Making waves with heparin

Intraprocedural use in pulmonary vein isolation

Christopher George, Jesseca Eglington, Lyndsay Steel, Gae Goodman, Dr Paul Martin

Royal Brisbane and Women's Hospital (RBWH), Herston, QLD

Background

Catheter Ablation (CA) therapy is an effective option for patients with atrial fibrillation (AF) who; have failed, decline or are intolerant to anti-arrhythmic drug treatment.[1] Pulmonary vein isolation (PVI), a type of CA therapy, is effective for restoring patients to sinus rhythm, and has demonstrated benefits for improving quality of life and reducing risk of cardiovascular hospitalisation, death, stroke and serious bleeding.[2,3]

In addition to the intrinsic thromboembolic risks associated with AF, the PVI procedure is linked with a further increased risk of stroke and transient ischemic attack, with reported rates between 0% and 7%.[1,4] As such, therapeutic anti-coagulation is often indicated pre, intra and post-procedure.[1,4] Current guidelines stipulate comprehensive recommendations around pre and post-procedural anticoagulation, with advice to continue the agents throughout the procedural period to reduce both bleeding and thromboembolic risk [1,4]. However, guidance on intraprocedural anticoagulation is limited (see Figure 1).

Unfractionated Heparin (UFH) is employed for intraprocedural use, with an initial bolus and subsequent infusion based on patient weight.[1,4] The dosing is altered throughout to achieve an Activated Clotting Time (ACT) of >300 seconds, as this is associated with a reduction in thrombosis without an increase in bleeding risk.[1,4]

Figure 1: Anticoagulant use around ablation. Summary of current guidelines

Pre-procedural

Oral anticoagulation for 3 weeks prior to procedure for patients with a $CHADS^2VA \geq 2$ not on established therapy.[1,4]

For patients on established therapy:

<u>VKA and Dabigatran:</u>
- Continue uninterrupted. [1,4]
- Reasoning: Reduced thromboembolism and bleeding risk and reversal agents are available.

<u>Rivaroxaban</u>: Unclear
- With-hold 1-2 doses[1]
- Uninterrupted [4]

<u>Apixaban</u>: Unclear
- With-hold 1-2 doses[1]
- Uninterrupted, however no specific evidence available [4]

Intra-procedural

Intraprocedural UFH recommended to reduce thromboembolism risk.[1]

Check ACT every 10-15 minutes until therapeutic, and then every 15-30 minutes.[4]

Patients on VKA achieve a therapeutic ACT faster compared to NOACs[4]

UFH loading doses (bolus) dependent on pre-procedural anticoagulation[4]
- No VKA/NOAC 75units/kg
- VKA 50units/kg
- NOAC 120units/kg

Post-procedural

Continue for a minimum of 1-3 months post-procedure.[1]

Anticoagulation for minimum 2 months post-procedure.[4]

Can reinitiate NOAC 3-5 hours after sheath removal provided no evidence of bleeding.[4]

Aim

To assess current practice at the Royal Brisbane and Women's Hospital for dosing of intraprocedural UFH for PVI.

Methods

- A retrospective review of medical notes and procedural and anaesthetic reports
- January 2018 to May 2019 at the RBWH
- Inclusion: patients undergoing PVI and receiving intraprocedural UFH
- Exclusion: patients with no anaesthetic report available for data collection
- Data collected:
  - Patient demographics
  - Initial UFH dose
  - Pre and post-procedural oral anticoagulation including the dosage and type and the preprocedural plan (continued or with-held)

Results

45 patients were identified with 9 excluded. Of the 36 included patients (baseline characteristics shown in figure 2) the type of long-term pre and post-procedural anticoagulation received is illustrated in figure 3 (bar graph portion).

Figure 2: Patient demographics.

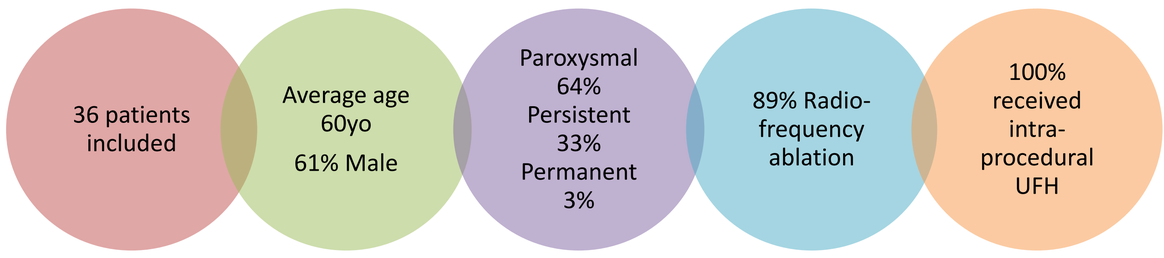
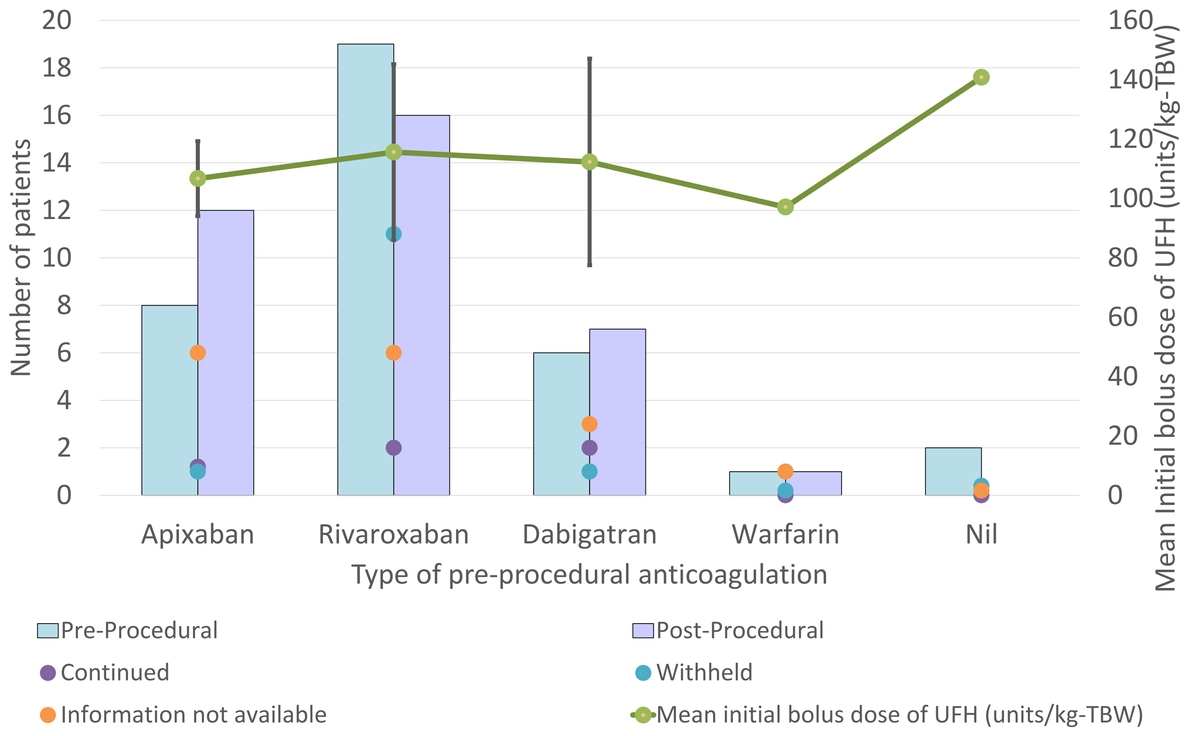


Figure 3: Anticoagulation results. Column graph: Anticoagulation received pre and post procedure. Scatter points: decision regarding pre-procedural anticoagulation plan. Secondary axis and line graph: Mean initial bolus dose of UFH (units/kg) according to anticoagulation.



The mean±SD initial bolus dose of UFH was 9888.9±2754.7 units, which equated to a weight-based dose of 113.9±26.8 units/kg. Mean±SD initial boli of UFH split by type of pre-procedural anticoagulation are shown in Figure 3 (green line portion). The mean±SD initial bolus for all NOACs collectively is 9885.7±2794.7 units and 114.4±27 units/kg. The pre-procedural plan for each anti-coagulant is illustrated in figure 3 (scatter point portion), with 44% of pre-procedural plans not recorded and 36% of anticoagulants being withheld prior to procedure.

Conclusion

Current practice for initial dosing follows the general trend stipulated by international guidelines, with patients on pre-procedural NOAC therapy receiving a higher weight based dose compared to those on a VKA. For patients with no pre-procedural anticoagulation, higher than recommended initial doses of UFH were received, however this may be influenced by the small sample size.

Regarding pre-procedural anticoagulation plans, almost a third of patients intentionally had their medication with-held prior, which differs from guidelines and places the patient at an increased risk of both bleeding and thromboembolism. However, given approximately half of patients had no plan documented in the electronic medical notes, this proportion is not a true representation of practice. This data highlights the need for improved documentation, and for education amongst medical staff regarding continuation of anticoagulation.

Further investigation into a larger sample size and patient outcomes is ongoing.

References

1. Brieger D, Amerena J, Attia J, Bajorek B, Chan KH, Connell C, et al. National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand: Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018. Heart, Lung and Circulation. 2018;27(10):1209-66.

2. Packer DL, Mark DB, Robb RA, Monahan KH, Bahnson TD, Poole JE, et al. Effect of Catheter Ablation vs Antiarrhythmic Drug Therapy on Mortality, Stroke, Bleeding, and Cardiac Arrest Among Patients With Atrial Fibrillation: The CABANA Randomized Clinical TrialEffect of Catheter Ablation vs Antiarrhythmic Drugs on Mortality, Stroke, Bleeding, and Cardiac Arrest in AFEffect of Catheter Ablation vs Antiarrhythmic Drugs on Mortality, Stroke, Bleeding, and Cardiac Arrest in AF. JAMA. 2019;321(13):1261-74.

3. Mark DB, Anstrom KJ, Sheng S, Piccini JP, Baloch KN, Monahan KH, et al. Effect of Catheter Ablation vs Medical Therapy on Quality of Life Among Patients With Atrial Fibrillation: The CABANA Randomized Clinical TrialEffect of Catheter Ablation vs Medical Therapy on Quality of Life in Patients With Atrial FibrillationEffect of Catheter Ablation vs Medical Therapy on Quality of Life in Patients With Atrial Fibrillation. JAMA. 2019;321(13):1275-85

4. Calkins H, Hindricks G, Cappato R, Kim Y-H, Saad EB, Aguinaga L, et al. 2017 HRS/EHRA/ECAS/APHRS/SOLAECE expert consensus statement on catheter and surgical ablation of atrial fibrillation. Heart Rhythm. 2017;14(10):e275-e444.

Queensland Government