Maximising weakness:
Does vessel structure influence aneurysm risk?

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INTRODUCTION
- An aortic aneurysm describes the degradation and dilation above 1.5 times original aortic diameter.1
- Aortic aneurysm rupture is currently the 18th most common cause of premature death across all age groups.2
- There is a predisposition for their appearance at locations such as the abdominal aorta, and a theorised protection at the external iliac artery.3
- There are two major proteins found in the aortic wall, collagen and elastin, that impart stability and elasticity respectively.
- At high pressure, their absence or imbalance could be a factor that allows aneurysmal degradation.
- This research investigates their presence in healthy aorta, and links with aneurysm occurrence.

METHODS
Step 1
- Multiple sections of ‘healthy’ aortic wall collected (n=10)

Step 2
- Each section is stained to visualise collagen and elastin

Step 3
- Percentage of collagen and elastin in each section is quantitatively determined

RESULTS
- Representative images of stained slides show elastin (dark purple) and collagen (dark pink).
- Proportion and distribution of collagen and elastin vary along the length of the aorta.
- Higher proportion of collagen at the majority of sites.
- Largest difference in collagen : elastin ratio in the aortic arch and abdominal aorta.
- Smallest difference in collagen : elastin ratio in the external iliac arteries.

CONCLUSION
- Abdominal aorta, most prone to aneurysm formation, shows higher collagen : elastin ratio.
- External iliac artery, resistant to aneurysm formation, shows more equal ratio.
- A proportional increase of collagen, should offer protection from aneurysmal degradation.
- However, the dilutional decrease in elastin may reduce the ability of the aorta to ‘bounce back’ from daily stressors, such as high blood pressure.

SIGNIFICANCE
- Understanding predisposition of aortic aneurysm development adds insight to pathogenesis mechanisms.
- This informs potential treatment targets, such as the mechanisms of collagen and elastin degradation.

REFERENCES