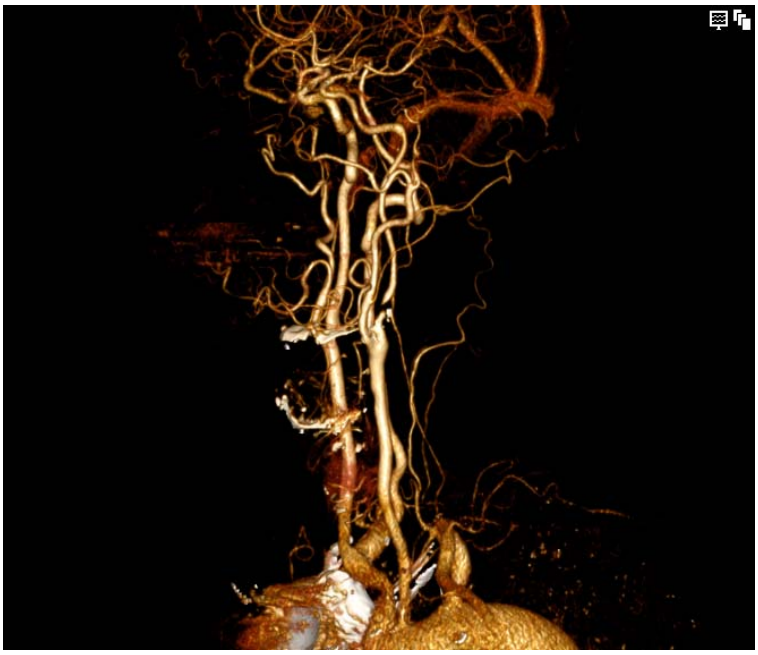

Timing

- When was the patient last seen at his normal baseline function?
- **"Time is brain"**
  - NINDS, NNT=8 in <3 hour window for rtPA treatment
    - For every 8 patients treated within 3 hours, 1 returned to normal that otherwise would not have.
  - ECASS III, NNT=14 in 3-4.5 hour window for rtPA treatment

Timing

- rtPA < 3hours
  - Two positive randomized trials (NINDS)
  - Several community reports
  - 2013, AHA – Class I, Level A Evidence

Timing

- rtPA 3-4.5 hours
  - One positive randomized trial (ECAS III)
  - Additional exclusions:
    - Age > 80
    - On warfarin (regardless of INR)
    - NIHSS > 25
    - Both DM and previous history of stroke
    - >1/3 MCA territory ischemic change
  - 2013, AHA – Class I, Level B evidence

"Time is Brain"

- **NINDS Recommendations for Timeline of Care:**
  - ED physician sees patient within 10 mins
  - Stroke physician notified within 15 mins
  - CT scan is completed within 25 mins
  - CT interpretation is obtained within 45 mins
  - IV rtPA should be initiated within 60 mins
- Some centers in Europe are door to needle in 25 min and in Canada 30 min
- **Strategies to increase speed of treatment:**
  - Activate stroke team prior to CT scan
  - Glucose only lab to worry about
  - Store rtPA in ED
  - Mix rtPA early (once CT shows no blood)

- **rtPA < 3hours exclusion criteria:**
  - Stroke or significant head trauma within 3 months
  - Major surgery or serious trauma within 14 days
  - Gastrointestinal and urinary hemorrhage within 21 days
  - Arterial puncture at a non-compressible site within 7 days
  - History of intracranial hemorrhage
  - Intracranial neoplasm, arteriovenous malformation, or aneurysm
  - Symptoms of subarachnoid hemorrhage
  - Active internal bleeding
  - Pretreatment blood pressure with systolic >185 or diastolic >110
  - Clear and large hypodensity on CT scan
  - Current bleeding diathesis including
    - INR>1.7
    - Heparin within 48 hours resulting in abnormal PTT
    - Platelets <100,000/mm.
    - Direct thrombin or factor Xa inhibitor (NOAC) use within 48 hours
      - » Optimal laboratory testing thresholds for safe IV rtPA use in this setting remain to be determined, and is an area of active investigation.

Jauch, E. C., et al, (2013). Guidelines for the Early Management of Patients With Acute Ischemic Stroke A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. Stroke, 44(3), 870-947.

Adverse effects of rtPA

- **Internal bleeding**
- **Superficial bleeding**
- **Allergic reactions**
- **Other adverse reactions**

Case 1 Question:

Is consent for this highly effective medication that carries risk of side effects required?

Case # 1

The patient received tPA with marked improvement of his speech over 4 weeks.

Access to Care

"The people of Ontario and their Government:

- *Recognize that a high quality health care system is one that is accessible, appropriate, effective, efficient, equitable, integrated, patient centred, population health focussed, and safe."*

Excellent Care for All Act, 2010
https://www.ontario.ca/laws/statute/10e14

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Access to Care

"Too often, health care services can be fragmented, uncoordinated and unevenly distributed across the province. For patients, that means they may have difficulty navigating the system or that not all Ontarians have equitable access to services….."

Dr. Eric Hoskins, Minister of Health and LTC

In the *Patients First: Action Plan for Health Care* (2015), the MOHLTC set goals for Ontario's health care system including:

- To Improve access -
providing faster access to the right care.

http://www.health.gov.on.ca/en/news/bulletin/2015/docs/discussion_paper_20151217.pdf

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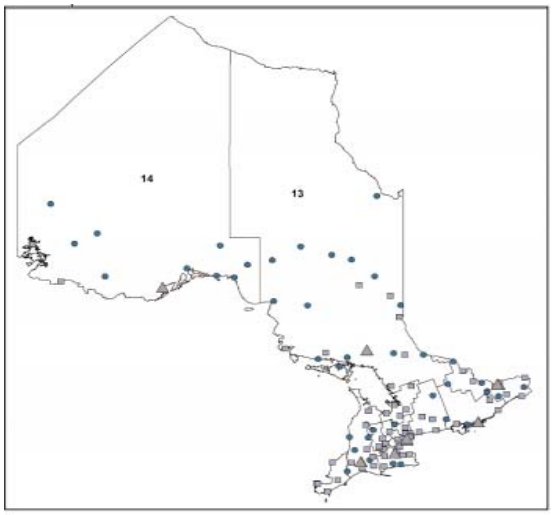
Hospitals in NWO



▲ Teaching Hospital
□ Community Hospital
● Small Hospital

Indicator	Total Pop.
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Source: https://secure.cihi.ca/free_products/OHA_Acute07_EN_final_secure.pdf page 1

Source: http://intranet.tbrhsc.net/Site_Published/i5/render.aspx?DocumentRender.IdType=5&DocumentRender.Id=61771

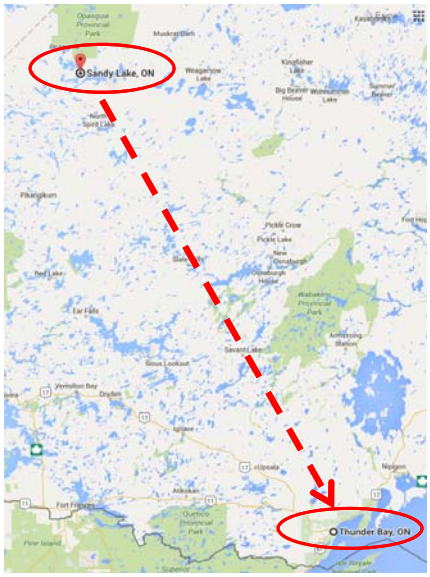
NWO Regional Stroke Services

NORTHWESTERN ONTARIO
Regional Stroke Network

Impact of Geography

Sandy Lake to Thunder Bay

- **Flight distance**
  - Sandy Lake Airport to Thunder Bay Airport 594 kilometers, 321 nautical miles.
- **Flight Duration**
  - Estimated flight time is 1 h 12 min.
- **Time Difference**
  - 1 Hour
  - Thunder Bay EST
  - Sandy Lake CST



http://www.airmilescalculator.com/distance/zsj-to-yqt/

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Northwestern Ontario District Health Council

Appendix - XV Approximate Distance (in Kilometres) Between Communities

City	Dryden	Fort Frances	Geraldton	Kenora	Manitouwadge	Marathon	Nipigon	Rainy River	Red Lake	Sioux Lookout	Terrace Bay	Thunder Bay	Hamilton	Kingston	London	Ottawa	Sudbury	Toronto	Winnipeg
Atikokan	290	150	460	305	575	490	300	240	490	375	405	190	1,620	1,755	1,720	1,660	1185	1,570	640
Dryden		190	610	140	725	640	450	285	215	95	555	340	1,770	1,900	1,865	1,805	1,330	1,715	345
Fort Frances			605	215	720	635	445	90	400	290	550	335	1,765	1,900	1,860	1,800	1,330	1,710	370
Geraldton				745	435	350	160	695	825	640	265	270	1230	1,295	1,330	1,200	795	1,180	960
Kenora					860	775	585	230	270	235	690	480	1,905	2,040	2,005	1,945	1,470	1,855	205
Manitouwadge						100	275	810	940	755	170	400	1,190	1,285	1,245	1,205	715	1,095	1090
Marathon							190	725	855	670	85	300	1,170	1,265	1,225	1,185	695	1,075	900
Nipigon								535	665	480	105	110	1,320	1,455	1,420	1,360	885	1,270	800
Rainy River									455	300	640	430	1,855	1,990	1,955	1,895	1,420	1,805	205
Red Lake										310	770	555	1,985	2,120	2 080	2,020	1,550	1,930	475
Sioux Lookout											585	370	1,800	1,935	1,895	1,835	1,365	1,745	455
Terrace Bay												215	1,215	1,350	1,310	1,270	780	1,160	905
Thunder Bay													1,430	1,565	1,525	1,485	995	1,375	690

Source: Ministry of Transportation, Distance Table, www.mto.gov.on.ca/english/travel/, accessed July 8, 2002

Selected Referral Sites			
Hamilton	London	Sudbury	Hospital for Sick Children
Hamilton Civic Hospitals	St. Joseph's Health Centre	Sudbury Regional Hospital	St. Michael's Hospital
Cheddle-Mohawk Hospitals	University Hospital		St. Michael's Hospital
		Toronto	
Kingston	Ottawa	Sunnybrook and Women's College	Winnipeg
Hotel Dieu Hospital	Ottawa Civic Hospital	University Health Network	Health Sciences Centre
Kingston General Hospital	Ottawa General Hospital, The	Toronto East General	

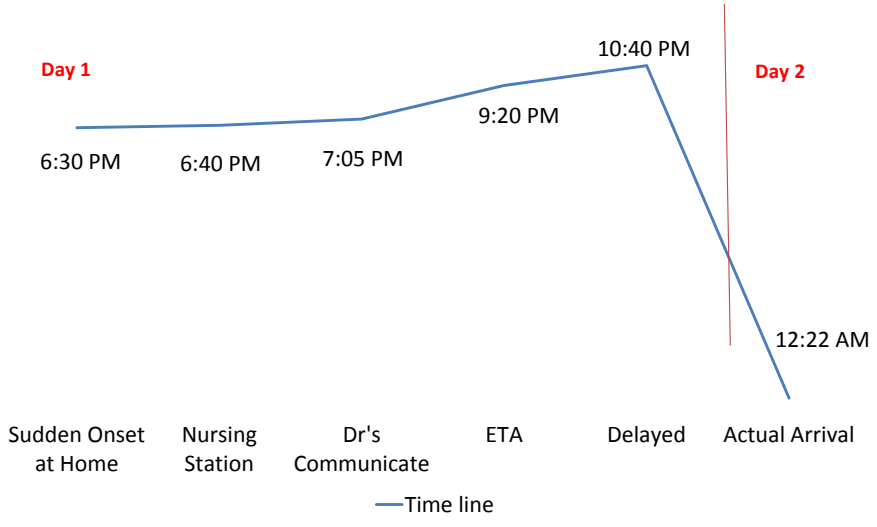
Northwestern Ontario Health System Monitoring Report 2002

Case 2

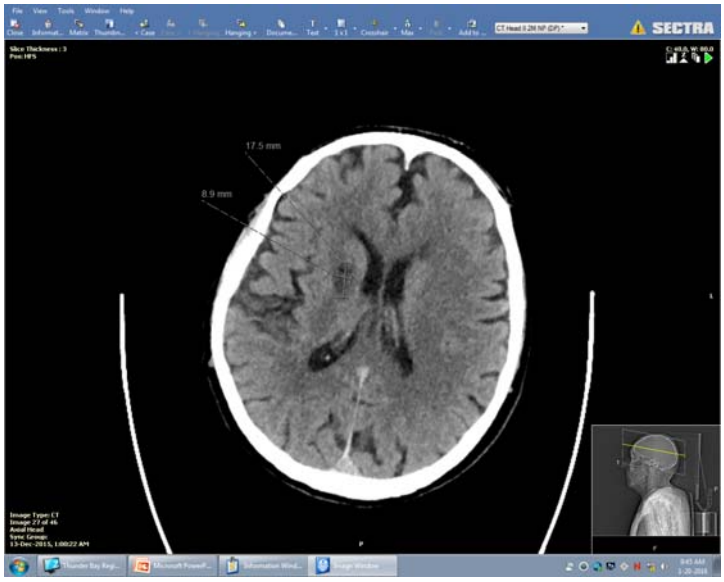
- 64 y/o man, lives with wife and 4 children
- He developed sudden onset Rt sided weakness and aphasia at 6:30pm (EST) on a Sunday evening while at home witnessed by his daughter
- He arrived at the nursing station after 10 min and I was contacted by the physician covering after 25 min.
- TBRHSC Bed coordinator was called immediately and the process of urgent transfer was initiated. Heads up to CT, Lab, Neurosurgery/endovascular on call and ED charge nurse was done to ensure rapid action on arrival that was estimated to be 9:20pm then became 10:40pm and he actually arrived at 12:22am next day.

Case 2

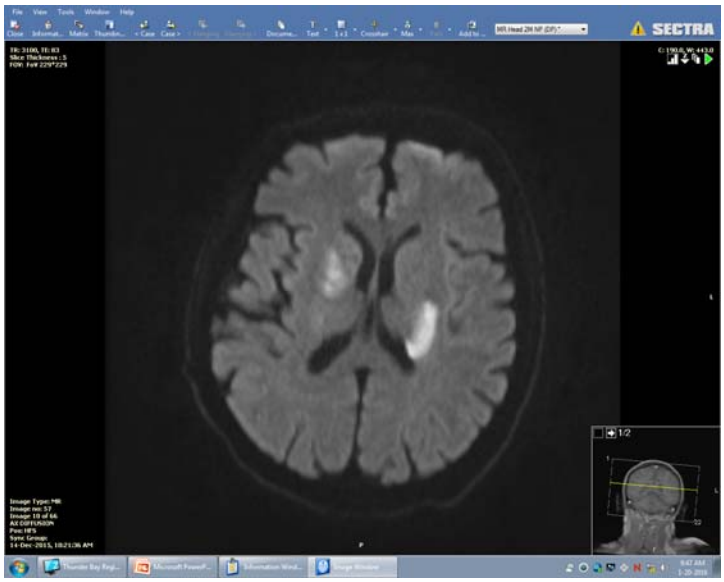
Timeline of Access to Care in NWO



Case 2



Case 2



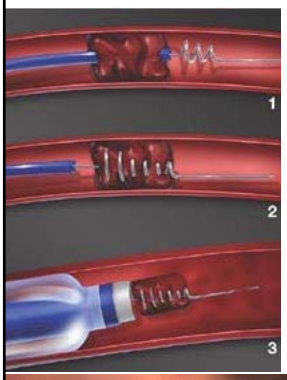
Hyperacute Care for Ischemic Stroke

- 4.5 hour window for tPA
  - Unrealistic goal for Case 2
- 6 hour window for Endovascular Treatmen
  - Still an option

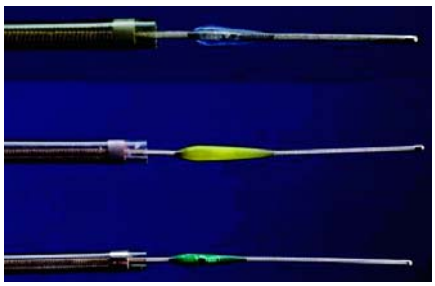
Comparisons of endovascular study design

	MR CLEAN	EXTEND IA	SWIFT PTIME	ESCAPE
Design	PROBE	PROBE	PROBE	PROBE
Center	Netherlands	Australia	US/Europe	Global/Canada
Patient #	500	70	196	316
Inclusion/ Selection	Age>18 NIHSS>2 Onset<6hrs Confirmed LVO **+ extracranial ICA lesions**	Age>18 NIHSS Any Onset<6hrs Confirmed LVO **100% IV-tPA Mismatch on CTP with core<70cc**	Age 18-80 NIHSS 8-29 Onset<6hrs Confirmed LVO **100% IV-tPA ASPECT>5 or Core<50cc or Penumbra>15 cc**	Age>18 NIHSS Any **Onset<12hrs** Confirmed LVO **ASPECT>5 and mod-good collaterals + extracranial ICA lesions**
Intervention	+/- IV-tPA (89%) + IAT **(81.5% stent retrievers)**	IV-tPA + **Solitaire**	IV-tPA + **Solitaire**	+/- IV-tPA (72.7%) + IAT **(86% stent retrievers)**

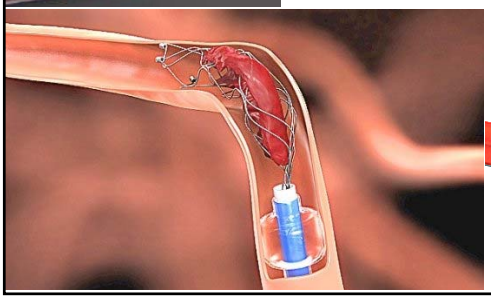
MERCI



PENUMBRA



SOLITAIRE



TREVO

Case 2 Question:

Are we providing equitable hyperacute stroke service in North Western Ontario?
If not how can we improve?

Connect with us!

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