Background
Plaque rupture or erosion are recognised as a pivotal cause for heart attacks (acute myocardial infarction; MI). Whether the resulting thrombus becomes occlusive depends on several factors, such as plaque composition and vessel morphology, but also on the magnitude of the haemostatic response. The latter may be especially relevant in patients who suffer an MI at an early age where the atherosclerotic burden may be relatively low. The incidence of early MI is much lower in women than men, therefore is less well studied.

Haemostasis is regulated by the balance of pro- and anti-coagulant proteins, resulting in the generation of thrombin. The overall thrombotic response can be assessed by measurement of the total thrombin generation capacity of the plasma – the Endogenous Thrombotic Potential (ETP).

Aim of study
To compare the levels of individual coagulation proteins, and the overall thrombotic potential, in plasma from 186 men and women who have suffered an MI <50 yrs.

Results
Measurement of the overall thrombotic potential of plasma demonstrated that although there was much overlap between groups, the mean ETP was significantly higher in the plasma from the premature MI cases than the control group with no family history of MI (Figure 1). Further analysis of the cohorts according to gender showed that the mean ETP was significantly elevated in female cases compared to mean ETP of their male counterparts (136%±49.7 vs 116%±33.0; p=0.014)(Figure 2. In contrast, mean ETP for female and male controls was very similar (103%±20.1 vs 101%±23.1; p=0.68).

Female patients had significantly higher levels of Factor VIII (p<0.005; Fig 3A), von Willebrand Factor, the co-factor for Factor VIII, (p<0.001; Fig 3B), and Factor IX (p<0.001; Fig 3C), compared to plasma levels measured in the male cases.

Factor VIII and Factor FIX are components of the tenase complex that serves to amplify the procoagulant response (Figure 4). Therefore, in comparison to their male counterparts, female cases appear to have increased levels of components of the tenase complex, which may contribute to an elevated thrombotic potential.

Conclusion
These findings suggest that women with premature MI might specifically benefit from antithrombotic therapy.