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Updates in Hospital Medicine

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Kevin Hageman, DO[1,2]

[1] Section of Hospital Medicine, Division of General Internal Medicine and Public Health, Department of Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee,
[2] Department of Veterans Affairs, Tennessee Valley Healthcare System, Nashville, Tennessee

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UPDATE I: POSTOPERATIVE AND NONOPERATIVE ATRIAL FIBRILLATION CARRY SIMILAR STROKE RISK

Postoperative atrial fibrillation (PAF) is a common problem encountered by the hospitalist. However, subsequent arrhythmia burden and stroke risk are not well defined compared to nonoperative atrial fibrillation (NAF). Therefore, researchers conducted a cohort study via a medical records linkage system of predominantly white patients from a single county in Minnesota who developed incident atrial fibrillation (AF) over a period of 13 years.[1] They then identified those with PAF as patients who underwent surgery and developed AF intra-operatively or within 30 days of the procedure. The comparison group was patients who developed new AF or flutter that was not temporally associated with surgery (NAF). The primary outcome was the composite of ischemic stroke or transient ischemic attack (TIA), and secondary outcomes included subsequent AF, all-cause death, and cardiovascular-related death at five years.

A total of 4231 patients developed incident AF and were included in the analysis. Of these patients, 550 (13%) had PAF as their first-ever AF presentation. Within the PAF group, 50% of cases presented within two days of surgery and 82% presented within the first week. The mean age and sex were similar between groups. Notably, the PAF cohort had more comorbidities and their mean CHA2DS2-VASc score was slightly higher than the NAF cohort (3.6 vs. 3.3, respectively). The types of surgical procedures were orthopedic (n=144 (26.2%), gastrointestinal n=128 (23.3%), respiratory n=113 (20.5%), urogenital n=38 (6.9%), neurosurgical n=35 (6.4%), other n=92 (16.7%)).

Over a mean follow-up of 6.3 years, 486 patients had an ischemic stroke or TIA, 2462 patients had subsequent AF, and a total of 2565 deaths occurred. The rate of recurrent, subsequent AF (18%) was lower for patients with PAF compared to those diagnosed with NAF; however, the rates of ischemic stroke or TIA were similar (absolute risk difference at 5 years, 0.1% [CI, -2.9% to 3.1%]; HR, 1.01 [CI, 0.77 to 1.32]). This translates to an annual rate of stroke or TIA in both groups of ~2%. No differences in cardiovascular-related death or all-cause death were seen between patients with PAF and NAF in adjusted analyses. The investigators also found that in patients who developed an ischemic stroke or TIA, only 19.6% of patients in the PAF group were prescribed anticoagulation at the time of the event, versus 38.4% in the NAF group (**Table 1**).

Table 1. Differences in anticoagulant prescriptions between the two groups

	PAF	NAF
Median days from AF diagnosis to anticoagulation prescription	37 days	13 days
Cumulative incidence of anticoagulant prescriptions at 30 days	25.1% (95% CI 20.7-29.2%)	37.1% (95% CI 35.3-39.0%)
Cumulative incidence of anticoagulant prescriptions at 1 year	39.1% (95% CI 33.9-43.8%)	50.9% (95% CI 48.8-52.8%)
Incidence of anticoagulant prescriptions at the time of ischemic stroke or TIA	19.6%	38.4%

Take-away: PAF occurs frequently, usually manifests within one week of surgery, is often recurrent, and is likely to go undertreated compared to NAF. Patients with PAF were shown to have a similar risk of stroke, TIA, and death compared to patients with NAF, although prospective studies are needed to confirm this finding. Considering the individual patient with PAF, hospitalists should assess bleeding risk, and through shared decision making, discuss additional outpatient cardiac monitoring and the initiation of anticoagulation.

UPDATE 2: AGGRESSIVE VOLUME RESUSCITATION IN ACUTE PANCREATITIS

Current guidelines, as well as dogma, recommend early, aggressive fluid resuscitation in patients with acute pancreatitis. The WATERFALL trial investigated whether aggressive (AR) versus moderate (MR) fluid resuscitation affected the development of moderate or severe pancreatitis.[2,3]

At 18 hospitals in four countries, patients with acute pancreatitis were randomly assigned to AR or MR with Lactated Ringers solution (LR). The patients were, on average, in their mid-50s with a BMI of 27 kg/m^2 and an average Charlson Comorbidity Index of 2. To be included, patients had to present within 24 hours of pain onset and received a diagnosis no more than 8 hours before enrollment. Patients were excluded if they had moderately severe or severe pancreatitis at baseline, had baseline heart failure, uncontrolled hypertension, hypernatremia, hyponatremia, hyperkalemia, hypercalcemia, decompensated cirrhosis, an estimated life expectancy of less than 1-year, chronic pancreatitis, or chronic renal failure. Patients were then initially assessed at 3 hours for fluid overload and then performed biochemical and physical assessments at 12, 24, 48, and 72 hours ("Checkpoints"). Fluid adjustments were made based on their volume status.

- Aggressive resuscitation protocol
  - Bolus of 20ml/kg, followed by 3 ml/kg/hr of LR
  - Checkpoint
    - Hypovolemia: bolus of 20ml/kg followed by 3 ml/kg/hr of LR, with the ability to give additional 20ml/kg boluses for oliguria or hypotension
    - Normovolemia: 1.5ml/kg/hr infusion, stopped after 48hrs if the patient can tolerate oral feeding for > 8 hours

- Moderate resuscitation protocol
  - Bolus of 10ml/kg in patients with hypovolemia (no bolus for patients with normovolemia), followed by 1.5/kg/hr of LR for all patients
  - Checkpoint
    - Hypovolemia: bolus of 10ml/kg followed by 1.5ml/kg/hr, with the ability to give additional 10ml/kg boluses for oliguria or hypotension
    - Normovolemia: 1.5ml/kg/hr infusion, stopped after 20hrs if the patient can tolerate oral feeding for > 8hrs

The primary outcome was the development of moderately severe or severe pancreatitis during the hospitalization, which was defined by local complications, exacerbation of a preexisting condition, a creatinine level of at least 1.9 mg/dL, systolic blood pressure of < 90 mm Hg despite fluid resuscitation, or a Pao_2:FIo_2 ratio of < 300. The main safety outcome was fluid overload, defined by imaging or clinical evidence, and/or dyspnea; in addition, acute respiratory distress syndrome had to be ruled out.

The interim intention-to-treat analysis included 249 patients. Patients in the AR group received a median of 7.8L LR (interquartile range, 6.5 to 9.8) during the first 48 hours, as compared with 5.5L (interquartile range, 4.0 to 6.8) in the MR group, with the greatest difference in volume administered occurring in the first 12 hours. The trial was stopped due to an increase in safety outcomes without an evident benefit to the patients. There was no significant difference in the incidence of moderately severe or severe pancreatitis (22.1% in the AR group and 17.3% in the MR; adjusted relative risk (aRR) 1.3; 95% CI, 0.78 to 2.18; P=0.32). Fluid overload developed in 20.5% of the patients who received AR and in 6.3% of those who received MR (aRR, 2.85; 95% CI, 1.36 to 5.94, P=0.004). Secondary outcomes such as SIRS, organ failure, and the need for ICU admission were not statistically different between the groups.

Take-away: In relatively healthy patients with mild, acute pancreatitis, aggressive volume resuscitation does not prevent the development of severe pancreatitis and may result in fluid overload. Based on this trial, moderate resuscitation is preferred. A practical example of MR in a 90kg female with gallstone pancreatitis is as follows:

- Hypovolemic: 900ml bolus of LR followed by LR @ 135ml/hr, with additional 900ml boluses for hypotension or oliguria.
- Normovolemic: no bolus recommended, start LR @ 135ml/hr and stop the infusion once the patient has been able to take PO for > 8 hours.

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Conflicts of Interest

The author has no conflicts of interest to disclose.

Correspondence

2525 West End Avenue, Suite 450
Nashville, TN 37203

Phone: 615-936-8219
Fax: 615-936-1269
E-mail: kevin.d.hageman@vumc.org

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