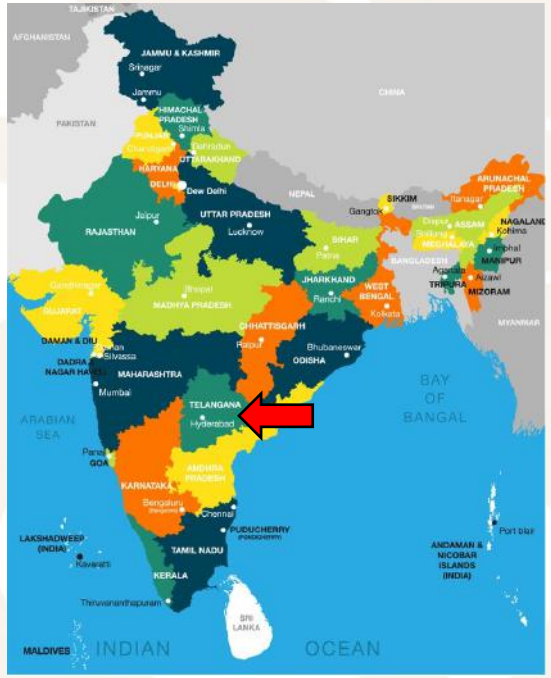
ASPA 2024



DVT in Oncology

What should the Anaesthesiologists know?

Dr Vibhavari Naik,

BIACH & RI, Hyderabad

No conflict of interest

Basavatarakam Indo-American Cancer Hospital and Research Institute

650 bed stand-alone Cancer Institute
8500 major cancer surgeries per year
Run Oncoanaesthesia fellowships

Case capsule

Baby C

- 2-year-old boy diagnosed with ALL
- Treatment initiated through central venous catheter
- A week later vascular screening revealed this
- Mild facial swelling

LARGE IJV THROMBUS!!

Risk for pulmonary embolism

Increased morbidity and mortality

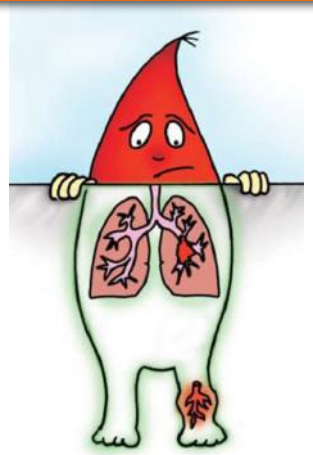
Anticoagulation

Delay in treatment

DVT in Oncology: What the anaesthesiologist should know?

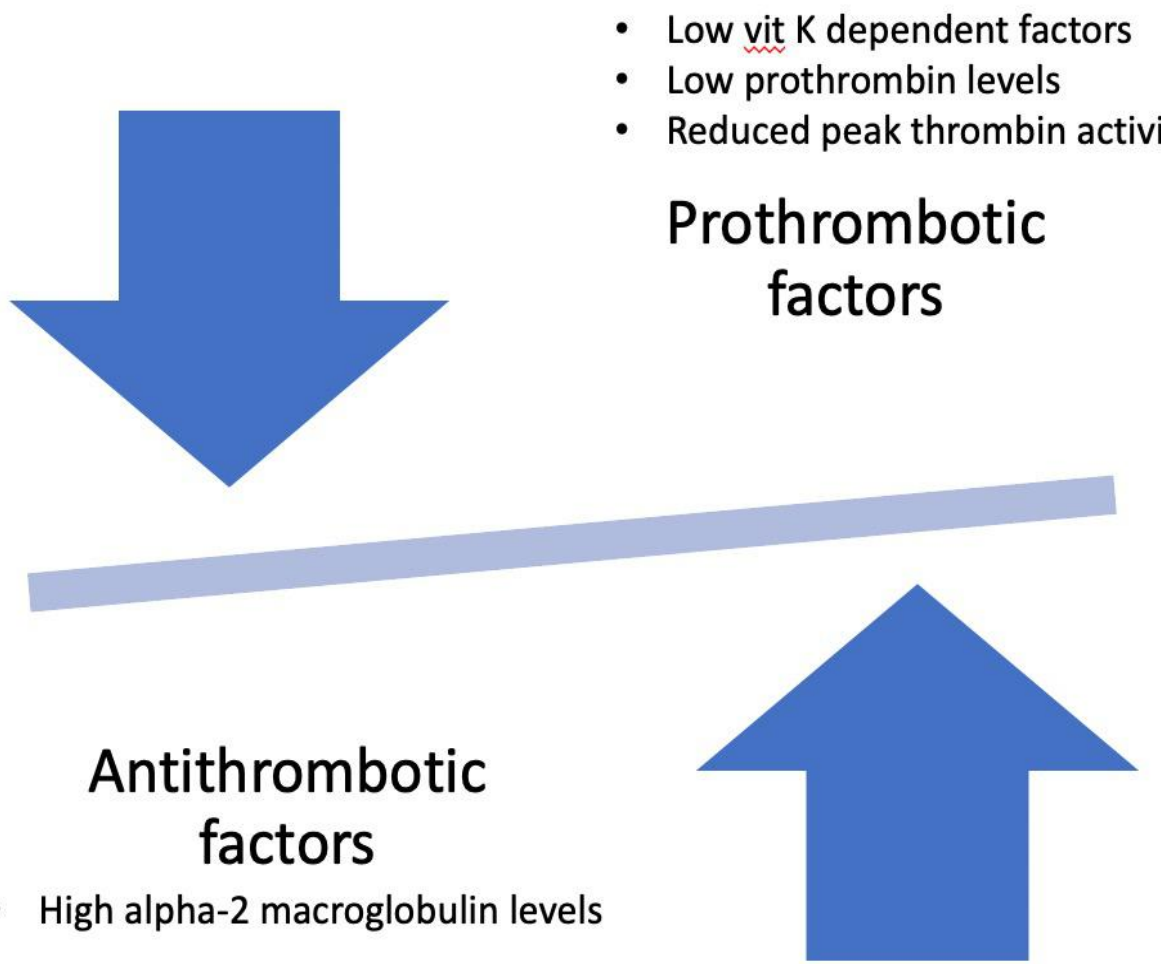
DVT (Deep vein thrombosis)
= thrombus in deep veins of hands or legs

VTE (Venous thromboembolism)
= current terminology for a broader disease process including thrombosis and embolism



- Who are at risk?
- Is there a role for VTE prophylaxis?
- Newer trends in management of VTE
- Periprocedural management of children on anticoagulants

Antithrombotic dominance in coagulation



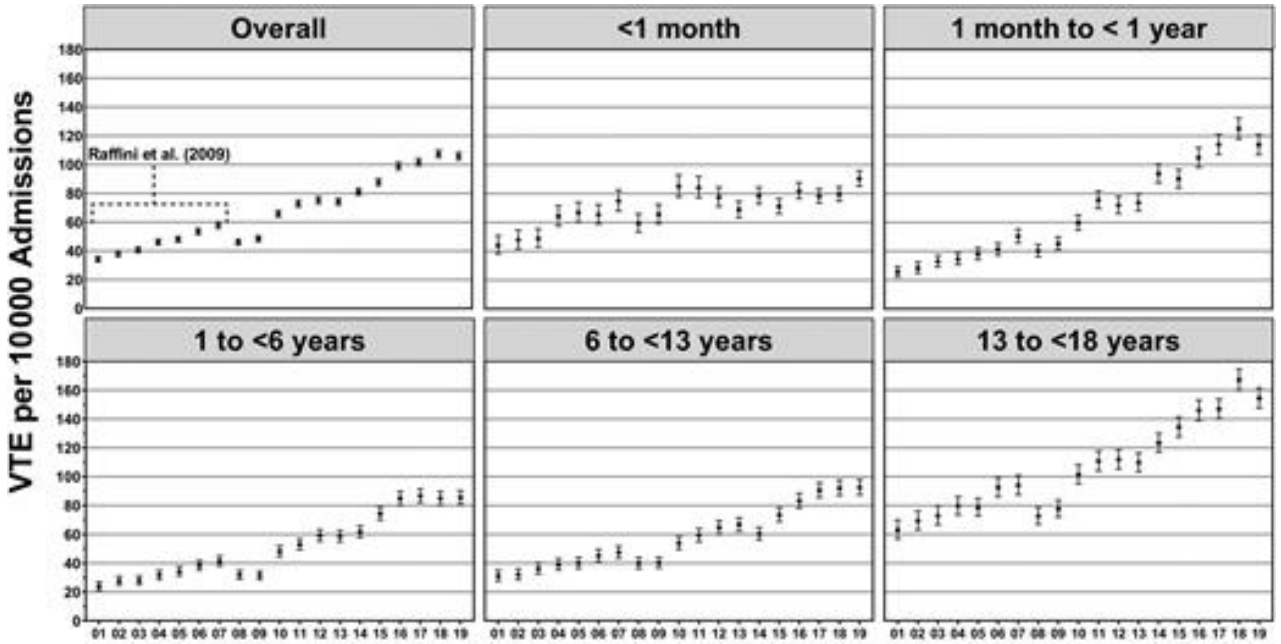
Children are physiologically protected from thrombosis

Pediatrics. 2009;124(4):1001.

Incidence of VTE in children on the rise

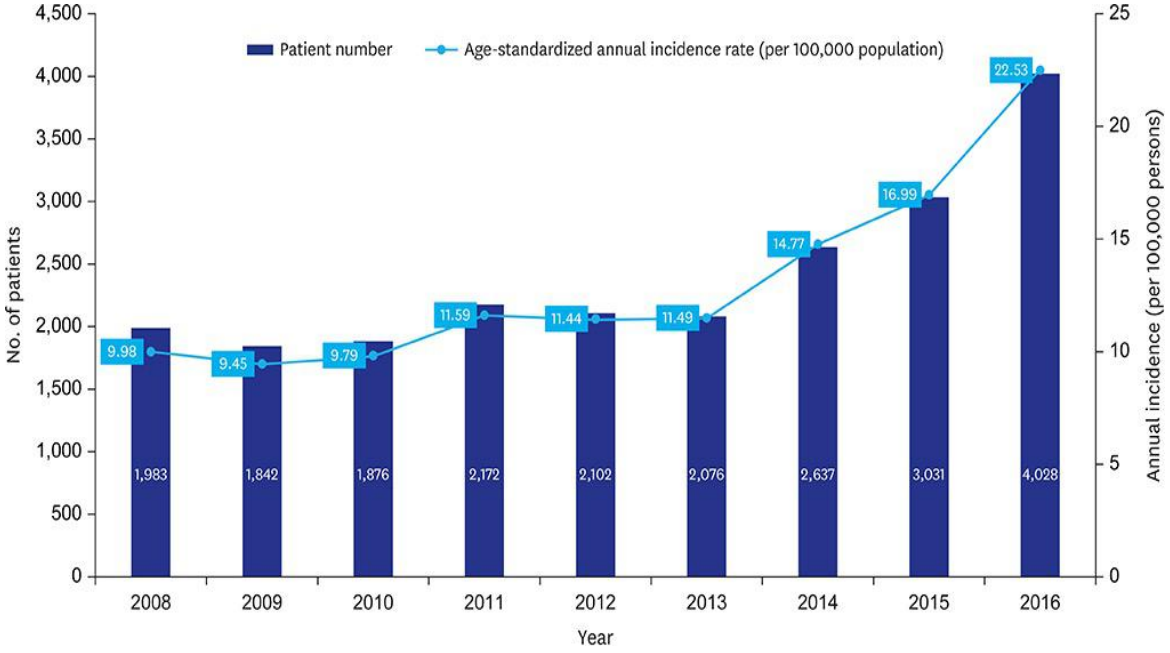
ARTICLES | FEBRUARY 14 2022

The Continued Rise of Venous Thromboembolism Across US Children's Hospitals FREE



J Korean Med Sci. 2019 Dec 23;34(49):e316. doi: 10.3346/jkms.2019.34.e316.

Venous Thromboembolism in Children and Young Adults in Korea: Analysis of the Korean Health Insurance Review and Assessment Service Database



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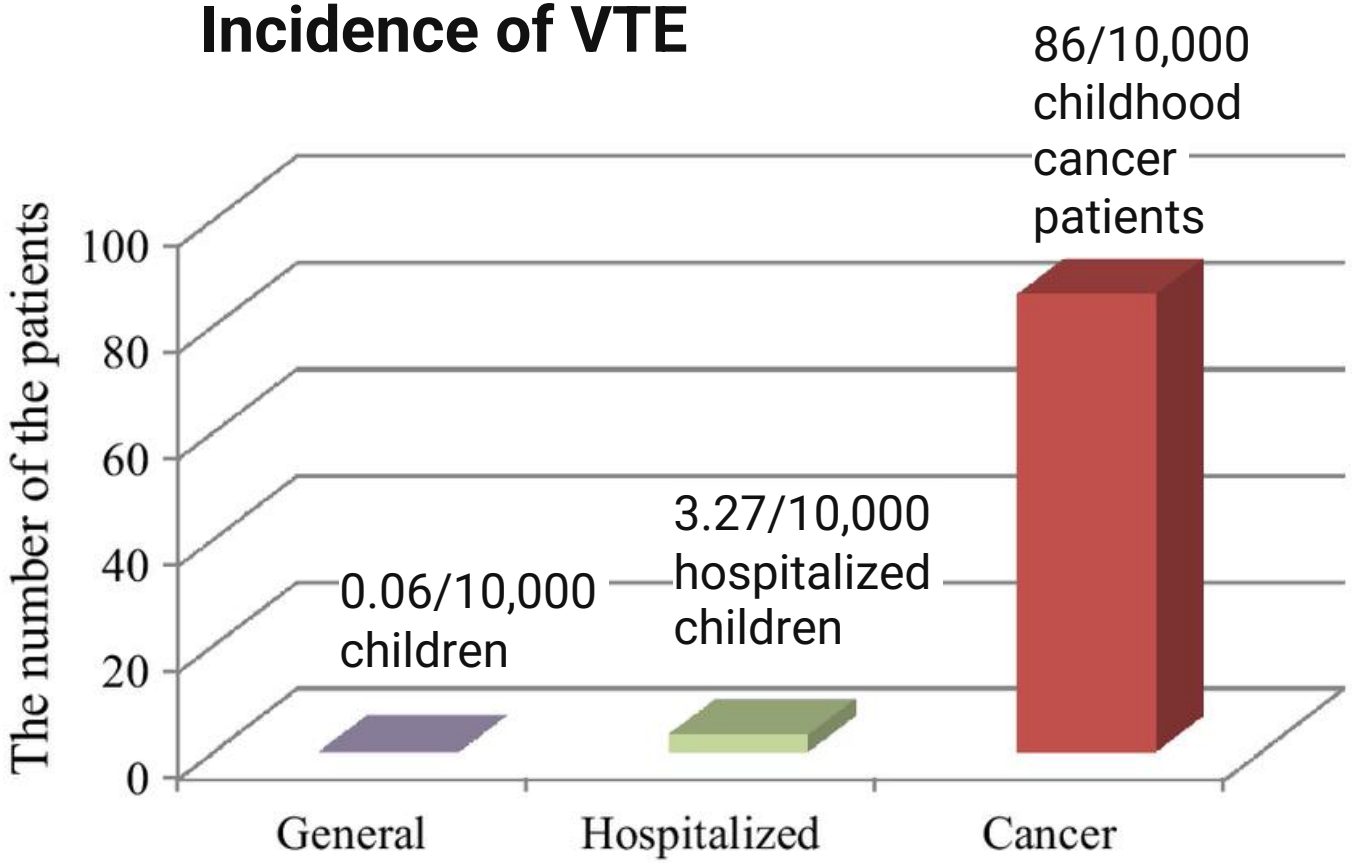
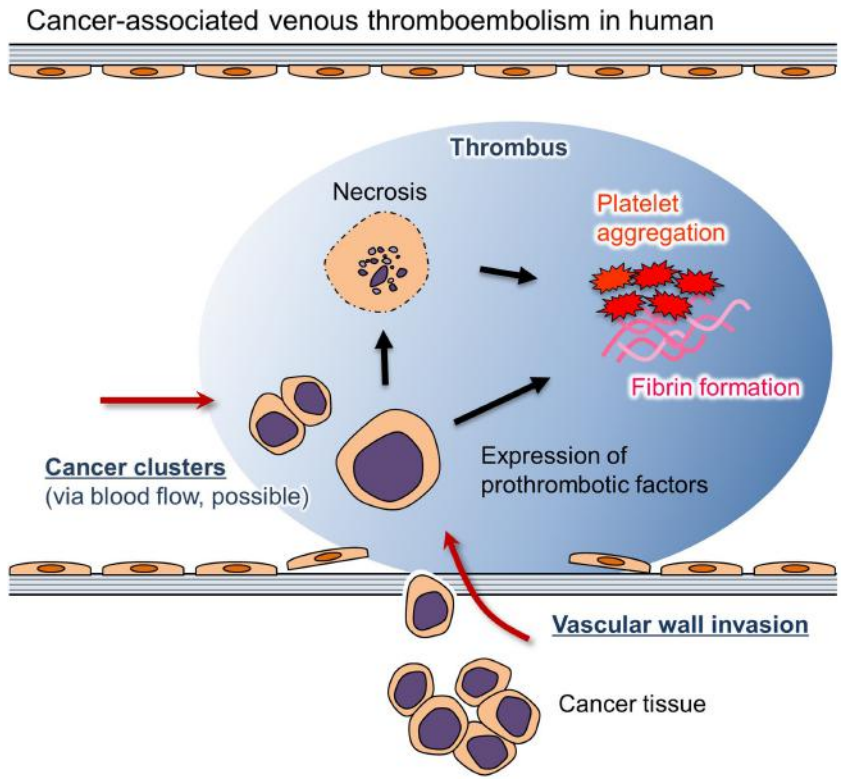
Children with cancer are at a higher risk

Baby C

Incidence of VTE

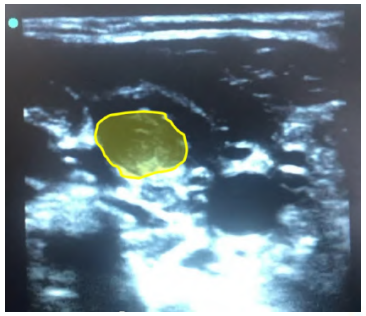


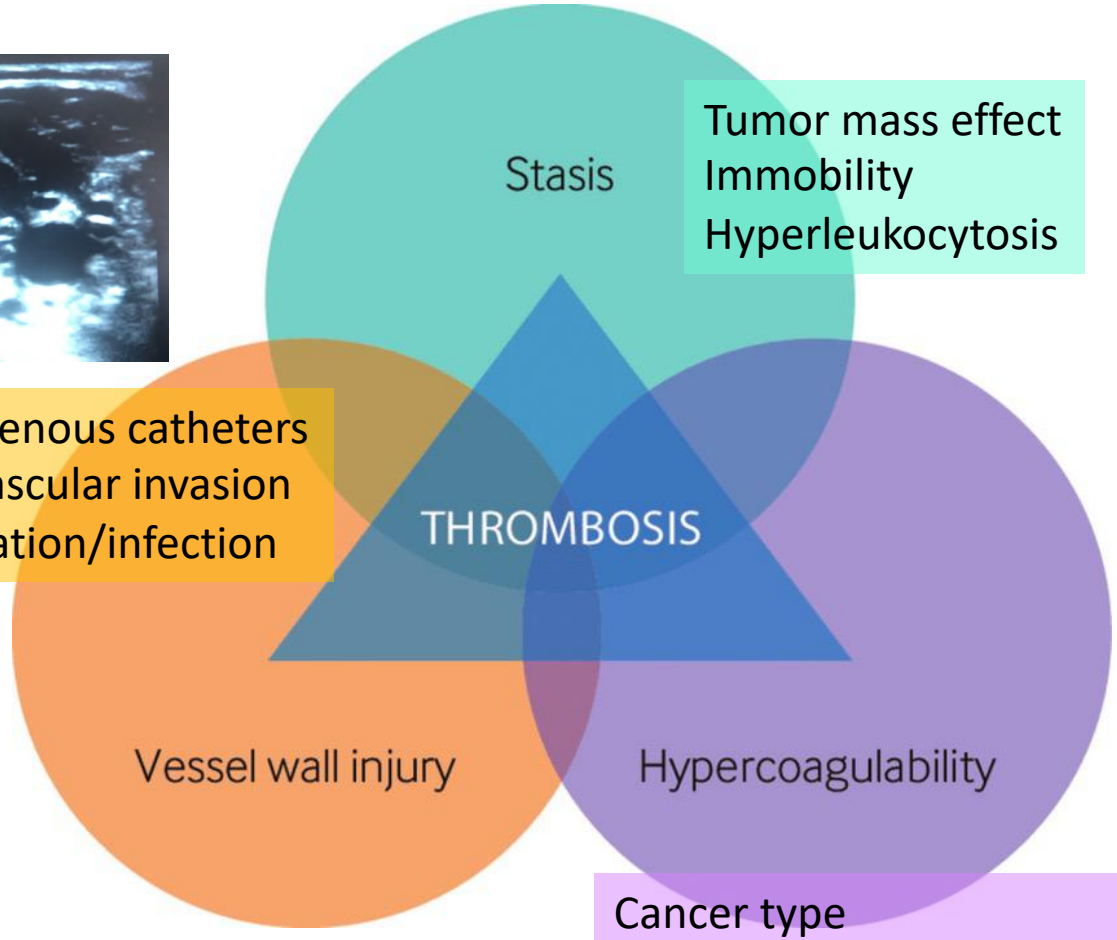


Arterioscler Thromb Vasc Biol. 2023 Jan;43(1):146-159.
J Thromb Thrombolysis. 2019;47(4):558-565.

Identify risk factors

Baby C





Tumor mass effect
Immobility
Hyperleukocytosis

Central venous catheters
Tumor vascular invasion
Inflammation/infection

Cancer type
Steroids/chemotherapy
Underlying thrombophilia

› Pediatr Blood Cancer. 2023 Feb;70(2):e30096. doi: 10.1002/pbc.30096. Epub 2022 Nov 19.

Pediatric cancer-associated thrombosis: Analysis from a tertiary care cancer center in India

Prospective cohort single institution study
Of 6132 eligible children,
150 (2.44%) had thrombosis
Median age 8.5 years
Male : female - 1.83 : 1
Hemato-lymphoid cancer > solid tumors
(incidence 3.23% vs. 1.58%; odds ratio [OR] = 2.06

Catheter related VTE

50 – 80% VTE in children with cancer is CVC related

Baby C

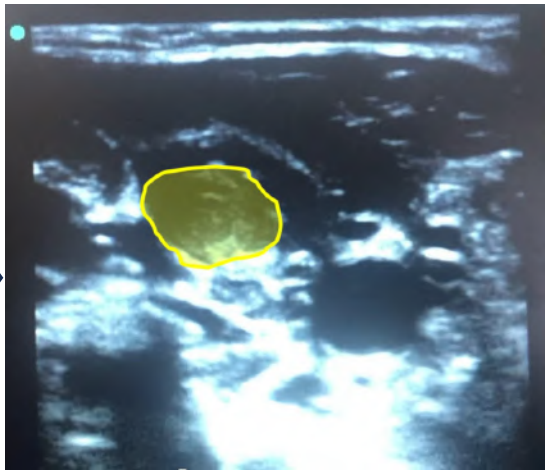
› Pediatr Res. 2024 May 17. doi: 10.1038/s41390-024-03225-0. Online ahead of print.

Risk factors and incidence of central venous access device-related thrombosis in hospitalized children: a systematic review and meta-analysis

Maoling Fu [1 2], Quan Yuan [2], Qiaoyue Yang [1 2], Yaqi Yu [1 2], Wenshuai Song [1 2], Xiuli Qin [1], Ying Luo [1], Xiaoju Xiong [1], Genzhen Yu [3]

47 studies evaluating
262,587 children with CVADs
Pooled prevalence of CRT was 9.1%.

D-dimer ---------- Raised > 5 times
Catheter location ---------- Subclavian -- IJV ---------- Femoral
Type of LTVADs ---------- Ports -------- Tunneled catheters ---------- PICCs
Number of lumens ---------- Single ---------- Multiple
Catheter vein ratio ---------- Higher > 0.33
Catheter maintenance ---------- Catheter dysfunction and infection
Medications ---------- Use of TPN, hyperosmolar, vasoactive drugs



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Do children undergoing cancer surgery are at increased risk of VTE?

J Pediatr Surg. 2021 Dec;56(12):2360-2363. doi: 10.1016/j.jpedsurg.2021.01.047.
Epub 2021 Feb 13.

Risk for deep venous thrombosis in pediatric cancer patients undergoing surgery

Only MODEST increase
Overall incidence of VTE 0.46%

Solid tumors with increased risk -
Musculoskeletal tumors - Rhabdomyosarcoma, Osteosarcoma, Ewing's sarcoma,
Tumour vascular invasion - Wilms tumour, Neuroblastoma, Hepatoblastoma

Tumour thrombus – not need anticoagulation
Bland thrombus – may need anticoagulation

Should children undergoing cancer surgery receive thromboprophylaxis?

THE UNIVERSITY OF TEXAS MD Anderson Cancer Center

Venous Thromboembolism (VTE) Prophylaxis for Hospitalized Surgical Pediatric Patients (Age 10-17 years)

Not routinely indicated in children < 10 years

Anticipated surgical duration > 60 mins
And altered mobility for >48 hrs
with
>=2 risk factors

Consider for VTE prophylaxis
If not at risk of bleeding

Weight/ Age	Enoxaparin Dose	Frequency
<5 kg/ <2 months	0.75 mg/kg sc	BD
>5 kg/ >2 months	0.5 mg/kg sc	BD
> 45 kg	40 mg sc	OD

Assess for VTE risk factors

- Active cancer (or suspicion of cancer)
- Blood stream infection
- Central venous catheter (LTVA)
- Chemotherapy (especially asparaginase, bevacizumab, thalidomide, high-dose dexamethasone, estrogen)
- H/o VTE
- Obesity (BMI > 95th percentile for age)
- H/o thrombophilia
- Major surgery (abdominal, pelvic, orthopedic surgery)

Guidelines for VTE management in children

Baby C

American Society of Hematology 2018 Guidelines for management of venous thromboembolism: treatment of pediatric venous thromboembolism

Paul Monagle, Carlos A. Cuello, Caitlin Augustine, Mariana Bonduel, Leonardo R. Brandão, Tammy Capman, Anthony K. C. Chan, Sheila Hanson, Christoph Male, Joerg Meerpohl, Fiona Newall, Sarah H. O'Brien, Leslie Raffini, Heleen van Ommen, John Wiernikowski, Suzan Williams, Meha Bhatt, John J. Riva, Yetiani Roldan, Nicole Schwab, Reem A. Mustafa, Sara K. Vesely

Symptomatic VTE in children should be treated unless at risk of bleeding (strong evidence)

Initial LMWH followed by Warfarin

Duration of treatment
Provoked VTE 6 weeks – 3 months
Unprovoked VTE 6 – 12 months

ASH 2024 guidelines are soon to be released!!

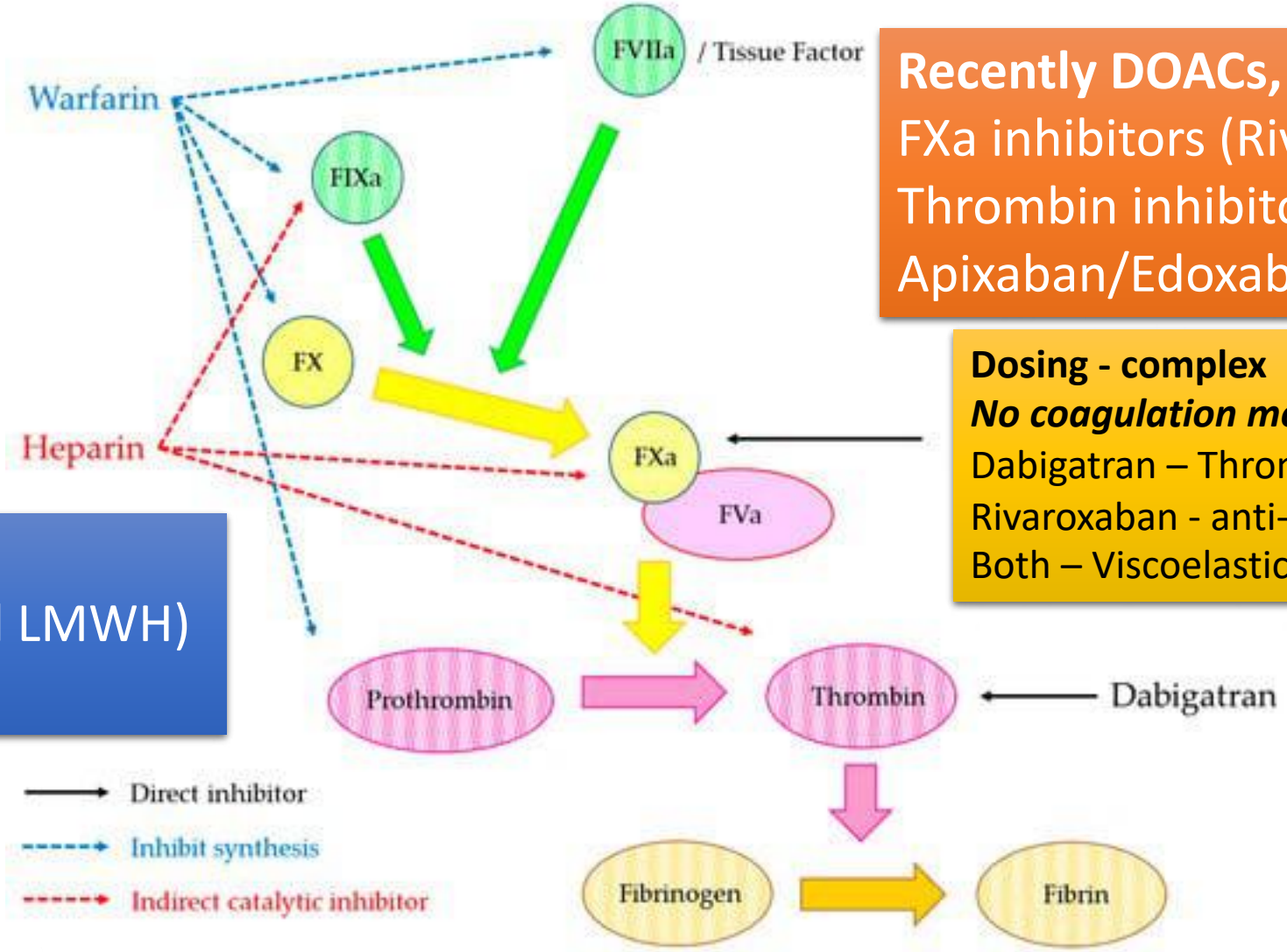
Prepublication release
Recommends DOACs over SOC (LMWH/Warfarin)
(low evidence)

Rivaroxaban/Dabigatran
(FDA approved)
No preference

Newer trends in anticoagulant therapy

Baby C

Traditionally,
Heparins (UFH and LMWH)
VKAs (Warfarin)



Recently DOACs,
FXa inhibitors (Rivaroxaban)
Thrombin inhibitors (Dabigatran)
Apixaban/Edoxaban under trial

Dosing - complex
No coagulation monitoring needed
Dabigatran – Thrombin time
Rivaroxaban - anti-FXa levels
Both – Viscoelastic testing

https://encyclopedia.pub/entry/8057

Management of catheter related thrombosis

Baby C

Do we need catheter?

Yes

- Anticoagulation with monitoring of thrombus
- Then continue prophylaxis till catheter removed

Thrombolysis ONLY if limb threatening

NO

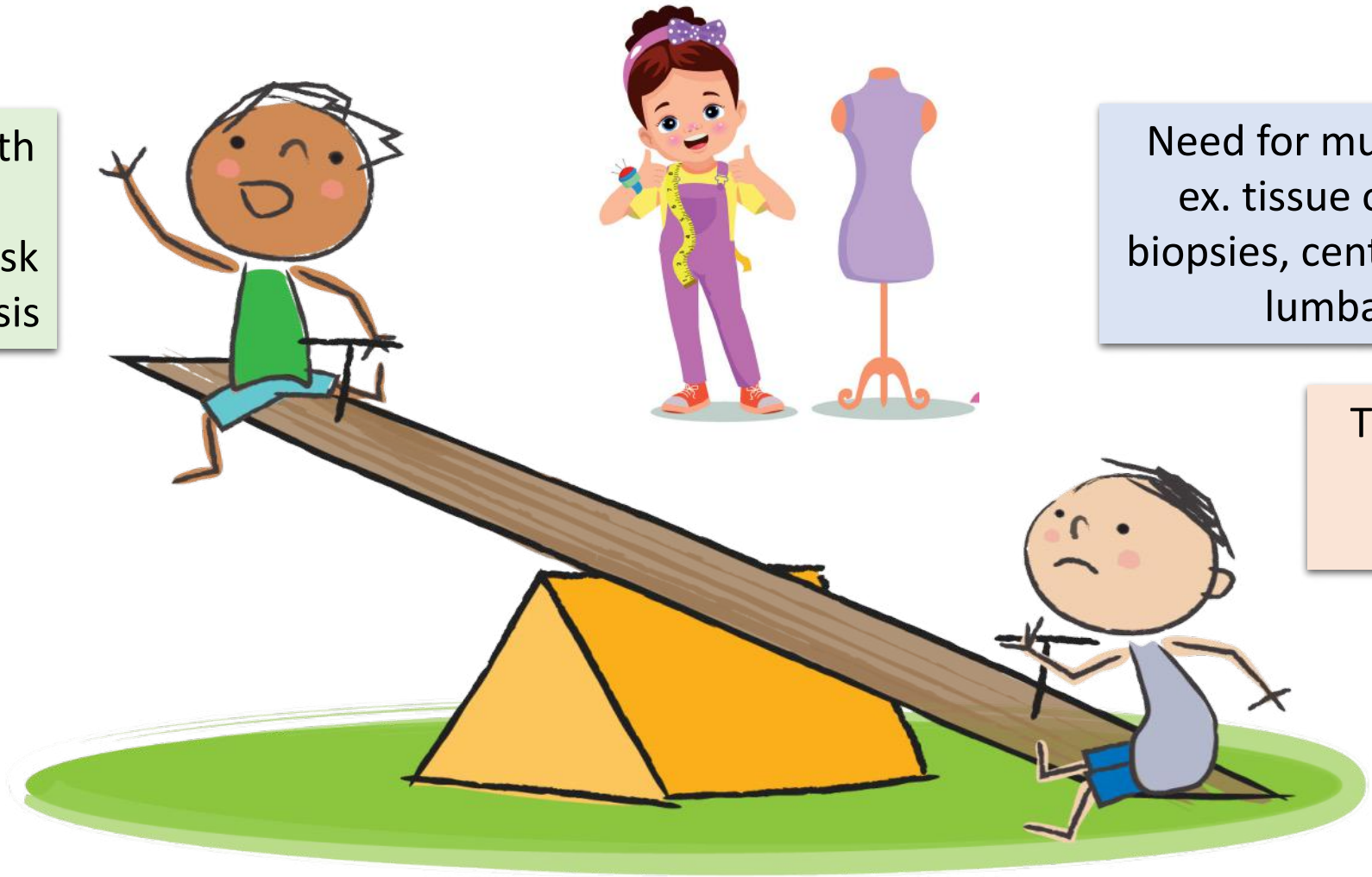
- Start anticoagulation for 2-5 days before removal
- Remove the catheter

1. ASH 2018 guidelines

Challenges in managing VTE in cancer children

Children with cancer at increased risk of thrombosis

Baby C

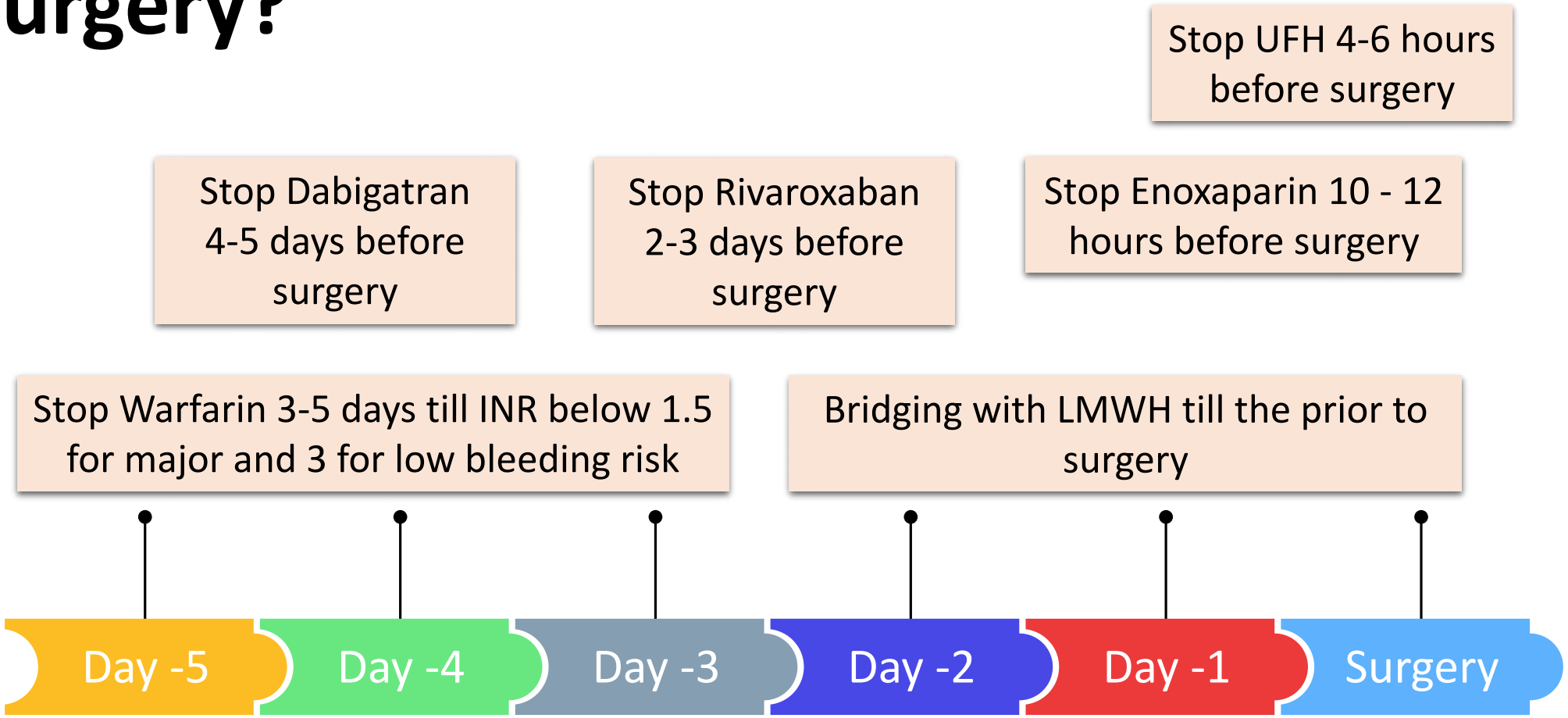


Need for multiple procedures ex. tissue or bone marrow biopsies, central venous access, lumbar puncture

Thrombocytopenia due to cancer or cancer therapies

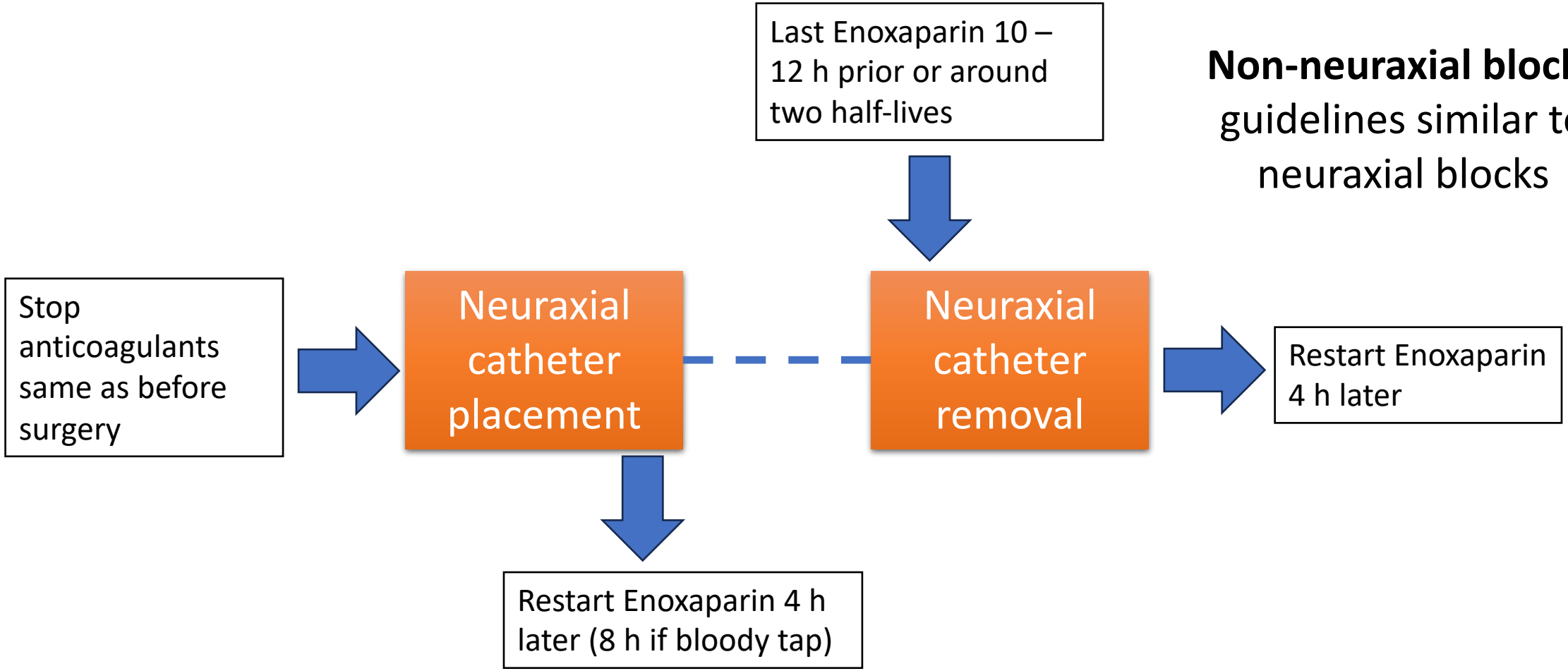
Increased bleeding risk

How do we hold anticoagulation before surgery?



Thromb Haemost. 2022 Dec;20(12):3026-3038.

If undergoing neuraxial techniques



Non-neuraxial blocks guidelines similar to neuraxial blocks

APAGBI guidelines 2018
J Clin Anesth. 2022 Aug;79:110725.

What Anaesthesiologists should know

- Children with cancer are at **higher risk** for VTE
- **Central venous access** major risk factor
- **Risk-based assessment** for thromboprophylaxis in children undergoing cancer surgeries
- Familiarize with **newer DOACs**
- Execute **periprocedural precautions** to balance the thrombotic and bleeding risk

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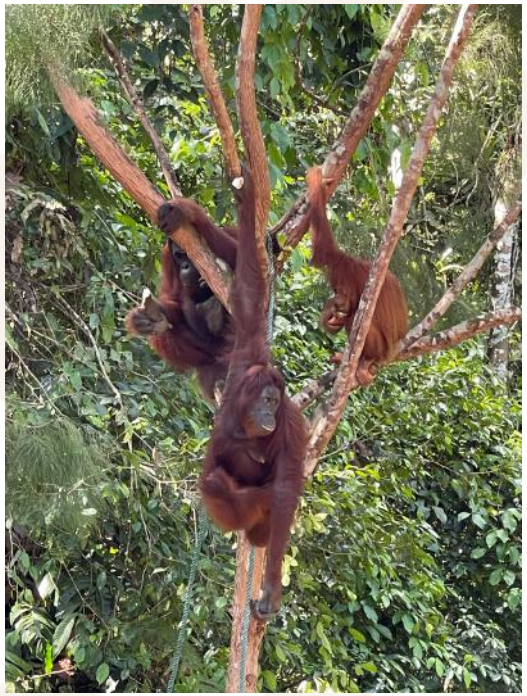

THANK YOU

TERIMA KASIH