PREVENTING COMPLICATIONS OF STROKE

BLOOD PRESSURE MANAGEMENT

HYPERtension

Goals:

Ischemic stroke, no thrombolysis	Ischemic stroke, post-thrombolysis	Intracranial hemorrhage	Subarachnoid hemorrhage
<220/<120	**<180/<105**	**<160/<100**	**<140/<90**

Rapid drops and wide fluctuations in blood pressure (BP) worsens stroke outcome

- Initial BP management may require IV antihypertensives
- After 24-48 hours, BP should be brought down **gradually** with oral medications over several days
- Stroke patients should not be given hydralazine or other peripheral vasodilators for BP management
- Beta-blockers are less effective for secondary stroke prevention. ACE inhibitor/angiotensin receptor blockers, thiazide diuretics and dihydropyridine-calcium channel blockers are preferred.

HYPOtension

BP less than 100/70 is associated with poor ischemic stroke outcome

- Hypotension is *unusual* in the setting of an acute stroke and could be a sign that something else is wrong (i.e. hypovolemia, sepsis, severe cardiac failure) and requires clinical evaluation
- Ensure all stroke patients are fluid replete (**euvolemia**)
- If patient's symptoms of stroke worsen with low BP, bolus with IV normal saline STAT and notify the patient's primary team

BLOOD GLUCOSE MANAGEMENT

HYPERglycemia in the first 24 hours from stroke onset independently predicts expansion of ischemic stroke, increases the risk of hemorrhage, increases mortality and increases the risk of a poor neurological outcome

- Recommended target blood glucose is 140-180 (**euglycemia**)
- Do <u>not</u> use D5W or D5½ NS (use normal saline for all stroke patients)
- Oral hypoglycemics should be held to avoid hypoglycemia
- Use long-acting and short-acting insulin to control blood glucose
- Metformin should always be held for 48 hours of contrast exposure (i.e. CTA)
- Consult diabetes educator for patients in need of improved glucose control

HYPOglycemia can mimic the symptoms of stroke and a STAT fingerstick blood glucose should be checked in any patient with acute neurological changes

TEMPERATURE MANAGMENT

HYPERthermia: The relative risk of poor outcome from stroke doubles with every 1°C increase in body temperature

- The source of any fever should **not** be attributed to the stroke itself and underlying infection should be sought, *especially infectious endocarditis, aspiration pneumonia and urinary tract infections*
- Use antipyrectics and cooling blankets to keep patients less than or equal to 37.5°C (99.5°F) (**euthermia**). Hypothermia has not been shown to improve stroke outcome.
- Prophylactic antibiotics are **not** effective, but suspected/identified infections should be treated

INFECTION PREVENTION

Patients with stroke are at increased risk for infections due to a phenomena known as post-stroke immune depression.

- **ASPIRATION PNEUMONIA**
  - **The development of PNA after stroke is associated with an increased risk of death and poor outcome**
  - An assessment of swallowing ability should be performed on <u>all</u> stroke patients upon admission
    - Bedside **dysphagia screen**, if patient fails →
    - Formal **speech therapy** evaluation, if ST requests →

    - Modified barium swallow
- Strict NPO (including meds) *for patients who fail the dysphagia screen* until cleared by ST
- Aspiration precautions, keep head of bed at 30°
- Oral hygiene

➢ **CATHERTER-ASSOCIATED UTI**

- **UTIs are associated with worse neurological outcomes, longer hospital stays, and increased cost of care. In addition, patients with stroke have an increased risk of nosocomial UTIs due to post-stroke immunodepression and bladder dysfunction**
- Stroke is not an indication for Foley catheter placement
- Discontinue any catheters if there is no clinical indication for them
- I recommend a low threshold for urinalysis with urine culture for all stroke patients

➢ **BLOOD STREAM INFECTIONS**

- Check all IV sites daily for signs of infection and remove any concerning lines.

VTE PROPHYLAXIS

PULMONARY EMBOLI (PE) accounts for up to 25% of early deaths after stroke

- The risk of DVT is highest in stroke patients who are immobilized, hemiparetic and elderly
- Activity orders should be updated daily
- Early mobilization by PT/OT as soon as patient is medically stable
- Low molecular weight heparin may be superior to UFH in stroke patients *with* a paretic leg (see *VTE prophylaxis in Stroke*)
- Monitor for skin break down if external compression devices are being used

NUTRITION

- NGT/OGT placement should be considered early if NPO status is expected to be more than 24 hours
- Electrolytes should be balanced, ensure $K^+ > 4.0$ and $Mg^{++} > 2.0$
- Discuss the potential need for PEG tube early with patients/families for patients who are not expected to recover swallow function so that they have time to consider whether or not this is right for them/their loved one
- There is no benefit to nutritional supplementation of a regular diet
- For those who are able to eat by mouth, order a low-salt, cardiac diet, a vegetarian diet or an ADA diet
- Consult nutrition if patient malnourished or in need of dietary counseling
- Consider assessing B12, folate and vitamin D and correct if deficient

PREVENTION OF PRESSURE ULCERS

- Early mobilization
- Check skin and pressure points for decubiti daily and turn the patient every 2 hours
- Order heel, foot or ankle protectors for those with paretic legs
- Consider boots to prevent Achilles tendon contractures for patients with prolonged immobilization
- Elevate paretic extremities above the level of the heart to reduce edema and skin breakdown
- Protect the limbs of patients with neglect as they may not know their leg is stuck between the bed and the bed rail. Place pillows to prevent them from wedging extremities into these spaces