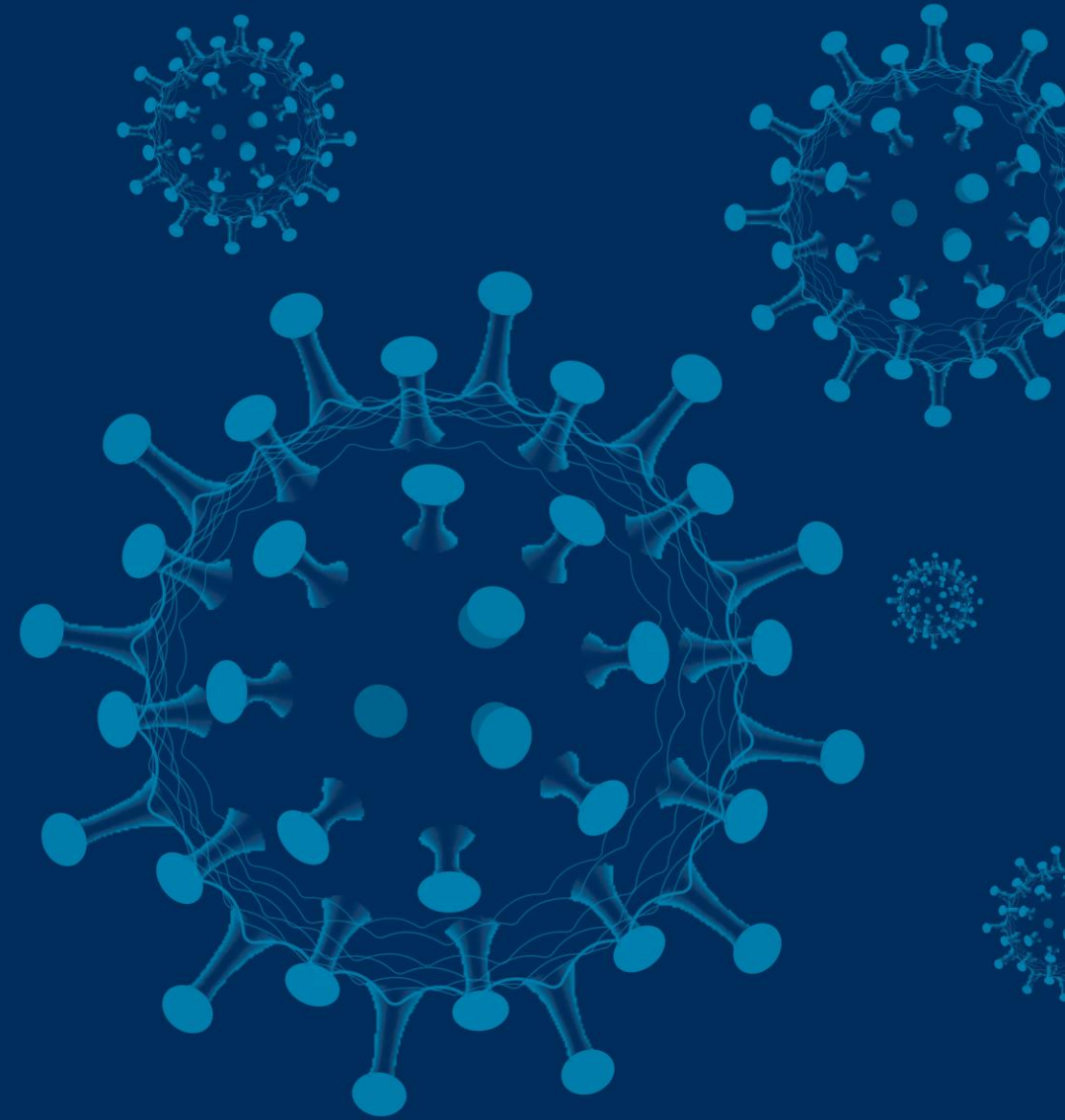




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COVID-19, Clots and Anticoagulants: A Case- based Discussion on VTE Prevention and Treatment





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Speakers

Geoffrey D. Barnes, MD, MSc, FACC

Assistant Professor of Internal Medicine, University of Michigan
Ann Arbor, MI

Adam Cuker, MD, MS

Associate Professor of Medicine, Pathology & Laboratory Medicine, University of Pennsylvania
Philadelphia, PA

Gregory Piazza, MD, FACC

Assistant Professor of Medicine, Harvard Medical School and Brigham and Women's Hospital
Boston

Deborah Michelle Siegal, MD

Assistant Professor, Division of Hematology and Thromboembolism, McMaster University
Hamilton, Ontario

Barbara S. Wiggins, PharmD, FACC

Professor, College of Pharmacy, Medical University of South Carolina
Charleston, SC

Case

- 49 yo man admitted after 5 days of fever, progressive SOB
- PMH: obesity (BMI 38), DM2 on insulin, and mild CKD (stage 2)
- ED: HR 98, SBP 134/88, RR 24, SpO2 84% on RA → 94% on 2L
- No leg swelling
- D-dimer 8.4 (nl<0.50)
- CXR: Bilateral patchy infiltrates
- PECT: no PE, bilateral ground glass opacities and consolidation (RLL, LUL)
- Admit to the general medicine wards

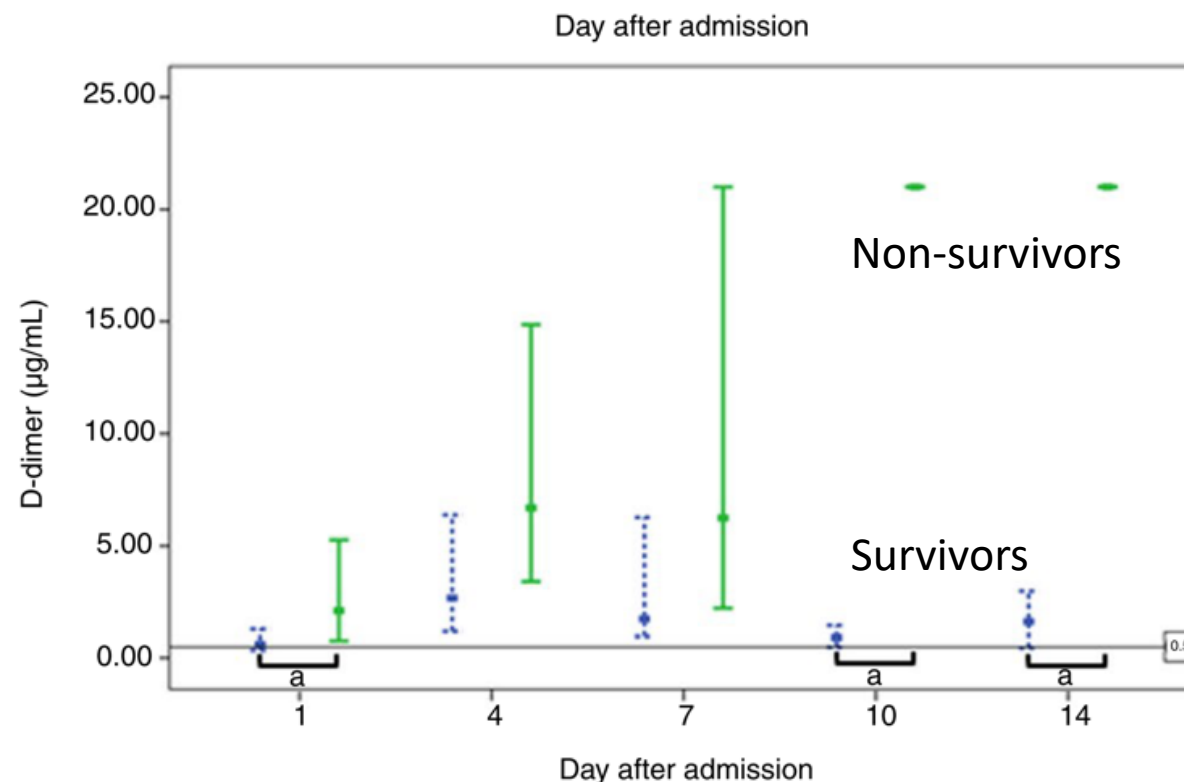


Discussion

- What contributes to VTE risk?
- On what type of unit should this patient be managed and why?

D-dimer and COVID-19 Mortality

Overall Mortality - China



Tang N et al JTH 2020;18:844-847

D-dimer and PE - France

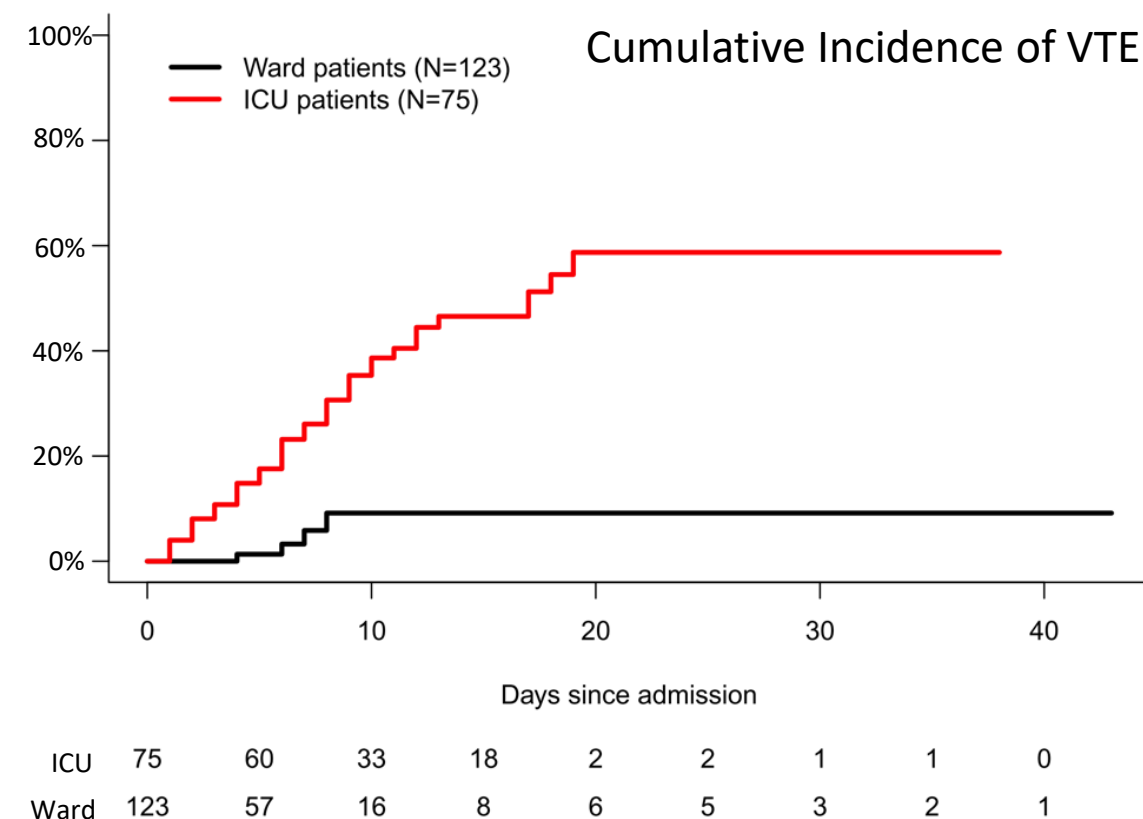
	PE Present (n=32)	PE Absent (n=74)	P-value
Elevated D-dimer (>0.5)	28 (88%)	50 (68%)	
Median (IQR)	15.4 ± 14.4	1.9 ± 3.1	0.001
<5	5 (18%)	39 (78%)	
5-20	12 (43%)	9 (18%)	
>20	11 (39%)	2 (4%)	

Leonard-Lorant I et al Radiology 2020 ePub Apr 24

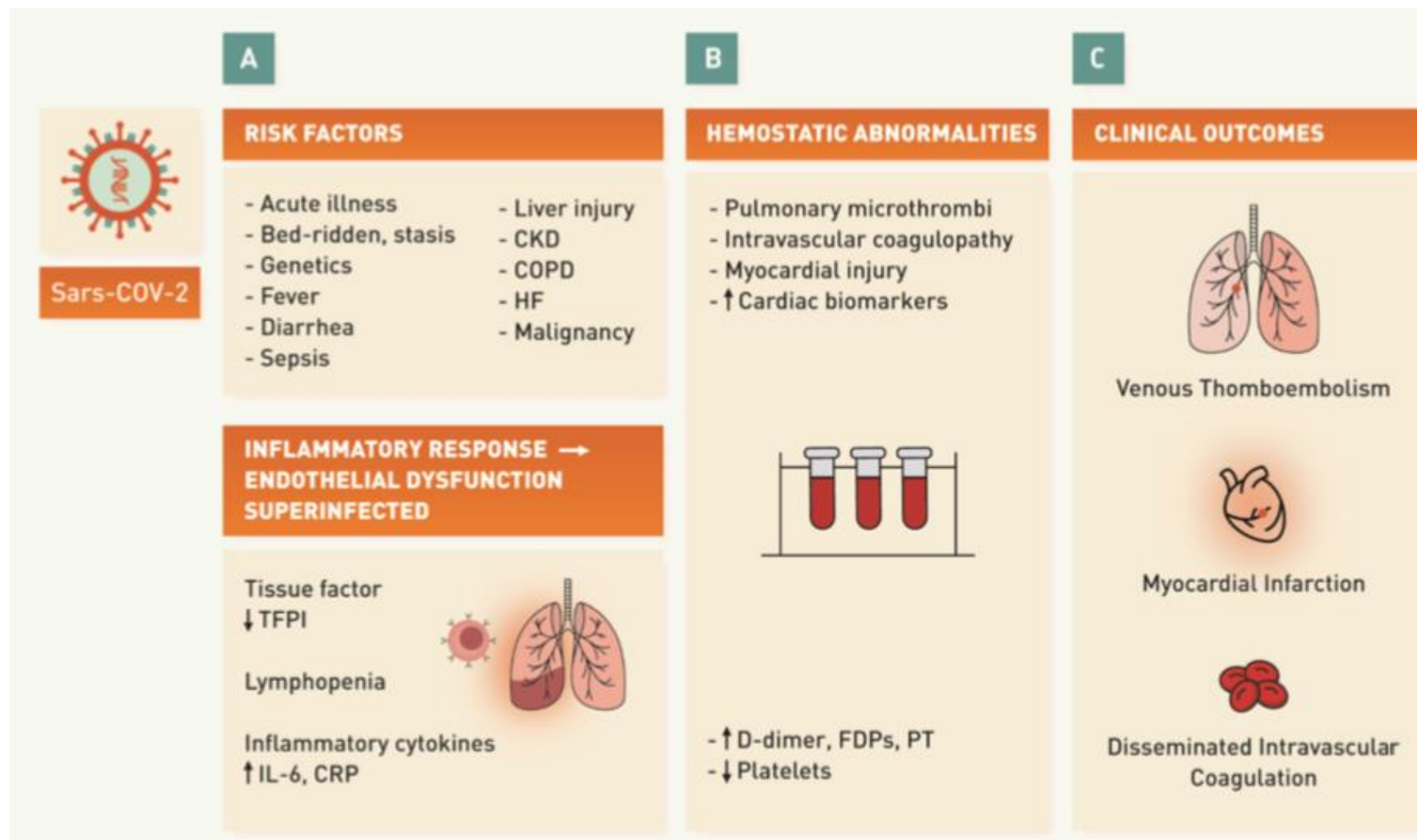
D-dimer and COVID-19 Mortality

VTE Risk Factors - Netherlands

	VTE (n=39)	No VTE (n=159)	HR
Mean age (SD)	62 (10)	60 (15)	1.05 (0.82-1.4)
ICU	35 (89%)	40 (25%)	8.9 (3.2-25)
Median D-dimer (IQR)	2.6 (1.1-18)	1.0 (0.7-1.7)	1.4 (1.1-1.9)



Mechanism of COVID-19 Thrombosis

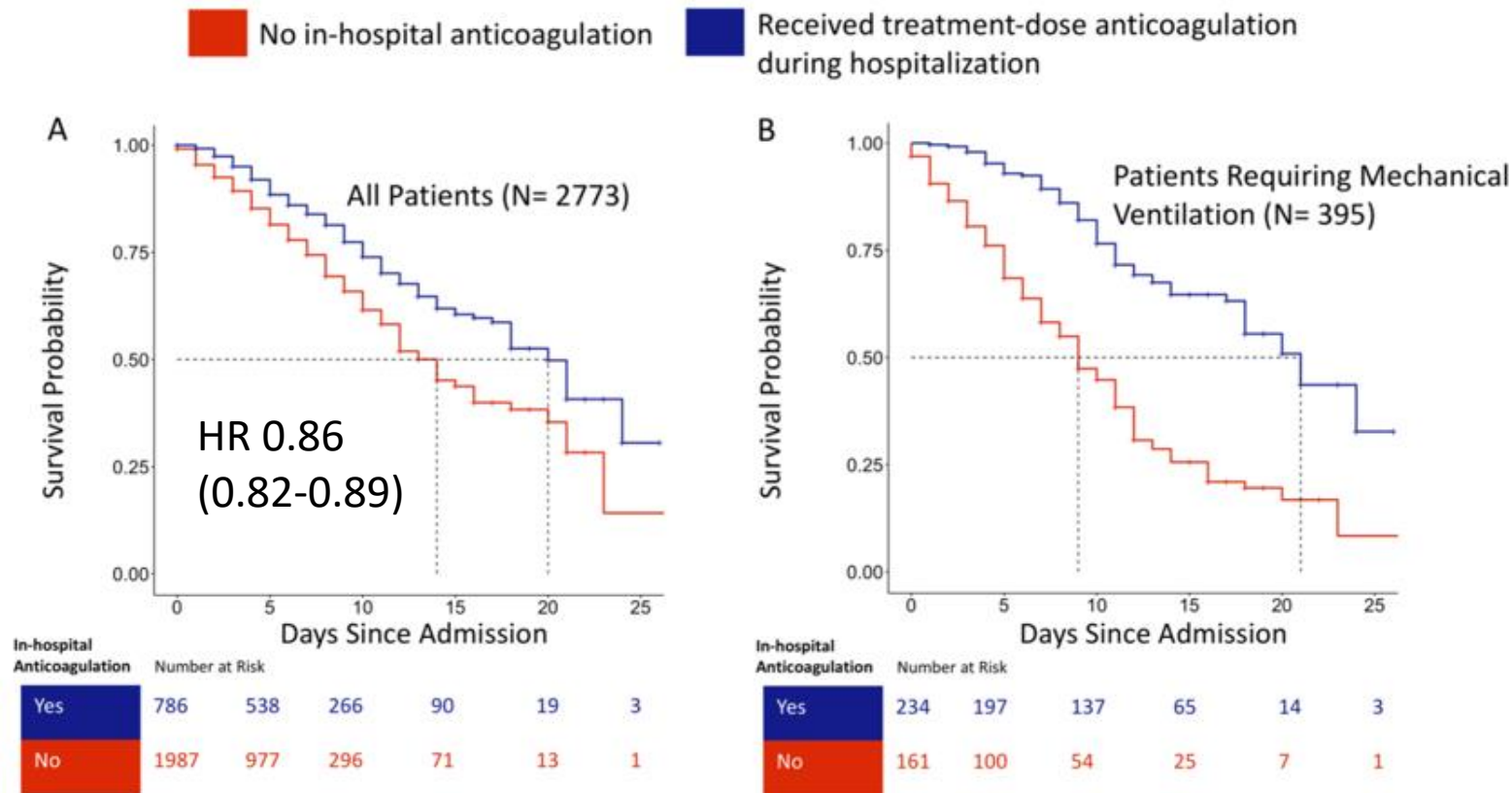




Discussion

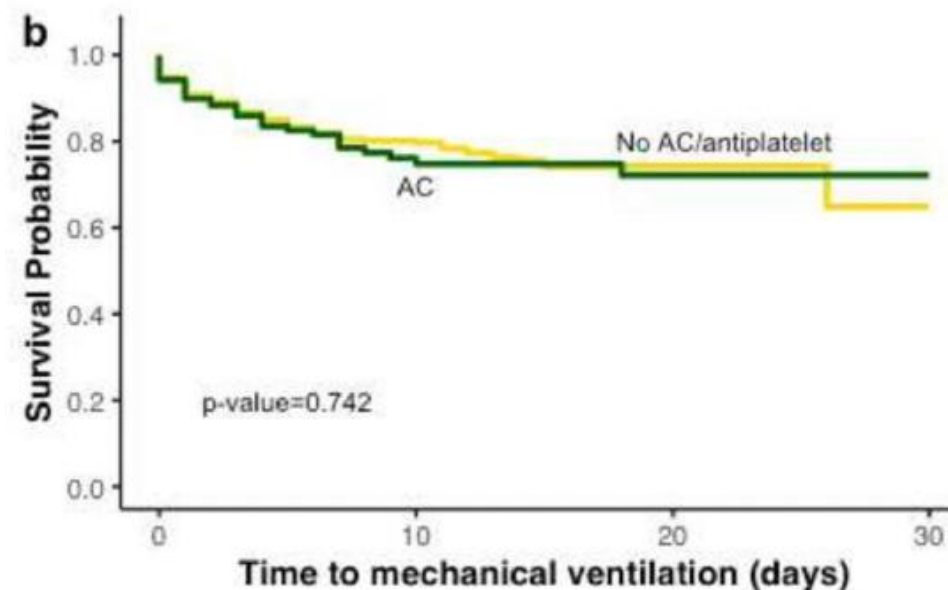
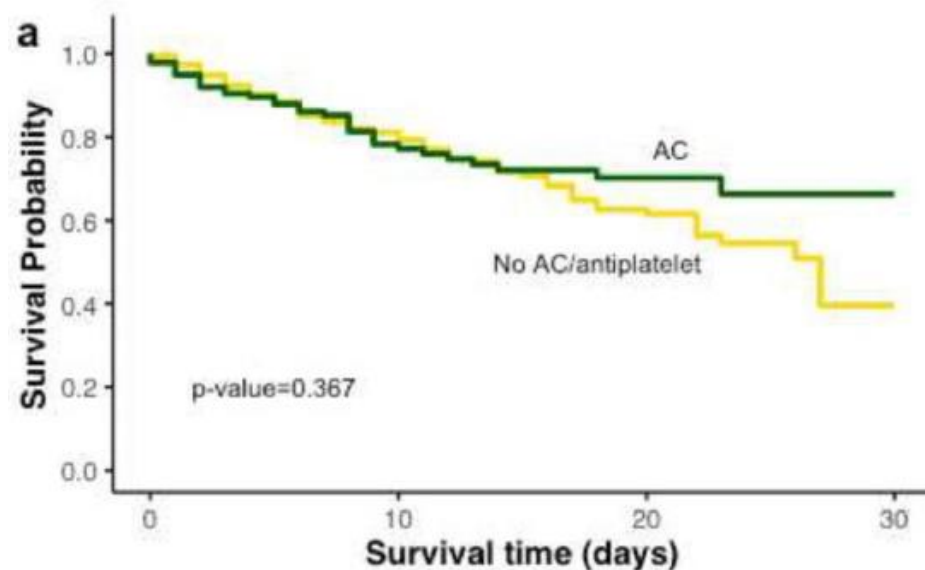
- What VTE prophylaxis would you use?

What dose of anticoagulation?



- NYC Hospital System
- 2733 hospitalized patients with COVID-19
- Compare in-hospital treatment-dose anticoag vs. none

Benefit of Therapeutic Anticoagulation?



- Same NYC Hospital System
- 3772 hospitalized patients with COVID-19
- Compare pre-hospital anticoag vs. no anticoag

What dose of anticoagulation?

Patient with COVID-19	Standard Dose VTE Prophylaxis	Intermediate or Escalated Dose VTE Prophylaxis	Therapeutic Anticoagulation
Outpatients	Consider if high-risk		
Floor patients	Yes		
ICU Patients		Yes	
ARDS Patients		Yes	
Confirmed VTE			Yes
Suspected PE			Yes

How best to address bleeding risk?

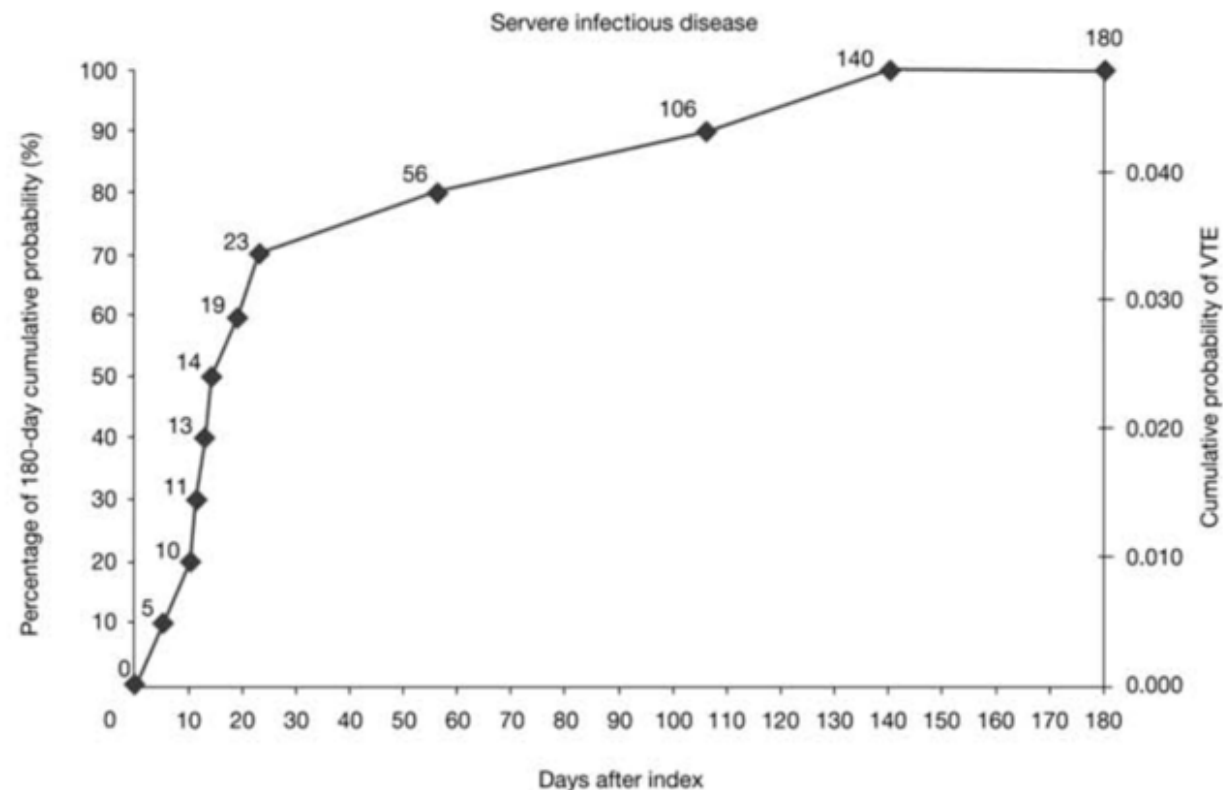
Case

- On hospital day 4, his O₂ requirement rapidly increases to 6L
- He is transferred to ICU for heated high-flow O₂
- He develops acute on chronic renal insufficiency
 - Cr 2.2, CrCl <30ml/min
- Do you change his VTE prophylaxis regimen?

Case

- After 3 days in the ICU, his O₂ requirements improve, no longer febrile
 - He transfers to the floor for continued O₂ weaning
 - Renal function improving (Cr 1.7)
- He is eventually discharged home on hospital day 10 (symptom day 15)
 - Still requiring 0.5-1L NC
 - Back to baseline renal function (Cr 1.3)
 - D-dimer 2.5 (nl <0.5)
- Do you consider post-hospital VTE prophylaxis?

Risk of post-hospital VTE



	VTE Events	Major Bleeding
Rivaroxaban 10mg daily	4.4%	1.1%
Enoxaparin 40mg daily	5.7%	0.4%
Betrixaban 80mg daily	5.3%	0.7%
Enoxaparin 40mg daily	7.0%	0.6%

Case – What if?

- Upon admission to ICU, DVT scan performed
 - Acute DVT in left iliofemoral vein
- Reminder: Cr 2.2, CrCl <30ml/min
- What anticoagulation regimen?
- How long to treat?

Take-home Points

- Key risk factors for VTE include COVID-19
- Stick to evidence-based prophylaxis unless in a clinical trial
 - Consider intermediate-dose or escalated prophylaxis for sicker patients
- Consider role of post-hospital VTE prophylaxis
 - Persistent immobilization
 - Ongoing inflammation
 - Prior VTE
- Confirmed or presumed VTE → 3 months of anticoagulation



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