FEB 2008
QUESTION 02

Outline the differences between heparin and enoxaparin with respect to; pharmacokinetics, monitoring, adverse effects and reversal of effect

	Heparin	Enoxaparin
	Heparin is an anioic, mucopolysaccaride, organic acid. It occurs naturally in the liver and mast cell granules.	Enoxaparin is a LMWH prepared from unfractionated heparin by controlled enzymatic or chemical depolymerisation.
Molecular weight	5000-25000 Daltons	Average of 5000 Daltons
Mechanism	Activates antithrombin which then inhibits clotting factors thrombin and factor Xa	Activates antithrombin but due to shorter length preferentially inhibits factor Xa
Pharmacokinetics		
absorption	reduced due to endothelial binding (SC)	up to 90% via SC (greater than heparin)
distribution	very high protien binding	less than heparin
metabolism	hepatic via heparinases / desulfation	hepatic via heparinases / desulfation
excretion	variable half life due to protien binding 30 - 150 mins depending on dose	2-4 tmes longer half life than heparin dose independent half time
	urine as inactive metabolites, little change in renal failure	urine as 10% active fragments, dose adjustment required in renal failure
Adverse effects	Bleeding Heparin Induced Thrombocytopaenia HITS Osteoporosis Transient transaminitis	Bleeding Needs adjustment in renal failure Less HITS and osteoporosis
Monitoring	APTT	anti Xa levels
Reversal	Protamine by slow infusion Cationic compound forms a stable covalent salt with heparin	Protamine by slow infusion Less effective than heparin due to the preferential Xa action