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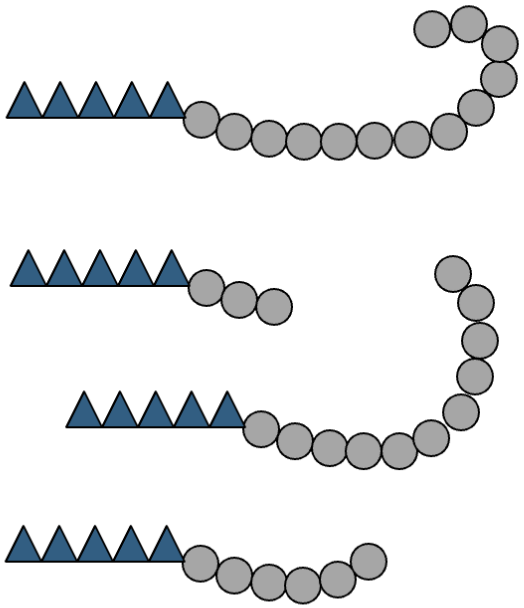
PARENTERAL ANTICOAGULANTS

DIFFERENCES BY MOLECULAR WEIGHT

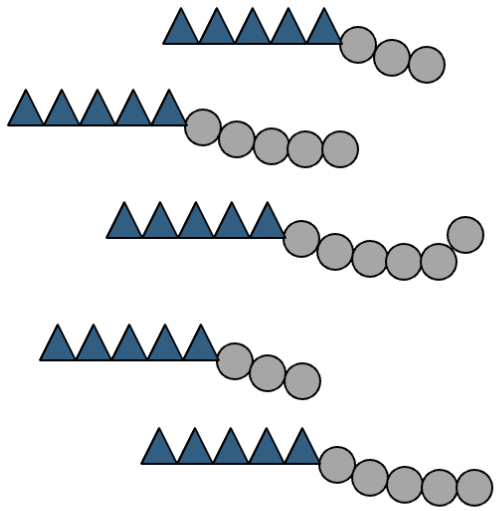
Unfractionated Heparin (UFH)

MW = 3,000 - 30,000 kDa



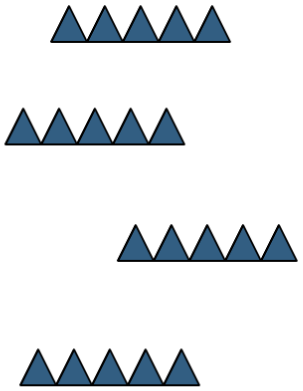
Low-Molecular Weight Heparin (LMWH)

MW = 2,000 - 7,500 kDa



Fondaparinux (Factor Xa Inhibitor)

MW = 1,728 kDa



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SUMMARY OF PARENTERAL ANTICOAGULANTS

PHARMACOKINETIC & PHARMACODYNAMIC DIFFERENCES

Drug	Concentration (units/mL)	Anti-Xa units per mg	MW (Da or g/mol)	Xa:II Inhibition
Unfractionated Heparin				
Heparin	1,000 – 20,000	N/A	5,000 – 30,000	1 to 1
Low-Molecular Weight Heparin				
Dalteparin	10,000-25,000	156	5,000	2.2 to 1
Enoxaparin	10,000	100	4,500	3.9 to 1
Direct Xa Inhibitor				
Fondaparinux	N/A	1.3	1,728	1 to 0

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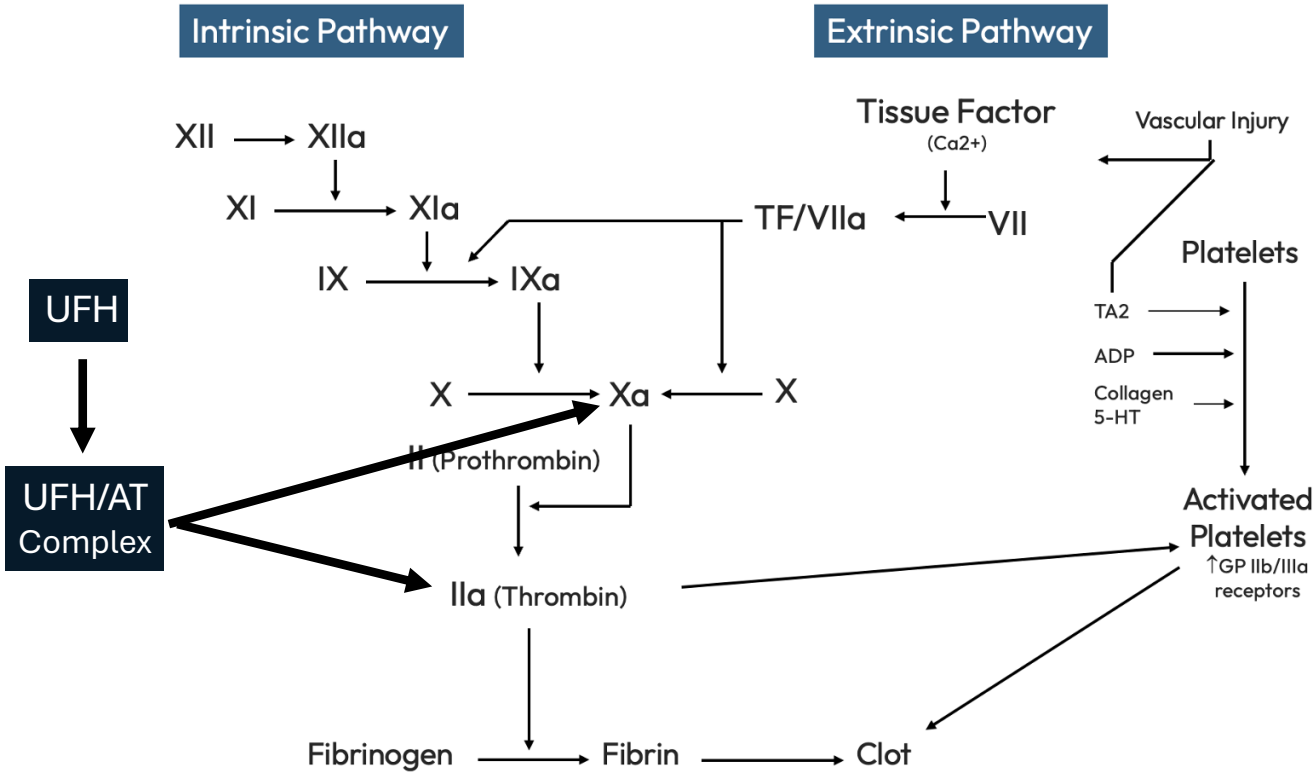
THROMBUS / CLOT FORMATION

NORMAL PHYSIOLOGY



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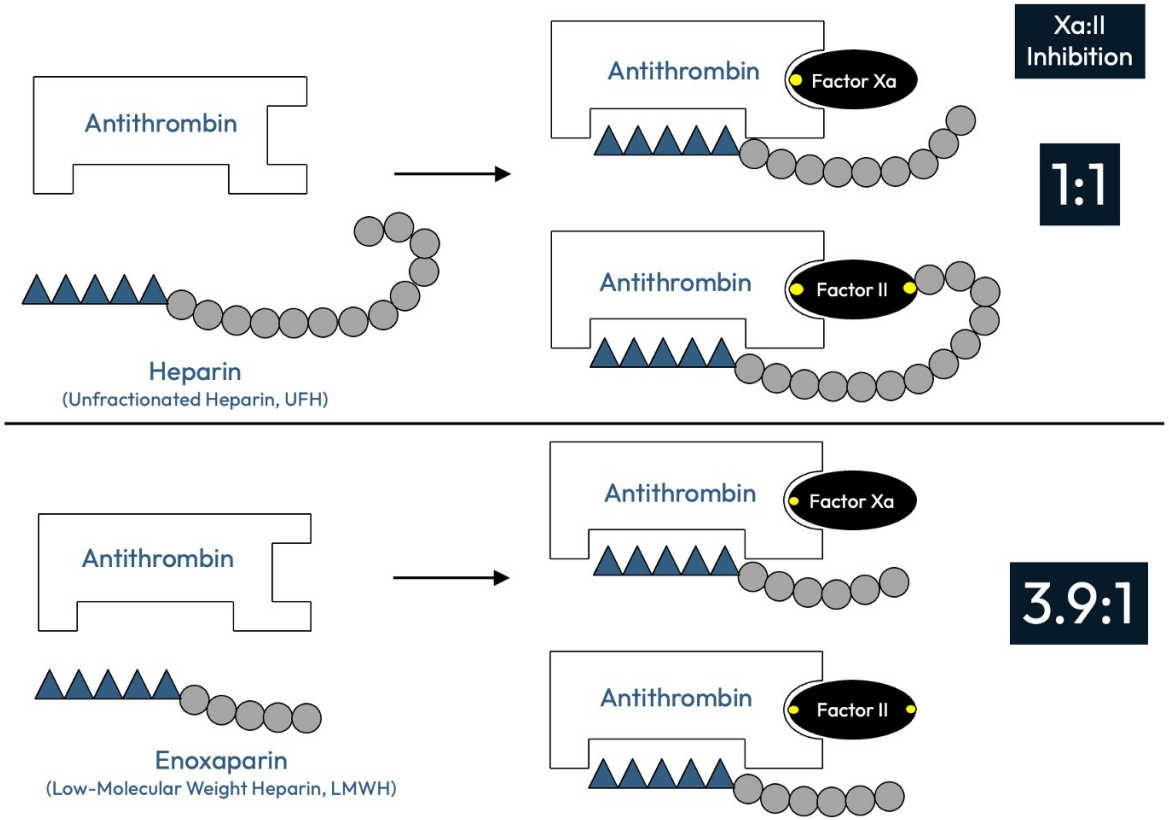
PARENTERAL ANTICOAGULANTS

PHARMACODYNAMIC DIFFERENCES



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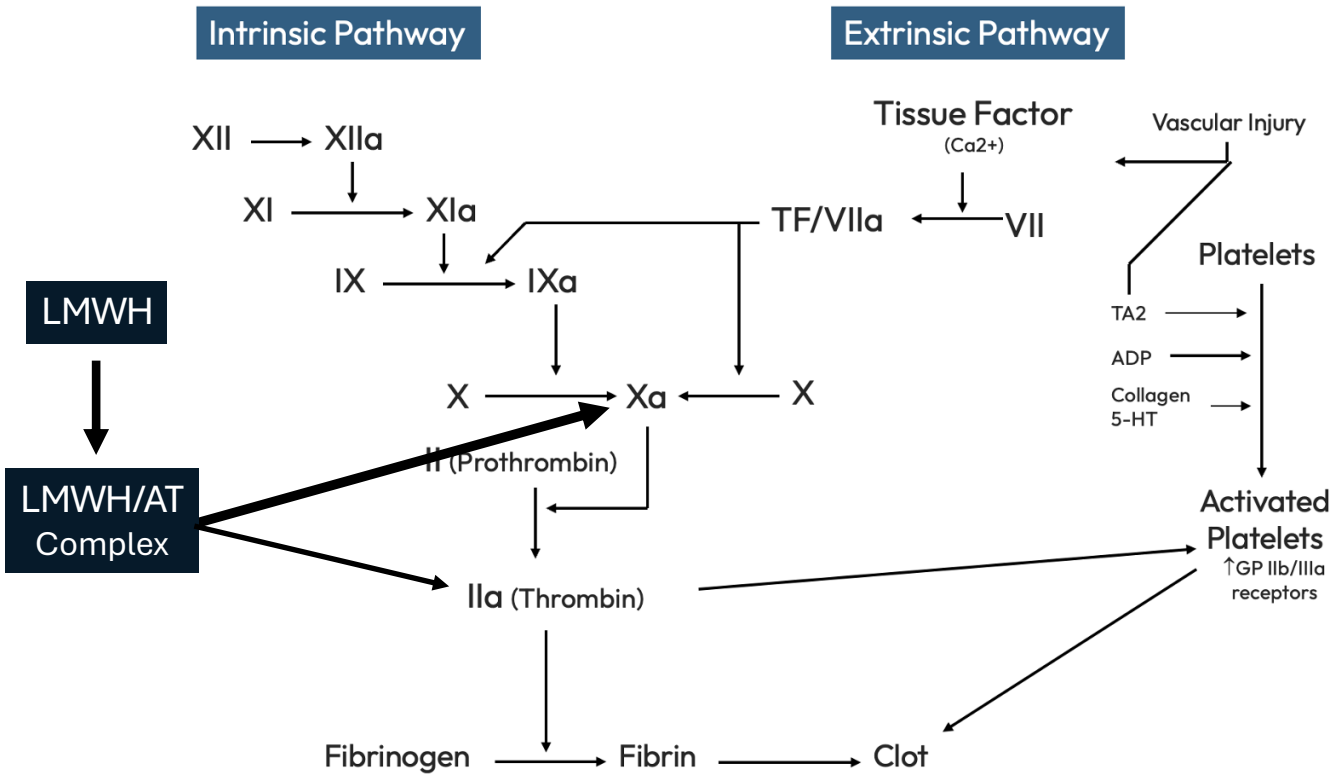
THROMBUS / CLOT FORMATION

NORMAL PHYSIOLOGY



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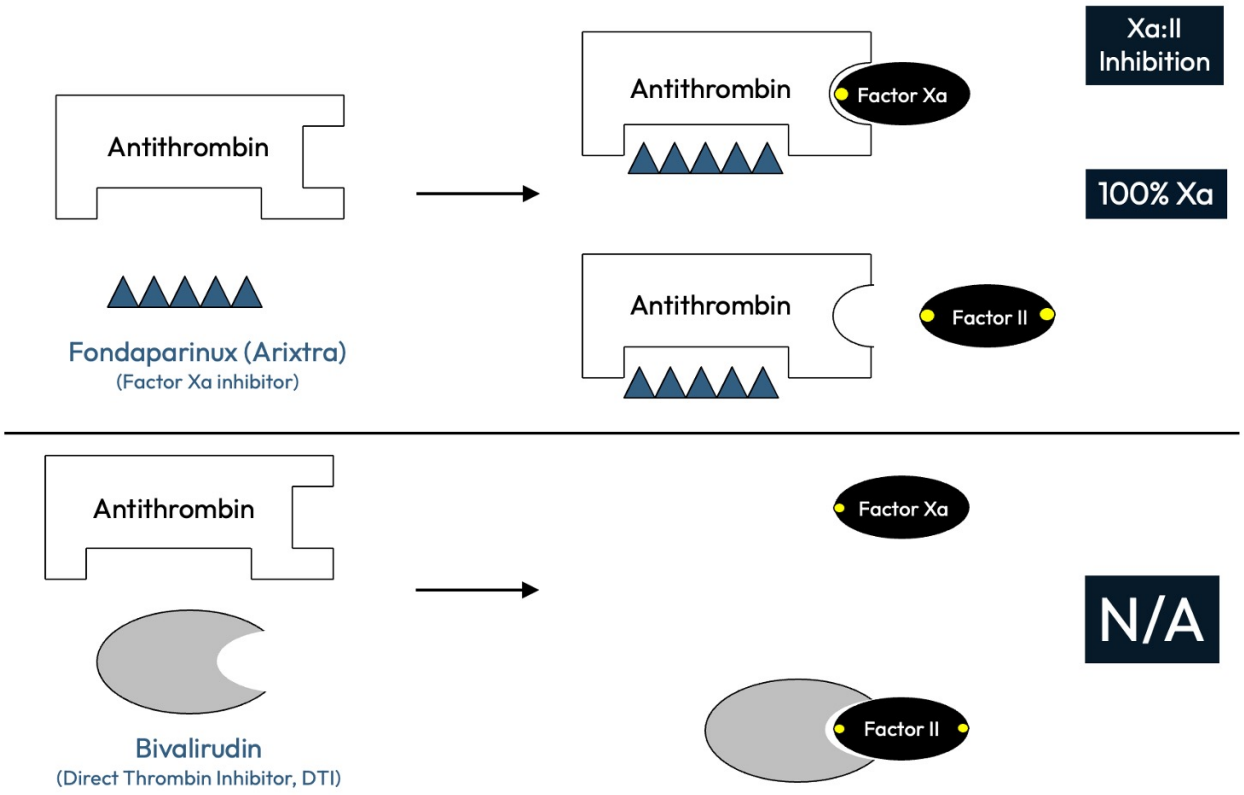
PARENTERAL ANTICOAGULANTS

PHARMACODYNAMIC DIFFERENCES



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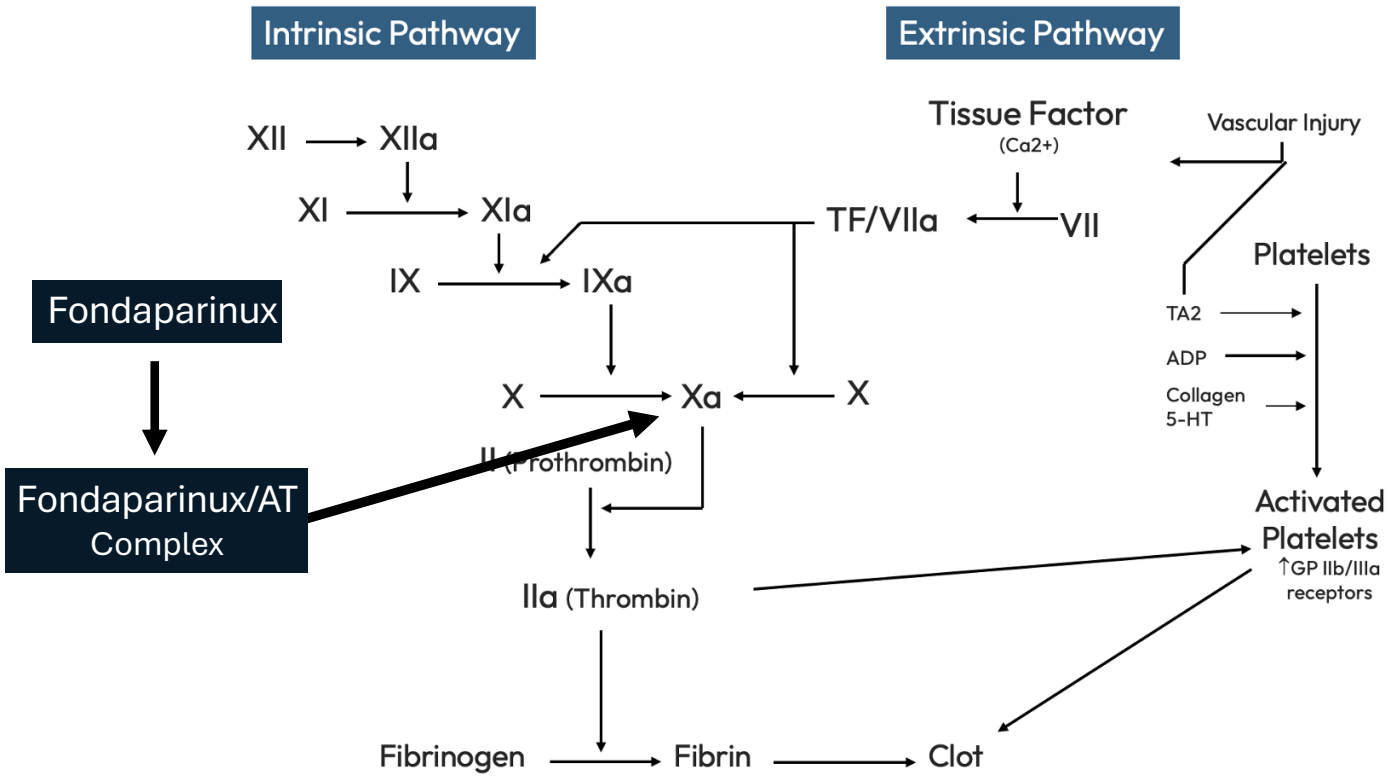
THROMBUS / CLOT FORMATION

NORMAL PHYSIOLOGY



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HEPARIN-INDUCED THROMBOCYTOPENIA
CLASSIFICATION

CATEGORY	TYPE 1 HIT or HAT	TYPE 2 HIT
Incidence	≈ 10%	0.5-5.0%
Antibody Positive	No	Yes
Onset of Thrombocytopenia	48-72 hours	< 24 hours
Platelet Decrease 30-50%	No	Yes
Lab test used for diagnosis	None	EIA, HIPA, SRA, Flow cytometry
Main risk factors	Heparin exposure	Exposure to heparin in last 100 days; esp. last 30d
Notes	Generally, not a concern; no clot present and no treatment needed	↑ thrombin & ↓ platelets, but not as drastic + clot present

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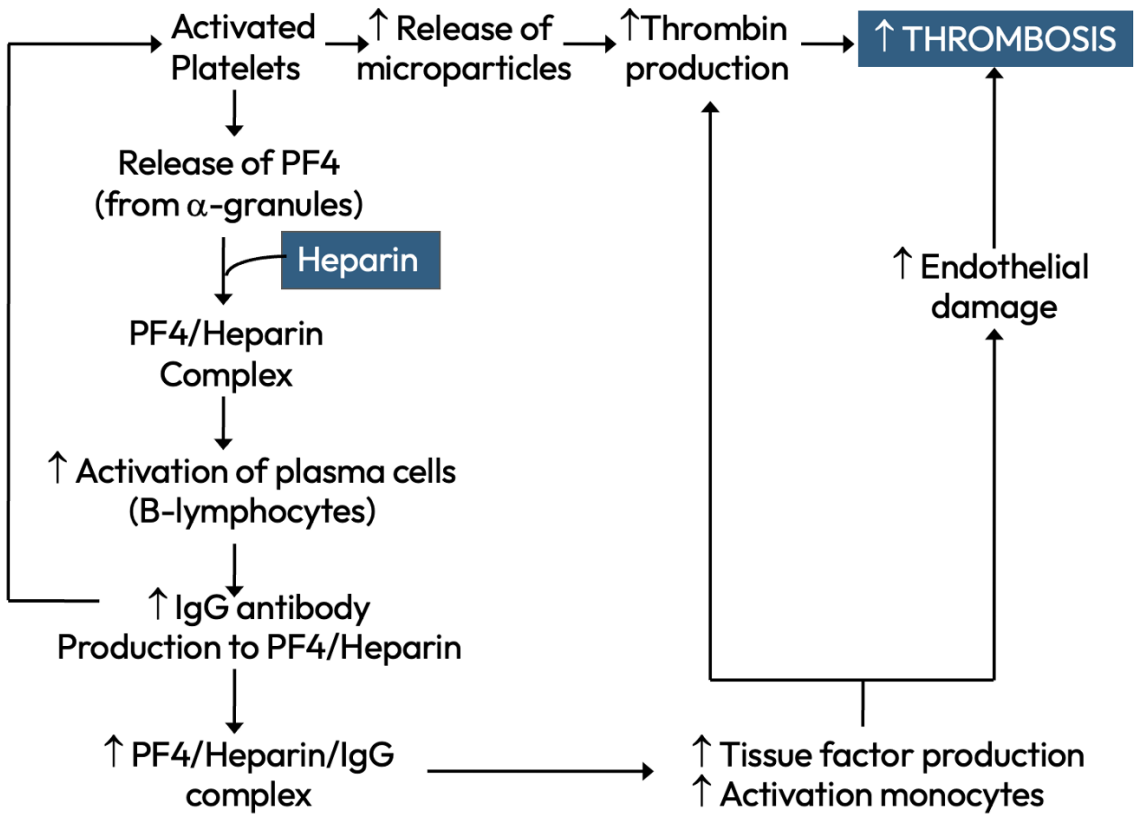
HEPARIN-INDUCED THROMBOCYTOPENIA

MECHANISM OF PATHOLOGY



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HEPARIN-INDUCED THROMBOCYTOPENIA
RISK FACTORS

Risk Factor	Description
Source of heparin exposure	▪ UFH [bovine >> porcine] > LMWH ▪ Bovine or Porcine UFH – Heparin is produced from cell lines of either bovine origin or porcine. – While the majority of the commercially available heparin HIT may be higher in individuals treated with UFH of bovine origin compared with porcine heparin and is lower in those treated exclusively with LMW heparin
Duration of heparin exposure	▪ > 4 days
Past exposure to heparin	▪ Within 30 days >> within 100 days
Dose of heparin exposure	▪ Treatment > prophylaxis > flush dose
Medical scenario	▪ Postoperative [cardiac > orthopedic > vascular > general medicine & OB] > medical > OB
Gender	▪ Female > male

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