



BRIGHAM AND
WOMEN'S HOSPITAL



*The impact of pre-existing conditions on
treatment decisions in patients with
stroke and risk of stroke*



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Disclosures

I have no financial relationships with the developers of any of
the products discussed.

NINDS

- SPOTRIAS
- NeuSTART
- IRIS (and Takeda Pharmaceuticals)
- ATACH II
- POINT
- StrokeNET
- DEFUSE-3

Covidien

- SWIFT PRIME

CASE 1

Time: 6:50 AM

53-year-old man suddenly developed left-sided
weakness was brought urgently to a local hospital.

ED examination:

- Awake with eyes closed
- Follows commands
- Normal language; severe dysarthria
- Right gaze deviation
- Left homonymous hemianopsia
- Dense weakness of left face, arm, and leg
- Mild left-sided sensory loss without apparent neglect.

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- Dense weakness of left face, arm, and leg
- Mild left-sided sensory loss without apparent neglect.

NIHSS = 18
LSW 6:30 AM

CASE 1

Time: 7:09 AM

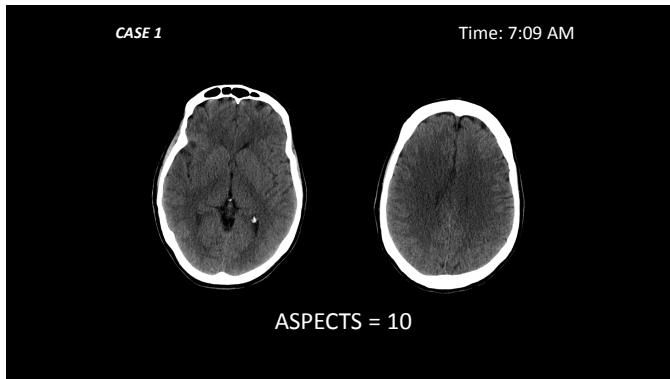


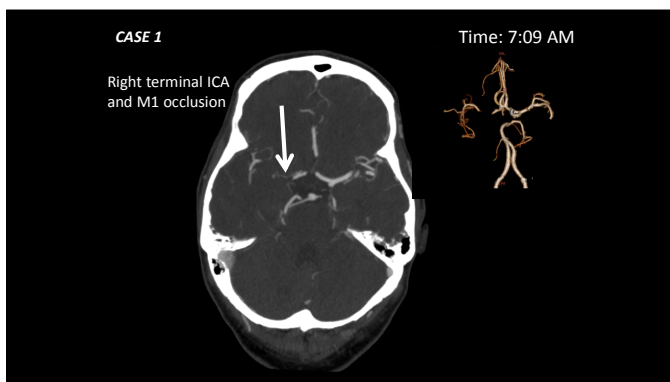
CASE 1

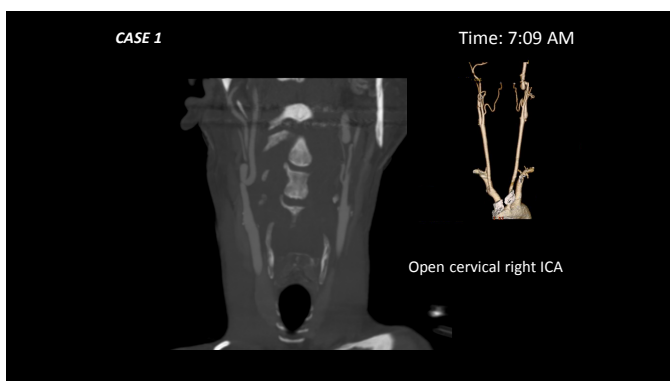
Time: 7:09 AM

Dense right MCA









CASE 1

One year before, he had a right leg DVT and PE.
Shortly after that, he had a right arm DVT. He was treated
with LMWH.

Evaluation showed a GE junction mass with avid regional
lymph nodes.

Biopsy showed poorly-differentiated adenocarcinoma.

He was treated with chemotherapy and XRT and minimally
invasive esophagectomy and node resection.

Two weeks before presentation, he had hydronephrosis
treated with ureteral stenting.

Biopsy of bladder nodules showed similar carcinoma.

Case 1: What would you do?

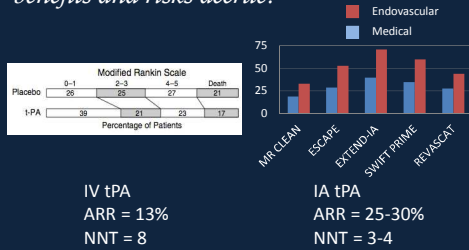
- Provide comfort care.
- Treat with IV tPA.
- Treat with endovascular clot extraction.
- Treat with IV tPA followed by endovascular clot retraction.
- Get more information.

What would you do?

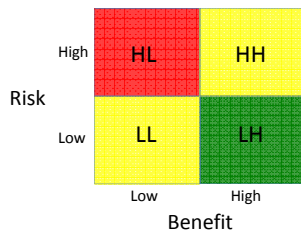
Do you need more information?

What kind of information?

What are the expected benefits and risks of potential therapies? Over what time do the benefits and risks accrue?



Risk-Benefit Plane



What patient-specific medical issues does the condition entail?

Is the patient disabled by the condition?

Does the condition shorten the life expectancy?

Does the condition itself confer added risks?

What value judgments might influence the patient's wishes? Has the patient made these clear in advance? Who will decide?

Has the condition advanced to a state that the patient finds intolerable?

Does the patient want to know all information and then decide? Or leave it to a HCP? Or to the physician?

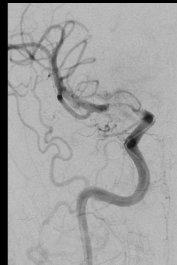
CASE 1

What would you do now?

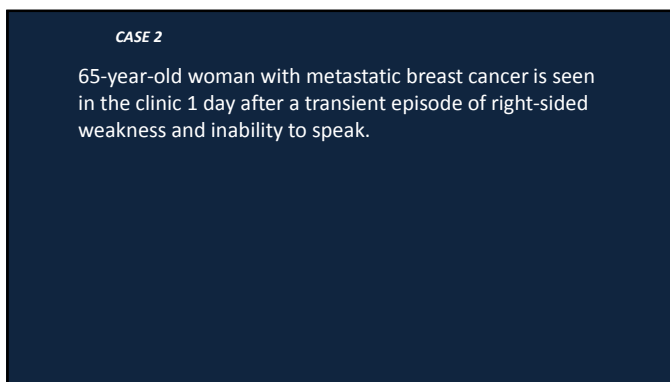
- Provide comfort care.
- Treat with IV tPA.
- Treat with endovascular clot extraction.
- Treat with IV tPA followed by endovascular clot retraction.
- Get more information.

CASE 1

Time: 11:27 AM









CASE 2

What would you do?

- Make no changes in her therapy.
- Give an antiplatelet agent and optimal risk factor management.
- Admit for early carotid endarterectomy.
- Admit for early carotid stenting.
- Get more information.

CASE 2

65-year-old woman with metastatic breast cancer is seen in the clinic 1 day after a transient episode of right-sided weakness and inability to speak.

65-year-old woman with metastatic breast cancer is seen in the clinic after an asymptomatic bruit led to a carotid ultrasound.

CASE 2b

What would you do (2)?

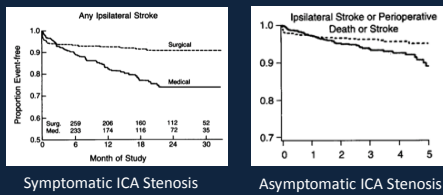
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- Get more information.

What would you do?

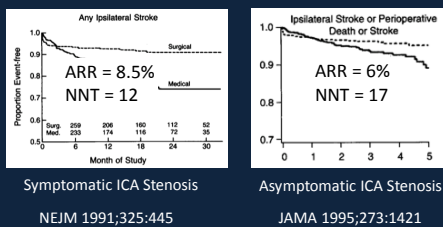
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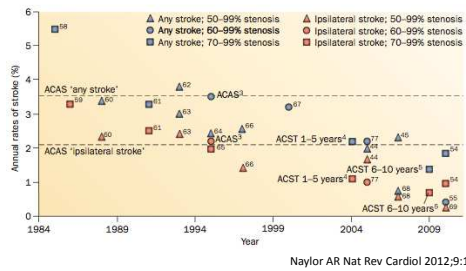
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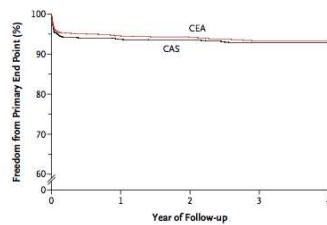
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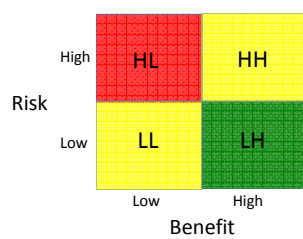
Decreasing Annual Rates of Stroke Medically Treated Patients with Asymptomatic Carotid Stenosis



CREST: CEA versus CAS



Risk-Benefit Plane



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Has the condition advanced to a state that the patient finds intolerable?

Does the patient want to know all information and then decide? Or leave it to a HCP? Or to the physician?

CASE 2

What would you do now?

- Make no changes in her therapy.
- Give an antiplatelet agent and optimal risk factor management.
- Admit for early carotid endarterectomy.
- Admit for early carotid stenting.
- Get more information.

CASE 2b**What would you do now (2)?**

- Make no changes in her therapy.
- Give an antiplatelet agent and optimal risk factor management.
- Admit for early carotid endarterectomy.
- Admit for early carotid stenting.
- Get more information.

CASE 3

28-year-old RH woman 30-weeks pregnant was found down mute and weak on the right side 50 minutes after she had last been seen well.

ED examination:

- Alert without gaze deviation
- Dense motor aphasia; mute
- Dense right hemiplegia
- Normal CBC, platelets, INR, aPTT

CASE 3

28-year-old RH woman 30-weeks pregnant was found down mute and weak on the right side 50 minutes after she had last been seen well.

ED examination:

- Alert without gaze deviation
- Dense motor aphasia; mute
- Dense right hemiplegia
- Normal CBC, platelets, INR, aPTT

NIHSS = 19
LSW 10:00 AM

CASE 3

G2 P1

G1 2009 STAT C-section at term for fetal distress

No miscarriages

No pre-eclampsia-eclampsia

No prior abnormal thrombosis

No prior heart disease

No trauma

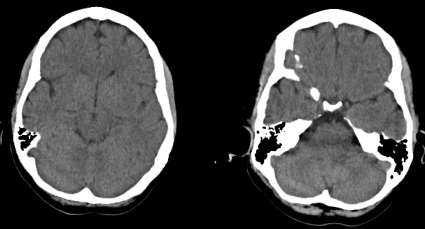
Non-smoker; no alcohol or drug abuse

2 maternal uncles and 1 aunt with DVT/PE

No family history of arterial dissection, aneurysm, or AVM

CASE 3

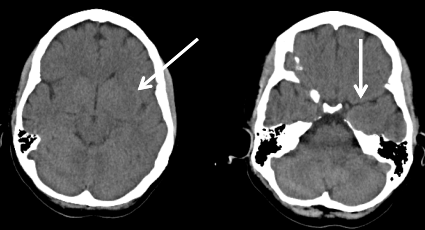
On Arrival at Local Hospital

11:50 AM
1 hr 50 min

CT without contrast

CASE 3

On Arrival at Local Hospital

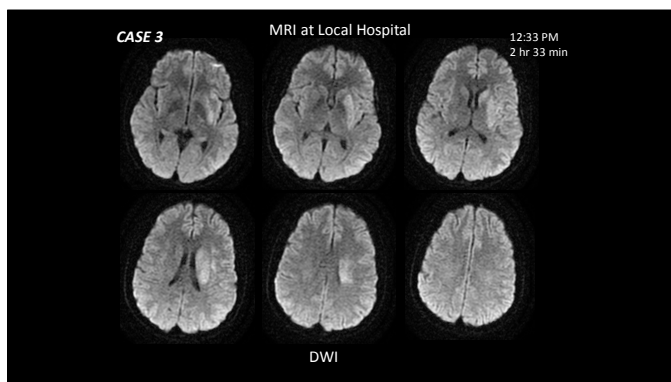
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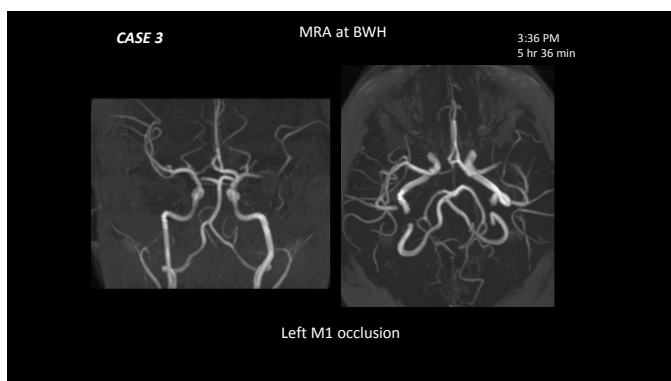
CT without contrast

CASE 3

What would you do?

- Give aspirin and support optimal hemodynamic status.
- Treat with IV heparin.
- Treat with IV tPA.
- Treat with endovascular clot extraction.
- Treat with IV tPA followed by endovascular clot retraction.
- Get more information.







CASE 3 What would you do now?

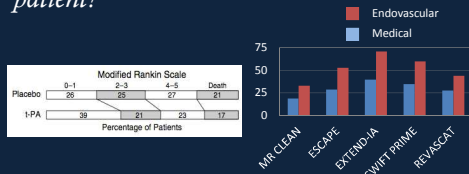
- Admit to stroke unit for post-tPA management.
- Treat with endovascular clot extraction.
- Get more information.

What would you do?

Do you need more information?

What kind of information?

What are the expected benefits and risks of potential therapies? Do RCTs apply to my patient?



IV tPA
ARR = 13%
NNT = 8

IA tPA
ARR = 25-30%
NNT = 3-4

tPA use in Pregnancy

Study/Year	Gestation	Indication	Outcome Mother	Outcome Fetus
Baudo 1990	35	PE 1	No cx	No cx
Flossdorf 1990	31	PE 1	No cx	No cx
Azzano 1995	16	Valve 1	Severe bleeding	Fetal death after rethrombosis
Schumacher 1996	21	MI 1	No cx	No cx
Fleyle 1997	28	Valve 1	No cx	No cx
Total		5	1 bleeding	1 death

From Ahearn Arch Intern Med 2002;162:1221

IV tPA Use for Stroke in Pregnancy

Study/Year	Maternal/Gestational Age	Outcome Maternal	Outcome Fetal
Daprich 2002	-- / 12 wk	minor ICH	No Cx
Weise 2006	33 yr / 13 wk	No Cx	No Cx
Leonhardt 2006	26 yr / 23 wk	No Cx	No Cx
Murugappan 2006	37 yr / 12 wk	minor uterine hematoma	MTP*
Murugappan 2006	31 yr / 4 wk	No Cx	MTP*
Murugappan 2006	29 yr / 6 wk	died**	died
Yamaguchi 2010	36 yr / 18 wk	No Cx	No Cx
Hori 2013	35 yr / 4 mos	No Cx	No Cx
Tassi 2013	28 yr / 16 wk	No Cx	No Cx
Ritter 2014	32 yr / 36 wk	No Cx	No Cx

*MTP = medical termination of pregnancy

** died from arterial dissection complicating angioplasty

Daprich Cerebrovasc Dis 2002;13:290
Weise Stroke 2006;37:2168
Leonhardt J Thromb Thrombolysis 2006;21:271
Murugappan Neurology 2006;66:768
Yamaguchi Rinsho Shinkeigaku 2010;50:315
Hori Rinsho Shinkeigaku 2013;53:212
Tassi Am J Emerg Med 2013;31:448
Ritter J Neurol 2014;261:632

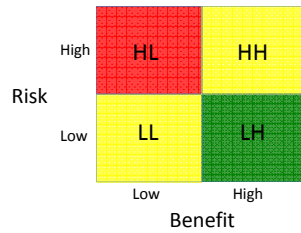
IA tPA Use for Stroke in Pregnancy

Study/Year	Maternal/Gestational Age	Outcome	
		Maternal	Fetal
Elfort 2002	28 / 3wk (after IVF)	minor ICH	No Cx
Johnson 2005	39 yr / 37 wk	No Cx	No Cx
Murugappan 2006	43 yr / 37 wk	No Cx	No Cx
Murugappan 2006	28 yr / 6 wk	buttock hematoma	No Cx
Murugappan 2006	25 yr / 1 st trimester	minor ICH	Miscarriage*
Li 2012	24 yr / 11 wk	No Cx	No Cx

* Mother had bacterial endocarditis

Elfort Neurology 2002;59:1270
 Johnson Stroke 2005;36:e53
 Murugappan Neurology 2006;66:768
 Li Neurologist 2012;18:44

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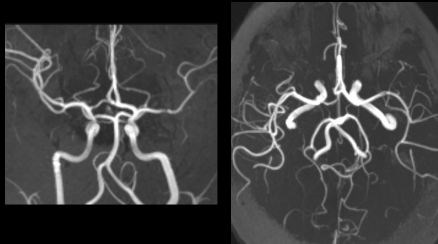
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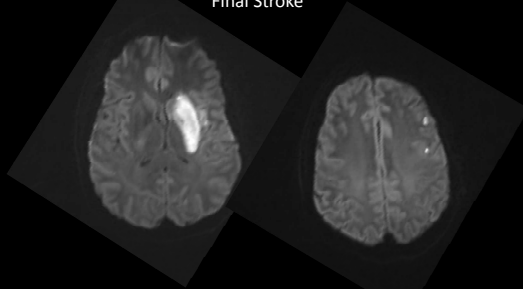
Day after Onset



Recanalization with small focal loss of flow

CASE 3

Final Stroke



Similar stroke, only few tiny areas of cortical infarction

Decision Making: The Ideal

A fully-informed autonomous patient calmly making a rational and emotionally sound decision.

Decision Making: Information

- *Framing*
- *Lack of knowledge/education/expertise/context*
- *The effect of advice on the use of information*
- *Too much information*
 - *Better choices with less detail*
 - *Some patients desire not to know; not to be the decision maker*

Decision Making: Values

- *Only patients are experts on their own values.*
- *Values in a vacuum of information.*
- *Values and stark choices*
 - *Do everything*
 - *Make me comfortable*
- *Valuing distance for protection; who decides?*

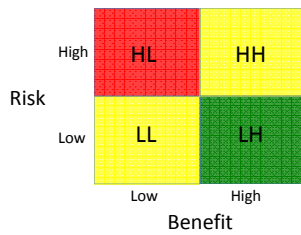
Decision Making: Who decides?

1. *Ideal – informed, autonomous patient*
2. *Second best – close, autonomous proxy*
3. *Third best – physician*

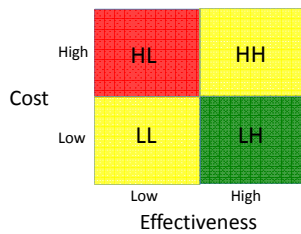
The Agency Problem

Autonomy versus Paternalism

Risk-Benefit Plane



Cost-Effectiveness Plane



Maximize benefit in the population

Utilitarian Ethics

Duty, obligation to the individual

Deontological Ethics

"No country is sufficiently resourced to be able to meet all the aspirations of universal health coverage."

JAMA 2016;316:1447

Our Protocol for Endovascular Therapy
Unlikely Benefit Category

Clinical Criteria

- NIHSS < 4
- Time > 16 h from LSW (ant circ); > 24 hr (post)
- **Premorbid condition**
 - **mRS ≥ 4**
 - **Major medical comorbidity**
 - **Limited life expectancy**
