Incidence of left atrial appendage thrombus in patients undergoing AF ablation: Is TOE needed in low risk patients in the NOAC era?

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Outline

- Stroke risk
- Risk factors
- Current guidelines
- James Cook University Hospital data
Stroke risk

- Studies have suggested risk of peri-procedural stroke between 0.1-0.8%.¹
- Asymptomatic cerebral embolism detected by MRI scanning between 7.9%-14.9%.¹
- Mechanism
  - Dislodgement of left atrial appendage thrombus
  - Thrombogenicity of catheters in left atrium
  - Thrombogenicity of delivering RF ablation and acute lesions

¹ Haeusler K et al. Stroke. 2011;43:265-270
Risk Factors for left atrial appendage thrombus

- Type of AF – Paroxysmal versus Persistent.¹
- Left atrial size.¹
- LVEF.¹
- CHA₂DS₂-VASc.²

# Incidence of left atrial appendage thrombus

<table>
<thead>
<tr>
<th>Study</th>
<th>Number of Patients</th>
<th>Anticoagulation</th>
<th>Number of patients with LAA thrombus (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scherr et al 2009.¹</td>
<td>585</td>
<td>Warfarin/Enoxaparin</td>
<td>CHADS₂ 0 – 0.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHADS₂ 1 - 1.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHADS₂ 2 – 5.3%</td>
</tr>
<tr>
<td>Puwanant et al 2009.²</td>
<td>1058 patients</td>
<td>Interrupted warfarin</td>
<td>CHADS₂ 0 – 0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHADS₂ 1 – 0.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHADS₂ 2 – 1%</td>
</tr>
<tr>
<td>McCready et al 2010.³</td>
<td>635 patients</td>
<td>Warfarin/Dalteparin</td>
<td>Overall Incidence 1.9%</td>
</tr>
<tr>
<td>Atkinson et al 2017.⁴</td>
<td>332 patients</td>
<td>Warfarin (94%) NOAC – interrupted</td>
<td>CHA₂DS₂VASc 0 – 0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHA₂DS₂VASc 1 - 0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHA₂DS₂VASc 2 – 2%</td>
</tr>
</tbody>
</table>

Current Guidelines

2017 HRS/EHRA/ECAS/APHRS/SOLAECE expert consensus statement on catheter and surgical ablation of atrial fibrillation.

Performance of a TEE in patients who are in AF on presentation for AF catheter ablation and who have been receiving anticoagulation therapeutically for 3 weeks or longer is reasonable.

Performance of a TEE in patients who present for ablation in sinus rhythm and who have not been anticoagulated prior to catheter ablation is reasonable.

Use of intracardiac echocardiography to screen for atrial thrombi in patients who cannot undergo TEE may be considered.

Variation in Practice

A survey of the writing group members shows that:

- 51% perform a TEE in all patients presenting for AF ablation regardless of presenting rhythm and anticoagulation status.

- 71% of the writing group members perform a TEE in patients presenting AF who have been therapeutically anticoagulated for 3 or more weeks prior to ablation.

- Among patients who present for AF ablation in sinus rhythm who have not been previously anticoagulated, 78% of the writing group members routinely perform a TEE.

Aim

‘This study aimed to evaluate the incidence of left atrial appendage thrombus in patients undergoing first time AF ablation in the NOAC era and determine whether TOE is required for low risk patients’
Methods

- Single centre retrospective study

- Data collected using electronic records

- Including all patients who underwent AF ablation and had a TOE performed between 1\textsuperscript{st} May 2015 and 11\textsuperscript{th} May 2018
  - Patients who had multiple ablations during the study period were only included for the first ablation
Results

- 225 patients underwent AF ablation during the study period
  - 140 patients did not undergo TOE
    - 101 patients CHA$_2$DS$_2$VASC <2
    - 39 Patients operator discretion or alternative imaging used (ICE)
  - 85 patients underwent TOE (37.8%) - (63 male, 22 male), mean age 60 years
Results

- 72 patients were treated NOACs
  - 11 patients – uninterrupted dabigatran
- 13 patients treated with warfarin
Results

<table>
<thead>
<tr>
<th>CHA$_2$DS$_2$-VASc Score</th>
<th>Number of Patients</th>
<th>Number of Patients with LAA thrombus</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>14</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>1 (female status)</td>
<td>1</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>1</td>
<td>18</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>2</td>
<td>36</td>
<td>1 (2.8%)</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>
Results

- 1 patient with left atrial appendage thrombus
  - CHA$_2$DS$_2$-VASc – 2
  - Persistent AF
  - Dilated left atrium – 4.9cm diameter
  - Moderate LV impairment
  - No resolution despite apixaban, rivaroxaban

- No patients during the study period had a peri-procedural stroke
The overall incidence of left atrial appendage thrombus on patients undergoing TOE prior to catheter AF ablation was low (1.2%).

No patients during the study period had a peri-procedural stroke.

No low risk patients with a CHA$_2$DS$_2$-VASc score of 0/1 had left atrial appendage thrombus on TOE.

Unlike previous literature the majority of patients were on NOACs.
Implications for Practice

Although small patient numbers our single centre experience in the NOAC era supports existing literature that routine TOE in low risk patients (CHA$_2$DS$_2$-VASc <2) may not be required
Questions?