Docket #: S18-294

Patient-specific hemodynamic analysis to predict coronary artery bypass graft failure from imaging data

Prof. Alison Marsden and her colleagues have developed a computational framework that uses personalized anatomical information to identify patients that have a high risk for saphenous vein graft (SVG) failure after coronary artery bypass graft (CABG). Currently, about 5-10% of SVGs fail within a month due to stenosis and occlusions and 40-50% fail within 10 years. This technology helps address that problem using three-dimensional patient-specific models derived from medical images (e.g. CTA, MRI or ultrasound). These models and other physiological data are then used for detailed computational hemodynamic simulations that determine early predictors of SVG failure. Stratifying patients at high risk for poor outcomes could help save lives through monitoring and early intervention.

Applications

- **Vascular grafts** – computational analysis of cardiovascular imaging to stratify patients at high risk SVG failure after CABG

Advantages

- **Personalized prediction** - anatomic predictors used by this model are specific to individual patients:
    - incorporates both anatomical and computationally-obtained physiological data
    - identifies specific individuals with elevated risk

- could potentially save lives through early intervention for high risk patients

Publications

- Khan M. et al. Abstract 14906: Computational Fluid Dynamics (BypassCFD) Trumps Anatomic Predictors of Saphenous Vein Graft Failure in CABG Patients *Circulation* Vol 138, Issue Supp 1.Nov. 5 2018

Patents

- Published Application: 20200008765
- Issued: 10,709,400 (USA)

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