Introduction:
A major risk factor for stroke is atrial fibrillation (AF). To treat AF anticoagulation is needed. There are now several anticoagulants available. However, a lack of head to head data as well as the absence of accurate techniques makes it difficult to compare them and measure determine there efficacy. Stroke is known to produce an abnormal clot microstructure which is a common factor in many thrombotic diseases. This pilot study aims to use a functional biomarker of clot microstructure ($d_f$) and clotting time (TGP) to investigate the therapeutic effects of different anticoagulants in stroke and AF.

Methods:
We recruited 114 patients (59 AF and 55 stroke & AF). Two samples of blood were taken: before anticoagulation (baseline) and post anticoagulation (6-10weeks). Patients were either given warfarin (31%) or axipaban (69%). $d_f$ and TGP were measured and compared before and after anticoagulation.

Results:
Warfarin increased T$_{GP}$ (267±56secs to 332±78secs (p<0.05)), and decreased $d_f$ (1.71±0.05 to 1.65±0.06 (p<0.05)).
Apixaban increased TGP (235±66sec to 410±105sec (p<0.05)) but did not change df (1.72±0.04 & 1.72±0.05).
Interestingly we found that in the apixaban group TGP significantly correlated (p=0.05) with blood drug concentration levels.

Conclusion:
In this study we show that $d_f$ and TGP can quantify and differentiate between the therapeutic effects of two different oral anticoagulants. Showing that warfarin prolongs clotting and weakens the ability of the blood to form stable clots. Conversely apixaban prolongs clotting time but does not affect the bloods ability to form stable clots. This shows the utility of the $d_f$ and TGP biomarkers in comparing two different treatment options, something no other current marker has proven able to do. Where $d_f$ and TGP may prove useful tools in a personalised approach to anticoagulation treatment and monitoring in an acute setting.