
Full Reversal of Anticoagulants Before Cephalomedullary Fixation of Geriatric Hip Fractures May Not Be Necessary

Mark Hake, MD

October 10th, 2023



Disclosures

- None pertinent to this talk

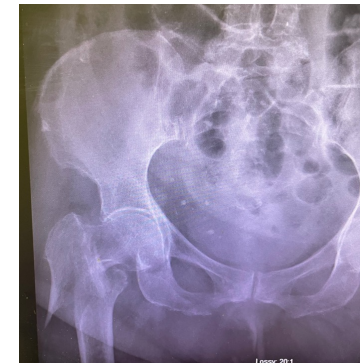
Introduction

- Timely surgical treatment of geriatric hip fractures within 24-48 hours is recommended
- Some advocate for delay in treatment for patients on DOACs.
- Goal: Evaluate blood loss in patients taking anticoagulants undergoing CMN

AAOS
AMERICAN ACADEMY OF
ORTHOPAEDIC SURGEONS

Management of Hip Fractures in Older Adults

Evidence-Based Clinical Practice Guideline



Methods

- Retrospective review
 - All patients 60 years and older
 - Acute, isolated extracapsular hip fracture treated with CMN
 - 10 years of data from THAA and U of M
- Exclusion criteria:
 - Missing data, path fracture, other procedures

Methods

- Study Groups
 - Direct Oral Anticoagulants
 - Warfarin
 - Antiplatelet
 - Control
- Primary Outcome
 - Calculated blood loss
 - Transfusion Risk
 - Hospital LOS
 - Overall 1-year mortality

Methods

Direct Oral Anticoagulants

	Phase 1: Recommended Initial Anticoagulant Dosing	Phase 2: Completion of Anticoagulation Dosing (Finish after 3-6 months)	Phase 3: Extended Anticoagulation Prophylaxis Dosing
Apixaban ^a	10mg daily x 7 days	5mg twice daily	3-6 months after treatment, dose reduction to 2.5mg twice daily
Dabigatran ^b	5-10 days of parenteral anticoagulation	150mg twice daily Not recommended if CrCl<30mL/min	150 mg twice daily ^e
Edoxaban ^c	5-10 days of parenteral anticoagulation then initiate drug	60mg daily if CrCl >51 ml/min	60mg daily if CrCl >51 ml/min
		30mg daily if CrCl 30-	30mg daily if CrCl 30-50mL/min ^e
		Not recommended if CrCl<30mL/min	Not recommended if CrCl<30mL/min ^e
		30mg daily if body weight ≤60kg or in combination with a P-glycoprotein inhibitor Avoid use if CrCl >95 ml/min	30mg daily if body weight ≤60kg or in combination with a P-glycoprotein inhibitor Avoid use if CrCl >95 ml/min ^e
Rivaroxaban ^d	15mg twice daily x 21 days	20mg daily Avoid use if CrCl<15mL/min	3-6 months after treatment, dose reduction to 10mg daily Avoid use if CrCl<15mL/min ^e

Antiplatelet

<i>Drug</i>	<i>Mechanism of action</i>
Aspirin	COX inhibitors
Dipyridamole	Phosphodiesterase inhibitors
Treprostinil	Analogue of prostacyclin
Clopidogrel Prasugrel Ticagrelor Ticlopidine	ADP antagonists
Abciximab Eptifibatide Tirofiban	GP IIb/IIIa inhibitors

Methods

- Retrospective review
 - All patients 60 years and older
 - Acute, isolated extracapsular hip fracture treated with CMN
 - 10 years of data from THAA and U of M
- Exclusion criteria:
 - Missing data, path fracture, other procedures

Methods

- Original project
 - Blood loss for Short vs Long CMNs
 - Calculated blood loss for accuracy
 - 26% reduction in CBL and 21% transfusion risk using short CMNs

$$\text{CBL} = (V_{\text{blood}} \times (\text{Hct}_0 - \text{Hct}_1) / 100 + V_{\text{RBC}} \times 0.6) \times 200 / (\text{Hct}_0 + \text{Hct}_1)$$

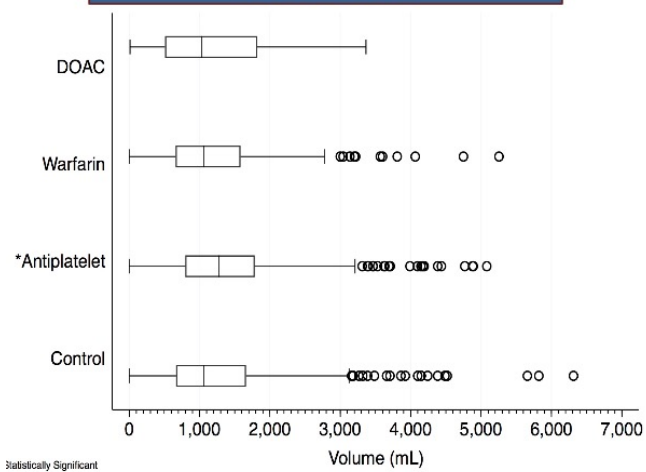


Results

- 1,442 patients
 - 47 DOACs
 - 148 Warfarin
 - 657 antiplatelet
 - 590 controls
- Calculated blood loss was significant only between Antiplatelet vs Control groups
 - 1386 mL (SD 837 mL) vs. 1254 mL (SD 864 mL) ($p < 0.001$)
- Rate of transfusion was significant between Antiplatelet (42.7%) versus Control (33.1%) ($p < 0.001$)

Results

Blood Loss

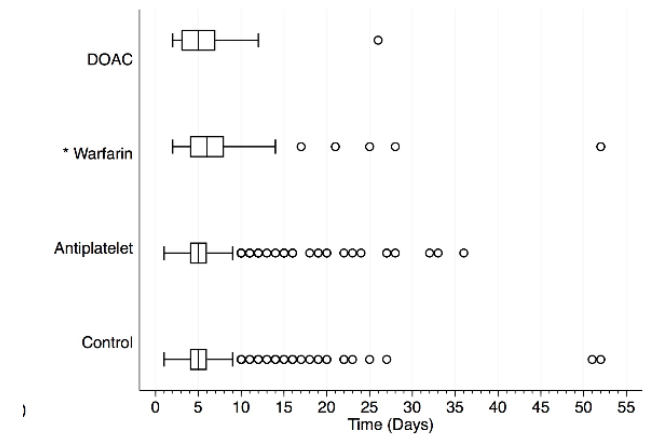


Transfusion

Treatment Group	Transfused Patients	Total Cohort
DOAC	14 (29.8%)	47
Warfarin	60 (40.6%)	148
Antiplatelet*	281 (42.7%)	657
Control	195 (33.1%)	590
Totals	550 (38.1%)	1,442

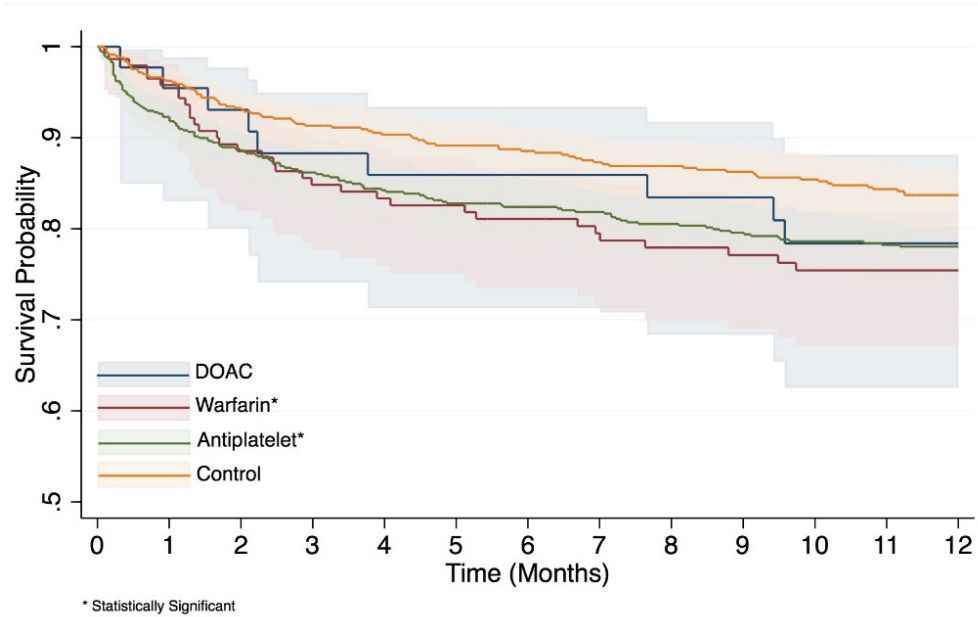
*Statistically Significant

Length of Stay



Results

Kaplan-Meier Survival Estimates



Conclusions

- Delaying surgery or reversing DOACs does not appear to change the risks of bleeding or risk of transfusion
- Antiplatelet drugs appear to increase blood loss and transfusion risk
- Unclear if this trend continues for hip fracture patients requiring arthroplasty.

References

- American Academy of Orthopaedic Surgeons Management of Hip Fractures in Older Adults Evidence-Based Clinical Practice Guideline. <https://www.aaos.org/hipfxcpvg.pdf> Published December 3, 2021.
- R. Meinig *et al.*, “Is anticoagulation reversal necessary prior to surgical treatment of geriatric hip fractures?,” *J. Clin. Orthop. Trauma*, vol. 11, pp. S93–S99, 2020, doi: 10.1016/j.jcot.2019.10.004.
- Adeyemi A, Delhougne G. Incidence and Economic Burden of Intertrochanteric Fracture: A Medicare Claims Database Analysis. *JB JS Open Access*. 2019 Feb 27;4(1):e0045. doi: 10.2106/JBJS.OA.18.00045. PMID: 31161153; PMCID: PMC6510469.
- Caruso, G., Andreotti, M., Marko, T. *et al.* The impact of warfarin on operative delay and 1-year mortality in elderly patients with hip fracture: a retrospective observational study. *J Orthop Surg Res* 14, 169 (2019)
- L. Mattisson, L. J. Lapidus, and A. Enocson, “What is the influence of a delay to surgery. 24 hours on the rate of red blood cell transfusion in elderly patients with intertrochanteric or subtrochanteric hip fractures treated with cephalomedullary nails?,” *J. Orthop. Trauma*, vol. 32, no. 8, pp. 403–407, 2018, doi: 10.1097/BOT.0000000000001183.
- S. M. Tarrant, M. J. Catanach, M. Sarrami, M. Clapham, J. Attia, and Z. J. Balogh, “Direct Oral Anticoagulants and Timing of Hip Fracture Surgery,” *J. Clin. Med.*, vol. 9, no. 7, p. 2200, 2020
- R. Yassa, M. Y. Khalfaoui, I. Hujazi, H. Sevenoaks, and P. Dunkow, “Management of anticoagulation in hip fractures: A pragmatic approach,” *EFORT Open Rev.*, vol. 2, no. 9, pp. 394–402, 2017, doi: 10.1302/2058-5241.2.160083. 7. Collinge CA, Kelly KC, Little B, Weaver T, Schuster RD. The effects of clopidogrel (Plavix) and other oral anticoagulants on early hip fracture surgery. *J Orthop Trauma*. 2012 Oct;26(10):568-73. doi: 10.1097/BOT.0b013e318240d70f. PMID: 22441640.

Questions?

