

# CVA, TIA, A. Fib

## Atrial Fib

- Calculate CHA<sub>2</sub>DS<sub>2</sub>-VASc score – treat if ≥ 2
- Consider HAS-BLED score to evaluate risk of bleeding
- If unstable - treat emergently (hospital)
- If stable:
  - **Rate control** (first line beta blocker or non-DHP CCB vs second line digoxin esp. if heart failure) + **anticoagulation** initially - keep rate < 110 if asymptomatic and normal EF
  - Rhythm control for certain patients: 1. instability 2. younger 3. those w/ shorter duration AF 4. reduced LVEF 5. persistent symptoms despite treating with rate control.
    - Electrical Cardioversion - usually first line
    - Pharmacological
    - Consider cardiac ablation – if unable or unwilling to take rate or rhythm control meds
      - This may improve EF in some patients w/ HFrEF
      - May be preferred in younger patients with fewer comorbidities who have paroxysmal AF
- Cardioversion within 1 year of AF onset may be associated with lower mortality
- Antiarrhythmic medication may reduce CV morbidity and mortality in patients < 65 years compared with rate control

CHA <sub>2</sub> DS <sub>2</sub> -VASc	Risk Factor	Points
C	Congestive Heart Failure	+1
H	HTN	+1
A	Age 75 yrs+	+2
D	DM	+1
S	Previous Stroke, TIA, or thromboembolism	+2
V	Vascular dx	+1
A	Age 65-74	+1
Sc	Sex Category (female)	+1

Treat if score ≥2 in men / ≥3 in women

## HAS-BLED

### HAS-BLED Criteria (Each scored 1 point):

- Hypertension (SBP >160 mmHg)
- Abnormal Renal/Liver Function (1 point for each)
  - Renal: Dialysis, transplant, or serum creatinine >2.3 mg/dL
  - Liver: Cirrhosis or bilirubin >2x normal, with AST/ALT >3x normal
- Stroke (history of stroke)
- Bleeding History or Predisposition (e.g., prior major bleeding, anemia)
- Labile INRs (unstable or high INRs if on warfarin)
- Elderly (age >65 years)
- Drugs or Alcohol (1 point for each)
  - Drugs: Antiplatelets or NSAIDs
  - Alcohol: ≥8 drinks/week

### Interpretation:

- **Score ≥3** indicates **high bleeding risk**. Extra caution and closer monitoring are required if anticoagulation is started.

### Management:

- Address modifiable risk factors (e.g., control BP, avoid NSAIDs/alcohol).
- Consider alternative strategies if bleeding risk outweighs the benefits of anticoagulation.

## Atrial Fib: Anticoagulant & other Options

- DOACs are usually preferred to Warfarin
  - Lower risk of bleeding
  - Warfarin still preferred in patients w/ valvular a. fib (those w/ moderate to severe mitral stenosis or with a mechanical heart valve).
  - Direct Factor Xa Inhibitors: apixaban, rivaroxaban, and edoxaban
  - Direct Thrombin Inhibitor: dabigatran
- Aspirin is not recommended for reducing risk of stroke (in patients with AF)
  - Left atrial appendage occlusion (e.g., Watchman device) is an alternative for patients with increased risk of stroke w/ contraindications to anticoagulation.

## Transient Ischemic Attack

- Definition is now based on imaging rather than time.
  - A TIA occurs when there are transient neurological symptoms without evidence of infarction on brain imaging
  - Symptoms typically resolve within minutes to 1 hour, but if they persist for longer, imaging is essential to rule out infarction (i.e., stroke).
- 60-Minute Threshold: Symptoms lasting > 1 hour are more likely to show infarction on imaging and may indicate a minor stroke rather than a TIA.
  - Use MRI with DWI to distinguish TIA from stroke and guide further management.

## TIA Risk Stratification

The ABCD<sup>2</sup> Score helps estimate the short-term risk of stroke after a Transient Ischemic Attack (TIA). It assesses factors associated with stroke risk within 2 days after a TIA.

### ABCD<sup>2</sup> Criteria:

- Age ≥60 years (1 point)
- Blood Pressure ≥140/90 mmHg (1 point)
- Clinical Features (max 2 points):
  - Unilateral weakness (2 points)
  - Speech disturbance without weakness (1 point)
- Duration of TIA symptoms:
  - ≥60 minutes (2 points)
  - 10-59 minutes (1 point)
- Diabetes (1 point)

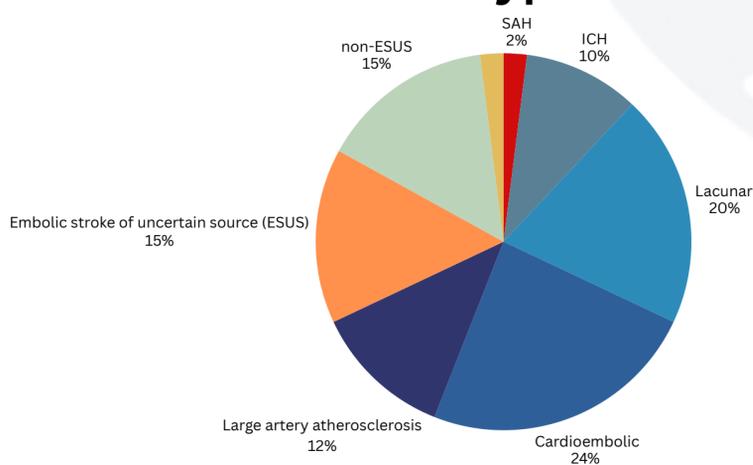
### Interpretation:

- **Score 0-3:** Low risk (1% stroke risk in 2 days)
- **Score 4-5:** Moderate risk (4.1% stroke risk in 2 days)
- **Score 6-7:** High risk (8.1% stroke risk in 2 days)

### Management:

- **High-risk patients** (ABCD<sup>2</sup> ≥4): Send to ER
  - Prompt initiation of secondary stroke prevention (e.g., antiplatelets, statins) is critical for all patients.
  - **Aspirin and Clopidogrel:** Dual antiplatelet therapy (DAPT) for 21 days then switch to single antiplatelet after 21 days

## Stroke Types



## Tests to Identify Cause of TIA/CVA

### Imaging Studies:

- Non-Contrast CT Scan of the Head
- MRI of the Brain (if CT is negative and clinically indicated)
- CT Angiography (CTA) or MRI Angiography (MRA) (to assess vascular status)

### Laboratory Tests:

- Complete Blood Count (CBC)
- Basic Metabolic Panel (BMP)
- Coagulation Profile (PT/INR and aPTT)
- Lipid Panel
- Thyroid Function Tests
- Blood Glucose Level
- Serum Ethanol Level (if intoxication is suspected)

### Additional Tests:

- EKG & Echocardiogram (transthoracic or transesophageal) to evaluate for cardiac sources of emboli
- Autoimmune and Hypercoagulability Panels (if secondary causes are suspected)

## Neuroimaging

- Non-contrast CT of the Brain:
  - Initial imaging to rule out hemorrhage, particularly if anticoagulation or thrombolysis is considered.
  - May show early signs of ischemia.
- Magnetic Resonance Imaging (MRI):
  - Diffusion-weighted imaging (DWI): More sensitive for identifying acute ischemia, particularly small infarcts.

## Special Considerations: PFO, Vasculitis

- Patent Foramen Ovale (PFO\*):
  - Consider echocardiography (TEE) if cryptogenic stroke and patient under 60 years.
- Vasculitis or Other Rare Causes:
  - Further testing may be indicated if autoimmune conditions or other rare causes (e.g., vasculitis, dissection) are suspected.

\* It is reasonable to percutaneously close a PFO in patients who meet each of the following criteria: age 18–60 years, nonlacunar stroke, no other identified cause, and high risk PFO features (especially with an atrial septal aneurysm or large right-to-left shunting)

## Vascular Imaging

- Carotid Ultrasound (Carotid Doppler):
  - To assess for carotid artery stenosis, which is a common cause of ischemic stroke.
- Computed Tomography Angiography (CTA) or Magnetic Resonance Angiography (MRA):
  - Evaluate intracranial and extracranial arteries for stenosis, occlusion, dissection, or aneurysm.
  - Useful for identifying large vessel occlusion in ischemic strokes.
  - Especially useful when considering endovascular intervention

## Cardiac Evaluation

- Electrocardiogram (ECG):
  - To detect atrial fibrillation (A. fib), arrhythmias, or ischemic changes.
  - Consider long-term monitoring for paroxysmal A. fib if the initial ECG is normal (e.g., Holter monitor or event monitor).
- Echocardiogram:
  - Transthoracic (TTE): Assess for structural heart disease, valvular disease, left ventricular dysfunction.
  - Transesophageal (TEE): For detailed evaluation of the left atrium, interatrial septum (to detect PFO, atrial septal aneurysm), and aortic arch atheroma.

## Special Considerations: Managing Carotid Artery Stenosis

- Medical Management: ASA, statin, BP control, lifestyle
- Carotid Endarterectomy (CEA):
  - Recommended for symptomatic patients with 70-99% stenosis of ipsilateral side.
  - Considered for symptomatic patients with 50-69% stenosis based on individual risk factors.
  - For asymptomatic patients, CEA is considered in those with  $\geq 70\%$  stenosis if the perioperative risk is  $< 3\%$ .
- Carotid Artery Stenting (CAS)
  - Alternative to CEA, particularly for:
    - Patients with high surgical risk (e.g., significant comorbidities, prior neck surgery or radiation).

## Acute Ischemic Stroke - tPA and Beyond

- Thrombolysis (tPA): Administered within 4.5 hours based on eligibility.
  - Converts plasminogen to plasmin, facilitating the breakdown of fibrin clots and restoring blood flow.

## Mechanical

### Thrombectomy

- Thrombectomy up to 24 hours in select patients.
- Treatment is beneficial for large-vessel occlusions (LVO), with significant improvement in outcomes compared to medical management alone.

## Anticoagulation in Stroke w/ A. fib

Management: Start anticoagulation with apixaban\* – Timing depends on severity of Stroke:

- Minor stroke (NIHSS 0-3): Anticoagulation can be initiated relatively early, typically within 3-4 days after the stroke.
- Moderate stroke (NIHSS 4-15): Anticoagulation is usually started after 5-7 days.
- Severe stroke (NIHSS  $> 15$ ): Anticoagulation is often delayed for 2 weeks or longer to minimize the risk of hemorrhagic transformation

\* Apixaban is preferred due to lower renal clearance and reduced bleeding risks compared to other DOACs

## Stroke and Rehab, Depression

- Rehabilitation Therapies: Early physical and occupational therapy are key to improving functional recovery after a stroke.
- Constraint-Induced Movement Therapy (CIMT): An effective rehabilitation technique for improving upper limb function in stroke survivors.
- Post-Stroke Depression (PSD): Affects up to one-third of stroke survivors and is associated with worse functional outcomes and increased mortality.
- Treatment: Early screening and management with SSRIs or cognitive behavioral therapy (CBT) are recommended.

## Secondary Stroke Prevention

- **Lifestyle interventions:** Mediterranean diet, physical activity, reduce or eliminate alcohol, quit smoking
- **Statins:** High-dose statin therapy - atorvastatin 80mg
  - Target LDL  $< 70$  mg/dL
  - If needed may add ezetimibe or PCSK-9i
- **Dual Antiplatelet Therapy (DAPT):** For select patients with a non-cardioembolic ischemic stroke or TIA:
  - Early arriving ( $< 24$ hrs from onset) with minor stroke (NIHSS  $\leq 3$ ) (for 21 days)
  - High risk TIA, ABCD<sup>2</sup>  $\geq 4$  (21 days)
  - Severe symptomatic intracranial stenosis (up to 90 days)
  - Post carotid stent for 30days
- Transition from DAPT to **single agent antiplatelet therapy**
- May consider adding icosapent ethyl (Vascepa) based on one small study if TGs are 150-499 mg per dL (in patients already on a statin)
- It is unclear whether **patients already taking aspirin** at the time of noncardioembolic stroke or TIA benefit from increasing the dosage or changing to a different antiplatelet therapy.

## Secondary Prevention CVA - BP control

- Hypertension Control: Goal  $< 130/80$
- First-Line Agents: ACE-I and thiazide diuretics are preferred

## Stroke prevention in Diabetics

- High dose statin
- Goal A1C  $< 7.0$ 
  - Metformin plus GLP-1 or SGLT2i is recommended

## Suspected Stroke

CT Head

Hemorrhagic

Neurosurgical consult  
Aggressive BP control

Ischemic

4.5-24 Hours from onset  
Mechanical thrombectomy if large vessel

$< 4.5$  Hours from onset  
Thrombolysis (tPA)

Determine Source

**Hypercoag State** (hypercoag panel, ESR/ANA, RF, cancer screen (CT chest/abd/pelvis))

Anticoagulation

**Cardioembolic (A. fib, valvular, LV thrombus)** (EKG, Tele, Holter, Event monitor, TTE, TEE)

Anticoagulation

**Large Artery Atherosclerosis** (CTA, MRA, angio Carotid U/S)

Antiplatelet + CEA (if indicated)

**Lacunar: mostly due to small vessel dx** (MRI w/ DWI)

Antiplatelet

**Cryptogenic** (No obvious source - ESUS and non-ESUS)

Antiplatelet