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Conference Abstract

# P.44 Application of an Algorithm Developed for Measuring Gastrointestinal Motility to the Assessment of Arterial Mechanical Properties

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## ABSTRACT

**Background:** GIQuant (Motilent, London) is an algorithm for analysing cine-MRI, using the displacement fields generated by registration of indivisdual ciné frames. It produces a summary of how much movement occurs ("motility") for anatomical locations within a reference image [1]. Although it is used clinically for quantifying gut motility [2], it can process any ciné-MRI. In this study, we explore the hypothesis that it can be used to examine the functionality of blood vessels.

**Methods:** Using ciné-MRI of the abdomen, obtained in initially to assess small-bowel motility in patients with Crohn's disease, we tested the feasibility of using GIQuant to examine the mechanical properties of blood vessels. In such data, coronal slices often intersect the abdominal aorta and the common iliac arteries. The reference images were manually segmented (see Figure 1A) for statistical analysis of the motility scores.

**Results:** We compared the mean motility score in the common iliac arteries, finding that the inter-subject, is greater than the intra-subject variability (Figure 1B). Additionally, motility in the right and left common iliacs is not correlated with that of the abdominal aorta (Figure 1C). When assessed spatially along the abdominal aorta, the motility score is correlated with position in a physiologically plausible manner, showing a general decrease in the caudal direction (Figure 1D–1E).

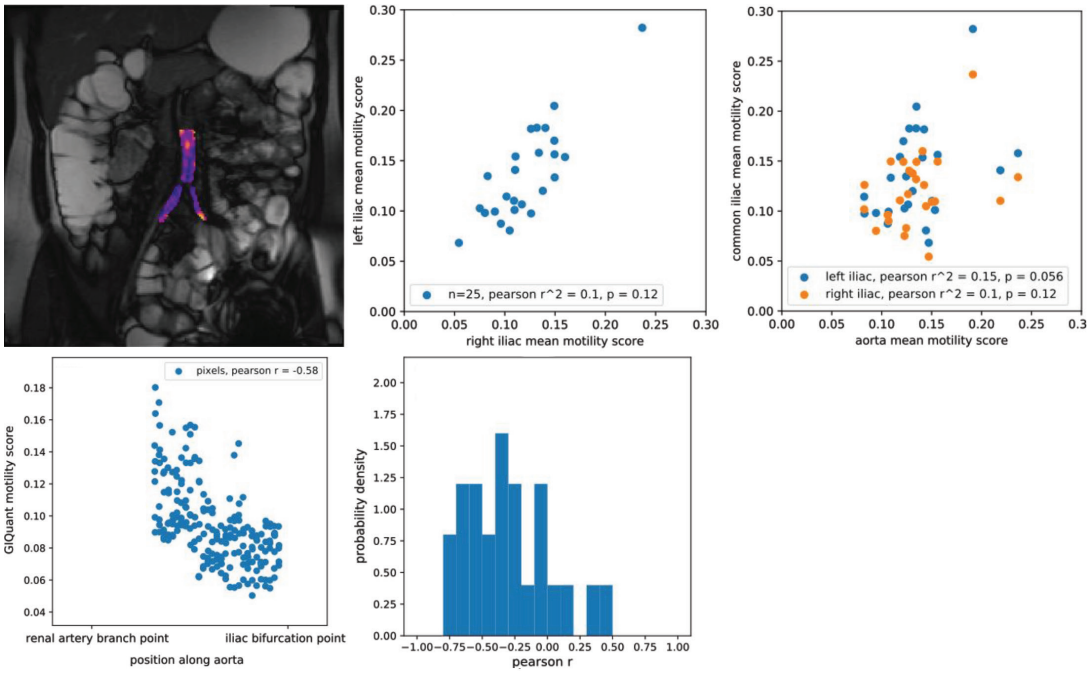


**Figure 1** | A. Example reference image, with abdominal aorta and common iliacs false-coloured according to GlQuant motility score. B-C. Scatter plots showing mean motility scores for both common iliacs (B) and comparisons with aorta (C). D. Scatter plot showing pixelwise motility scores against craniocaudal position, for the image shown in (a) E. r-values from n=25 subjects treated as per (D)

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**Conclusions:** It appears that GIQuant can be used to provide biologically meaningful information about blood vessel properties. Further validation work will use this technique to examine function in patients with bicuspid aortic valves, and to examine its predictive value for aortic aneurysm prognosis.

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