Low molecular weight heparin significantly reduces embolisation after carotid endarterectomy: A randomised trial

Objective.
Administration of heparin to patients undergoing carotid endarterectomy (CEA) significantly increases platelet aggregation. This may explain why some patients are more vulnerable to thromboembolic events in the early post-operative period despite aspirin. The hypothesis underlying the current study was that this phenomenon would be reduced by using low molecular weight heparin (LMWH) as compared with unfractionated heparin (UFH).

Methods
185 aspirinated CEA patients were randomised to 5000IU UFH (n=90) or 2500IU LMWH (n=95) prior to carotid clamping. End-points were; (1) platelet function (aggregation to arachidonic acid and ADP), (2) thrombogenicity (Transcranial Doppler (TCD) measurement of embolisation in the first 3 hours) and (3) effect on bleeding (time from flow restoration to operation end).

Results
There was a two fold increase in the magnitude of embolisation in the first 3 hours after CEA in patients randomised to UFH (Odds Ratio 2.03 (95% CI, 1.03-4.00, p=0.04), which was not associated with an increase in bleeding (mean time from flow restoration to operation end was 23mins (UFH) vs. 24mins (LMWH), p=0.193). Aggregation to arachidonic acid was unaffected by heparin type, but platelets of patients randomised to UFH exhibited significantly increased aggregation to ADP.

Conclusion
Intravenous LMWH (unlicensed for use in CEA) is associated with a significant reduction in post-operative embolisation (a recognised marker for increased risk of thrombosis) without increased bleeding. Paradoxically, the enhanced UFH effect on embolisation may be mediated through the platelet ADP receptor, rather than the cyclo-oxygenase pathway.