Comparative Incidence of Postoperative Hemorrhage in Vitreoretinal Surgery in Patients on Anti-Coagulation

Matt Starr, MD
Vitreoretinal Fellow
Retina Society Annual Conference 2020
Financial Disclosures

• None
Summary

• The use of direct oral anticoagulants does not appear to increase the immediate post-operative hemorrhagic risk in patients undergoing pars plana vitrectomy

• Pre-operative anticoagulant use may influence the type of post-operative hemorrhage
Introduction

• DOACs were first approved by the FDA in 2010
  • Do not require routine lab monitoring\textsuperscript{1–3}
  • Achieve effective anticoagulation with fewer drug interactions and a shorter half-life compared to warfarin\textsuperscript{2,3}

• With warfarin, the INR is used to determine an appropriate therapeutic target
  • For patients undergoing surgery, the INR guides dose adjustments to the warfarin dose in the peri-operative period
  • In contrast, the effect of DOACs is difficult to monitor using the INR and reversal agents are lacking\textsuperscript{4,5}

Surgeon’s preference on anticoagulation

• Vitreoretinal surgeons vary greatly in their management of pre-operative anticoagulation⁶-⁹
  • The majority of vitreoretinal surgeons (92%) would continue aspirin pre-operatively
  • 82% would continue clopidogrel
  • 79% would continue warfarin
  • 58% would continue DOACs
  • 83% of the same surgeons were not confident in their management of DOACs
  • 24% of these surgeons reported they did not know how to manage DOACs⁶

---

Study Objectives

• Identify the proportion of patients using DOACs preoperatively

• Calculate the rate of post-operative hemorrhages

• Compare the rates of post-operative hemorrhage between DOACs to both warfarin and eyes with no history of anticoagulation use (DOACs or warfarin)
Methods

• A panel of United States retina specialists (Vestrum Health, LLC, Naperville, IL)
  • 320 retina physicians
  • 1.8 million unique patients
  • 11 million encounters

• Detailed information on in office and outpatient pharmaceutical use

• The database is refreshed on a weekly basis
Inclusion/Exclusion Criteria

• **Inclusion Criteria:**
  - All patients who underwent a pars plana vitrectomy from Jan 2013 to May 2020
  - DOAC or warfarin use documented in the chart within 3 months of surgery

• **Exclusion Criteria:**
  - History of pre-operative hemorrhage
  - Less than one month of post-operative care
  - Other anti-thrombotic agent use
  - Aspirin use allowed, but not considered an anti-coagulant
Metrics

• Rate of post-operative hemorrhage

• Type of hemorrhage: retinal, vitreous, choroidal, hyphema

• Time from surgery to hemorrhage
Patient Population

- Total Number Of Eyes in the Database: 3,615,443
- Total Number Of Eyes with a PPV
- Eyes with 1 Month of Follow Up
- After Excluding Eyes with Previous Hemorrhage: 65,635
Rate of post-operative hemorrhage

• 1,066/65,365 (1.62%) eyes developed a post-operative hemorrhage during the study period

• 69/3531 (1.95%) eyes had a history of DOAC or warfarin use versus 997/62,104 (1.61%) of eyes with no prior anti-coagulant use, $p = 0.1205$

• Mean time to hemorrhage was 10.0 ± 7.0 days
DOACs vs Warfarin vs No Anticoagulants

- There was no difference in the rate of hemorrhage between DOACs (1.90%) vs warfarin (2.03%, p = 0.78) or DOACs vs no anticoagulant (1.61%, p = 0.31)
Types of post-operative hemorrhage

- Retinal
- Vitreous
- Choroidal
- Hyphema

DOAC/Warfarin vs No Anticoagulants

- Retinal: p = 0.02
- Vitreous: p = 0.02
- Choroidal: p = 0.04
- Hyphema: p = 0.91

Wills Eye Retina Service
Discussion

• The primary objective of the study was to characterize the real-world incidence and type of postoperative hemorrhage in patients using direct oral anticoagulants.

• There was no difference in the rate of hemorrhage in patients receiving DOACs or warfarin compared to no anticoagulant use.

• Patients on DOACs/warfarin had more retinal hemorrhages, choroidal hemorrhages, and hyphemas with less vitreous hemorrhages.
Limitations

• Use of a large electronic database precludes the ability to manually review each chart for accuracy of diagnoses and procedures

• A database metric to identify cessation and restarting of anticoagulation in the perioperative period was lacking

• Large databases, though, give real-world clinical data, and often add significant information to clinical trial findings

Conclusions

• This study cannot confirm if stopping DOACs pre-operatively is warranted

• The use of DOACs does not appear to increase the immediate post-operative hemorrhagic risk in patients undergoing PPV

• Pre-operative anticoagulant use may influence the type of post-operative hemorrhage
Acknowledgements

• Dr. Mike Ammar
• Dr. Luv Patel
• Nick Boucher
• Dr. Yoshihiro Yonekawa
• Dr. Sunir Garg
• Dr. Jason Hsu
• Dr. Allen Ho
• Dr. Carl Regillo
• Dr. Allen Chiang