Role of Cardiac Monitoring in Prevention of Cryptogenic Stroke

presentation on Friday, September 06, 2019

Rose Paul Bagh, DNP, APRN, FNP-BC, AGACNP-BC
Clements University Hospital (UTSW), Dallas, Texas
Cardiology Electrophysiology

DISCLOSURES

• There are NO CONFLICTS OF INTEREST related to this presentation.
• The information presented herein is for general educational purposes.
• This presentation should not be considered as an exclusive source of information on the topic.

ACKNOWLEDGEMENTS

• I am grateful to UT Southwestern Medical Center, the Cardiology Electrophysiology Unit, the Faculty Physicians & Providers who teach and train me with practical case scenarios on a daily basis.
• I am thankful to the Officers & Leaders of the Advanced Practice Providers for facilitating this presentation towards continuing nursing/medical education.

Objectives

• Understanding the concept of Cryptogenic Stroke (CS) and its prevalence
• Understanding the relationship of CS and underlying cardiac arrhythmia
• Type of cardiac monitor to choose for patients
• Choice of appropriate anticoagulation to prevent further stroke

WHAT IS CRYPTOGENIC STROKE?

• The majority of Ischemic Strokes are due to cardio-embolism, large vessel atherothromboembolism, small vessel occlusive disease, or other unusual mechanisms.
• Many Ischemic Strokes occur without a well-defined etiology, and are labeled as Cryptogenic Stroke.
• Other terms used for Cryptogenic Stroke include Cryptogenous Stroke, and Infarcts of unknown, uncertain, or undetermined causes.
• 30% of Ischemic Strokes are of unknown mechanism and are called as Cryptogenic Strokes.

PREVALENCE OF ISCHEMIC STROKE

Cryptogenic stroke is as prevalent as large vessel stroke.
CAUSES OF CRYPTOGENIC STROKE

• Patent Foramen Ovale
• Inherited Thrombophilias
• Aortic Arch Plaque
• Infectious/Autoimmune/Inflammatory states
• Occult Atrial Arrhythmias-Atrial Fibrillation

WHY CRYPTOGENIC STROKE Pt's NEED CV MONITORING?

• The ability to detect the possible etiology of stroke has profound implications in terms of treatment strategy and reduction of risk of further recurrences.
• Cardiac embolism secondary to occult paroxysmal atrial fibrillation (PAF) may be a common cause of assumed cryptogenic stroke.
• Majority of cryptogenic stroke patients are on antiplatelet therapy for the secondary prevention of stroke. The evidence is suggestive of the lack of efficacy of antiplatelet agents in the setting of cardio-embolic stroke. So it is important to identify occult PAF in the post stroke patients.

WHY CRYPTOGENIC STROKE Pt's NEED CV MONITORING?

• Evidence is suggestive that there is a five fold increase in ischemic stroke risk for patients with atrial fibrillation (AF).
• Evidence is also suggestive that AF related ischemic strokes are 2X more fatal compared to non-AF stroke.
• Evidence is also suggestive that the patients with AF who are on appropriate anticoagulation have a 67% decrease of stroke risk compared to those who are not on appropriate anticoagulation.

CRYSTAL AF STUDY - CRYPTOGENIC STROKE

• The CRYSTAL AF study used a rigorous exclusion methodology to identify Cryptogenic Stroke patients.
• In this study, stroke was only classified as Cryptogenic Stroke after extensive testing: – 12 EKG, 24 hours Holter monitoring, TEE, screening for thromobophilic states (in patients < 55 age), MRA, and CTA of brain did not reveal a cause.

EVIDENCE BASED PRACTICE: CRYSTAL AF STUDY

Objectives of Crystal AF Study:
• To assess whether a long-term cardiac monitoring strategy with an Insertable Cardiac Monitor (ICM) is superior to standard monitoring for the detection of AF in patients with cryptogenic stroke at 6 months (primary end point) and 12 months follow-up (secondary end point).
• Determine actions taken after patient is diagnosed with AF.

Methods of Crystal AF Study:
• 1:1 randomized trial comparing the yield of AF detection through continuous monitoring with an ICM versus standard medical care in cryptogenic stroke or transient ischemic attack (TIA) patients. 441 patients were enrolled.
• AF was defined in this study as an episode of irregular heart rhythm, without detectable P waves, of at least 30 seconds duration. AF episodes that qualified for analysis were adjudicated by independent committee.
**Patient Inclusion Criteria:**
- ≥ 40 years of age
- Cryptogenic stroke (or clinical TIA), with infarct seen on MRI or CT, within the previous 90 days; and no mechanism (including AF) determined after:
  - 12-lead ECG
  - 24-hour ECG monitoring (e.g., Holter)
  - Transesophageal echocardiography (TEE)
  - CTA or MRA of head and neck to rule out arterial source
  - Screening for hypercoagulable states in patients < 55 years old

**Patient Exclusion Criteria:**
- History of AF or Atrial Flutter
- Permanent indication or contraindication for anticoagulation
- Indication for pacemaker or ICD

**Conclusion of the Study**
CRYSTAL AF study showed that AF was more frequently detected with an ICM than with conventional follow-up in patients with a recent cryptogenic stroke. Atrial fibrillation after cryptogenic stroke was most often asymptomatic and paroxysmal and thus unlikely to be detected by strategies based on symptom-driven monitoring or intermittent short-term recordings.

**PATIENT CASE SCENARIO**
- 76 year old male with h/o HTN and T2Diabetes Mellitus presents with acute onset dysarthria and right-sided weakness.
- In ER - NSR, BP 148/92.
- Other than the neurological findings, his exam is unremarkable.
- CT of the brain shows no bleed - Thrombolytic Therapy.
- Neurologic deficits resolve over night
- On telemetry for 24 hours - NSR.

**PATIENT CASE SCENARIO (continued)**
- Echocardiogram reveals mild concentric LVH, mild MR, mild to moderate LAE, and no source of embolism.
- MRI/MRA shows no cerebrovascular disease. Multiple small areas of previous strokes (subclinical).
- TEE shows no R to L shunt and no evidence of spontaneous echo contrast or LA appendage thrombus.
- His Ischemic Stroke was deemed Cryptogenic.
PATIENT CASE SCENARIO (continued)

- Nothing other than - place him on Aspirin and Plavix, add a statin, manage his blood sugar, manage BP aggressively, and hope that patient will not have another stroke
- 24 Hour Holter
- 7 Day Event Mobile Cardiac Telemetry (MCT) Monitor
- 30 Day Event/MCT Monitor
- Implantable Cardiac Monitor or Reveal LINQ

CHOICE OF CARDIAC MONITORING

Diagnostic monitoring based on frequency of patient symptoms:
- < 1 Week: 24 Hour Holter, 7 Day Event Monitor
- 1 Week to < 1 Month: 7, 14, 21, 30 Day Event Monitor
- > 1 Month Implantable Cardiac Monitor (ICM)

TYPE OF CARDIAC MONITORING & RATE OF DETECTION

<table>
<thead>
<tr>
<th>Type of Monitoring</th>
<th>Setting</th>
<th>Implantable vs. Non-implantable</th>
<th>Duration</th>
<th>Rate of Detection of Atrial Fibrillation, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission ECG</td>
<td>Inpatient</td>
<td>Non-implantable</td>
<td>N/A</td>
<td>~2.7</td>
</tr>
<tr>
<td>ECG</td>
<td>Inpatient</td>
<td>Non-implantable</td>
<td>3-5 d</td>
<td>5-7.8</td>
</tr>
<tr>
<td>Holter monitor</td>
<td>Outpatient</td>
<td>Non-implantable</td>
<td>24 h</td>
<td>3.2-4.8</td>
</tr>
<tr>
<td>Mobile Holter</td>
<td>Outpatient</td>
<td>Non-implantable</td>
<td>7 d</td>
<td>4.4</td>
</tr>
<tr>
<td>Mobile Continuous</td>
<td>Outpatient</td>
<td>Non-implantable</td>
<td>21-30 d</td>
<td>16-25</td>
</tr>
<tr>
<td>24 Hour Holter</td>
<td>Outpatient</td>
<td>Non-implantable</td>
<td>35 min</td>
<td>30</td>
</tr>
</tbody>
</table>


WHAT IS REVEAL LINQ

- Implantable Cardiac Monitor (aka implantable loop recorder)
- Auto-detects: pauses, brady, tachy, AT/AF
- Patient activated events
- Wireless connectivity to cellular-enabled home monitor
- MRI-conditional
- 3-year battery life
- ~60 minutes of ECG storage

FDA REVEAL XT/LINQ INDICATIONS

- Patients with clinical syndromes or situations are at an increased risk for cardiac arrhythmias.
- Patients who experience transient symptoms such as dizziness, palpitations, syncope, and chest pain, that may suggest a cardiac arrhythmia.

COMMON INDICATIONS FOR IMPLANTING REVEAL LINQ

- Syncope/pre-syncope
- Palpitations
- Cryptogenic Stroke/TIA
- Suspected AF
- Post-AF ablation monitoring
- Post-AF ablation management of medication
- Newly diagnosed AF
- Dizziness
- Chest Pain
- Seizures, etc.
**Implant Overview: Insertion Location**

Recommended subcutaneous insertion in one of two locations without conducting pre-insertion surface mapping. *

**Best location:** The device is positioned 45 degrees relative to the sternum over the 4th intercostal space (V2-V3 electrode orientation). The superior end of the device is positioned approximately 2 cm (+/- 1 cm) left lateral from the edge of the sternum.

**Good location:** The device is positioned over the 4th intercostal space approximately 2 cm (+/- 1 cm) parallel to the edge of the sternum.

* Surface mapping eliminated based on Sub Q-IM Study and MapReveal

**Implant Overview: Tools**

**Step 1: Pinch the Skin and Make Incision**

- Pinch the skin (adjacent to selected incision location) to tent it.
- At an angle of ~90 degree to the pinched tissue, push the blade of the supplied incision tool into its full depth.
- Tip: Ensure implanter uses the tool as a "punch" rather than as a scalpel. The blade should be at the bottom of the pinched tissue.

**Step 2: Pinch Skin and Insert Supplied Tool**

- Tip: If necessary, pinch the skin adjacent to incision, then insert the tool probe completely to create a tunnel ~8 mm under the skin.
- Tip: Gripping the tool closest to the neck provides more stability and control during insertion.
- Tip: Verify that the word "LINQ" is legible in the plunger window prior to insertion.

**Step 3: Rotate Tool 180 Degrees**

Rotate the insertion tool 180 degrees to open the incision for inserting the preloaded Reveal LINQ Cardiac Monitor.

**Data Transmission: How Do We Get Results?**

- Nightly wireless transmission from device to MyCareLink monitor.
- Nightly cellular transmission from MyCareLink monitor to CareLink online system.
WHAT CAN I SEE?

• Daily Reports
  ○ Summary of previous day’s activities
• Episode Reports – Show full details of arrhythmia
  ○ Time of occurrence
  ○ Duration of occurrence
  ○ Corresponding ECG
• Summary Reports
  ○ Auto-generated report every 30-days (customizable)

EXAMPLE OF AN EPISODE REPORT

ROLE OF CARDIAC MONITORING - CRYPTOGENIC STROKE

Long-term cardiac monitoring helps in the early detection of occult atrial fibrillation (AF), may be beneficial in patients with Cryptogenic Stroke, and has the potential to shift the management paradigm and in preventing further recurrences of strokes.

CRYPTOGENIC STROKE PATHWAY

REFERENCES


THANK YOU ALL

Questions?
Thank you ALL for being here!