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# **Hanscom Aero Club Safety Meeting**

**27 April 2022**



# Outline

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- **Intro to some Medical Emergencies – Altered Mental Status**
  - Stroke
  - CO Poisoning
- **What's important to tell ATC**
- **In-flight Considerations (discussion)**
  - When/where to land
  - What if IFR?



# General Causes of Altered Mental Status

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- Trauma
- **Disturbances in oxygen flow to the brain (e.g. stroke, hypoxia)**
- Electrolyte imbalances
- Presence of intoxicants or poisons
- Too much/little glucose in blood (i.e. hypo/hyperglycemia)
- Psychiatric disorders
- Serious infections



# Stroke Video

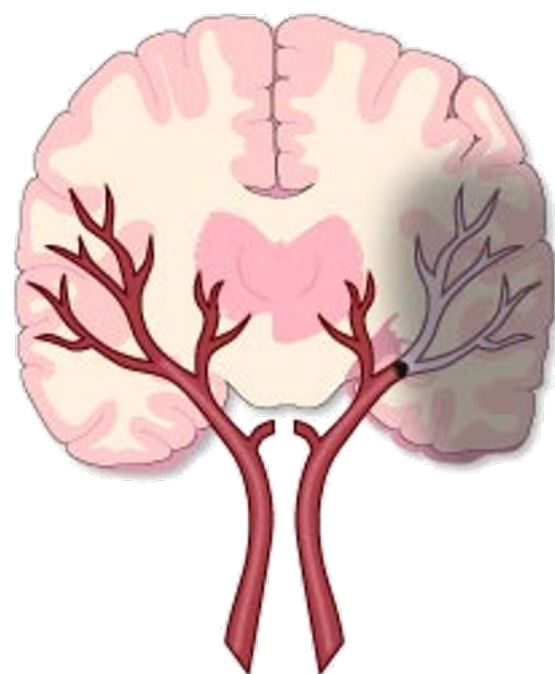
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- <https://www.youtube.com/watch?v=mkpbbWZvYmw>
- [https://www.cdc.gov/stroke/signs\\_symptoms.htm](https://www.cdc.gov/stroke/signs_symptoms.htm)



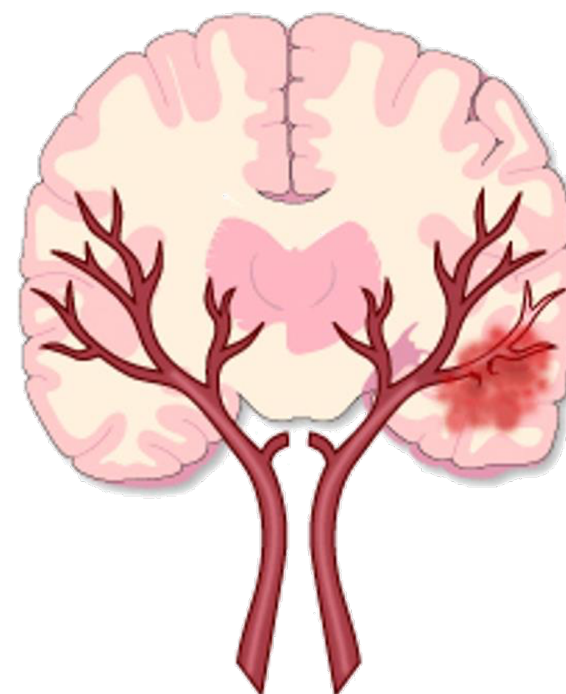
# Stroke – What Is It

- **2 Types of Stroke:**



**Ischemic**

- Caused by a blood clot
- Most common type



**Hemorrhagic**

- Caused by ruptured vessel
- Less common, higher mortality

- **Transient Ischemic Attack (TIA)**

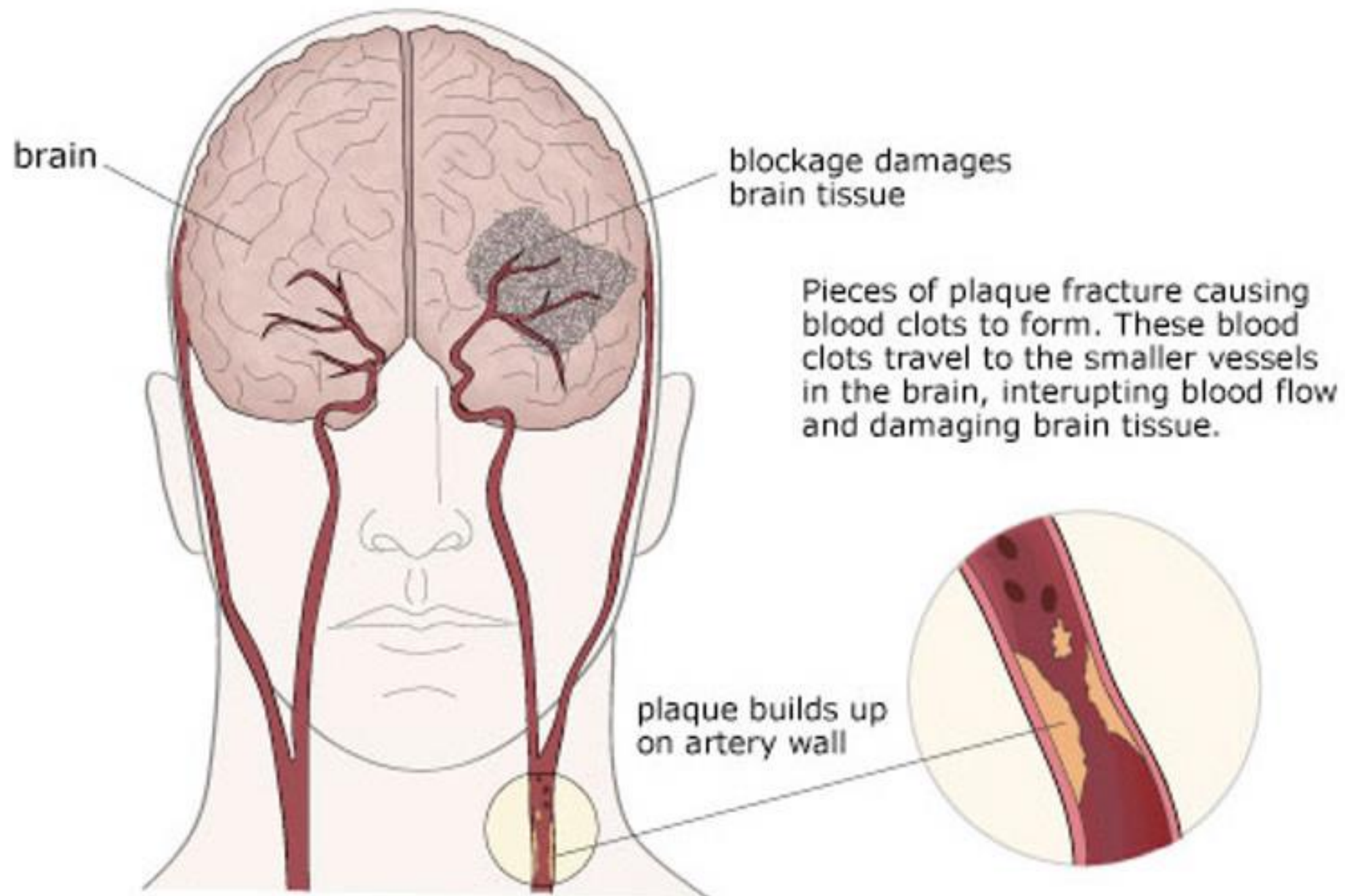
- Fast, resolves on its own in a few minutes
- Symptom of by major underlying condition, you still need to go to hospital

Reference: MECTA Neurological Emergencies, <https://mectaonline.newzenler.com/courses/neurological-emergencies-1920-r2-00173-t2/contents/5c9b64fbacc14>

**Both types serious, and patient needs prompt medical care**



# How Ischemic Strokes Happen



Reference: MECTA Neurological Emergencies, <https://mectaonline.newzenler.com/courses/neurological-emergencies-1920-r2-00173-t2/contents/5c9b64fbacc14>

**Thrombus becomes embolus, blocking blood flow to brain tissue**





# Stroke – Signs and Symptoms

- **Signs and Symptoms in Men and Women:**
  - Sudden **numbness** or weakness in the face, arm, or leg, especially on one side of the body.
  - Sudden **confusion**, trouble speaking, or difficulty understanding speech.
  - Sudden **trouble seeing** in one or both eyes.
  - Sudden **trouble walking**, dizziness, loss of balance, or lack of coordination.
  - Sudden **severe headache** with no known cause.
- **Remember, Act FAST**
  - **F**ace
  - **A**rms
  - **S**peech
  - **T**ime

References:



American Heart/Stroke Association Stroke Flyer (2011)  
[https://www.cdc.gov/stroke/signs\\_symptoms.htm](https://www.cdc.gov/stroke/signs_symptoms.htm)

### Stroke Assessment

#### The Cincinnati Prehospital Stroke Scale

Facial Droop (have patient show teeth or smile):



- Normal—both sides of face move equally
- Abnormal—one side of face does not move as well as the other side



Left: Normal. Right: Stroke patient with facial droop (right side of face).

Arm Drift (patient closes eyes and extends both arms straight out, with palms up, for 10 seconds):

- Normal—both arms move the same or both arms do not move at all (other findings, such as pronator drift, may be helpful)
- Abnormal—one arm does not move or one arm drifts down compared with the other



Left: Normal. Right: One-sided motor weakness (right arm).

Abnormal Speech (have the patient say “you can’t teach an old dog new tricks”):

- Normal—patient uses correct words with no slurring
- Abnormal—patient slurs words, uses the wrong words, or is unable to speak

Interpretation: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

Modified from Kothari RJ, Pancioli A, Liu T, Brott T, Broderick J. Cincinnati Prehospital Stroke Scale: reproducibility and validity. Ann Emerg Med. 1999;33:373-378. With permission from Elsevier.

Early Recognition -> Early Treatment -> Increased Survival and Recovery



# Hypoxia Review

- **Hypoxia = Low Oxygen**
- **Lack of Oxygen to the brain**
- **What are your symptoms?**
  - Varies by person
  - Euphoria
  - Confusion
  - Loss of night vision
- **Where can you go to see what yours are?**
  - Aviation Physiological Training – Closest in PA
  - <https://www.nastarcenter.com/altitude-hypoxia-training-courses.html>
- **Supplemental oxygen required (Part 91)**
  - >30 minutes operating at 12,500 – 14,000 ft
  - All portions of flight > 14,000 ft







# CO Poisoning: A Form of Hypoxia

- Carbon Monoxide (CO) is insidious and **deadly**
- Binds to hemoglobin easier than oxygen
  - A form of hypoxia
  - Rapid symptom onset
  - Slow to get rid of (hyperbaric chamber)
- Main sources in aircraft
  - Engine exhaust
- Symptoms
  - Headache, Drowsiness
  - Dizziness, Blurred vision
  - Cherry red
- What to do:
  - Open windows, vents
  - Land ASAP (<15 minutes)



Percent CO in Blood	Typical Symptoms
<10	None
10-20	Slight headache
21-30	Headache, slight increase in respirations, drowsiness
31-40	Headache, impaired judgment, shortness of breath, increasing drowsiness, blurring of vision
41-50	Pounding headache, confusion, marked shortness of breath, marked drowsiness, increasing blurred vision
>51	Unconsciousness, eventual death if victim is not removed from source of CO



# What should you tell ATC that's useful?

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- How does EMS *actually* work once you tell ATC
- Remember, there's a relay and a human controller in the loop



# Discussion: Altered Mental Status In-Flight

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- **Is this an Emergency?**
  - **YES**, DO NOT be afraid to declare one
  - Land at Logan if you think appropriate
- **Questions to ask yourself:**
  - Land now, or time to get closer to help?
  - Closest airport, or closest *appropriate* airport?
  - What if in Hanscom practice area?
  - Keene, NH area, or Western MA?
- **What if we're in IFR? What changes?**