response shapes from the 20 to 500 ms post-stimulation period. This allowed us to group stimulation sites that evoked similar responses. We then related each group to high frequency, broadband, changes in spectral power as a reflection of local neuronal activity. RESULTS/ANTICIPATED RESULTS: We found that the VTC receives strong inputs specifically from the amygdala and hippocampus, both in terms of amplitude and broadband spectral power change. However, inputs from the hippocampus produced a different canonical shape than those from the amygdala. We also observed that VTC responses to inputs from the insula clustered in shape with those from the amygdala. These clustering patterns were consistent across subjects, although the actual shapes of the clusters showed variability. We further observed that some shapes were more associated with increases in overall neuronal activity than others, as reflected by broadband spectral power change. DISCUSSION/SIGNIFICANCE OF FINDINGS: Stimulation of connected sites may drive excitability at the target region in ways that are described by sets of full-time-course responses. By capturing their shapes, we can begin to decipher canonical input types at the circuit level. This approach might identify how stimulation inputs can be tailored to therapy while mitigating adverse effects.

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High Screening Efficacy Using Wearable Seismocardiography to Identify Aortic Valve Disease Patients, Potential to Tailor MRI Exams to Patient Needs*

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ABSTRACT IMPACT: A single seismocardiography (SCG) parameter has been shown to accurately classify aortic valve disease (AVD) status in healthy controls and AVD patients. This could support development of SCG as a quick, inexpensive screening tool to better tailor MRI examination to patients' needs. OBJECTIVES/GOALS: MRI is used commonly for monitoring of aortic valve disease (AVD), but it has high costs. We hypothesize that energy in seismocardiograms (SCG)"signals from chest surface vibrations"is different between healthy controls and AVD patients, and we evaluate potential efficacy of using SCG to recommend MRI only for patients with flow abnormalities. METHODS/STUDY POPULATION: With IRB approval, 45 healthy control subjects (47 ±18years, 18 female) and 9 patients (63 ±16years, 2 female) with aortic valve disease history and known flow abnormalities were recruited. SCG signals were acquired supine, immediately prior to MRI of thoracic aortic blood flow at 1.5T with a time-resolved phase contrast (4D Flow) sequence. The SCG was processed to calculate late-systole high-frequency (120-240Hz) RMS energy. MR velocity images were analyzed to measure peak velocity and trace pathlines of flow.
Screening efficacy of the SCG energy metric was assessed, with hypothesis testing for differences in energy level distributions between controls and patients, and receiver-operator characteristic (ROC) analysis was used to calculate rates of correct/incorrect classification of disease. RESULTS/ANTICIPATED RESULTS: Healthy subjects had coherent flow pathlines through the aortic arch and mid-ascending aorta peak velocities of 106 ±21cm/s (cohort mean ±standard deviation). All valve disease subjects had flow abnormalities, such as jetting flow near the valve or swirling through the arch, as visualized by pathlines. Patients' peak mid-ascending aorta velocities were 167 ±69cm/s. The SCG energy for healthy controls was significantly different than that of valve patients (-5.6 ±0.3dBmm/s/s vs. -4.0 ±1.2dBmm/s/s respectively; $p<0.001$). Thresholding SCG energy to distinguish patients from controls correctly classifies subjects with a high true-positive rate and low false-positive rate. The ROC for this classification has area-under-curve 0.956. DISCUSSION/SIGNIFICANCE OF FINDINGS: A high potential screening efficacy was observed using a single, linear SCG metric to identify AVD patients with flow abnormalities. If used to complement MRI surveillance protocols for AVD, this method has potential to serve as a quick, inexpensive tool for better tailoring MRI exams to patient needs.

Dissemination and Implementation

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Asymptomatic Thoracic Aortic Aneurysm Growth Rates and Predicting Factors: A Systematic Review and Meta-Analysis

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ABSTRACT IMPACT: Through conducting this systematic review and meta-analysis, we will elucidate which factors influence thoracic aortic aneurysm growth, which will further help clinicians to properly stratify and manage their patients with TAAs. OBJECTIVES/GOALS: Thoracic aortic aneurysms (TAA) are an indolent but fatal disease, and the patient characteristics that predict both overall growth and growth rate are still not well characterized. Our goal is to conduct a systematic review and meta-analysis in other to better describe different patient characteristics that predict TAA growth. METHODS/STUDY POPULATION: M.M. conducted a search of Ovid MEDLINE, Embase, and Scopus to identify articles. Inclusion criteria were any longitudinal study reporting asymptomatic TAA growth, growth rates, or clinical proxies for growth such as dissection, rupture, emergency surgery, and death. M.H and P.B. independently applied the criteria to the results of the search. Conflicts were resolved by N.B. Data was extracted and risk of bias assessed independently by M.H. and P.B. Summary estimates of the outcome variables are combined across studies using standard meta-analysis methods. Heterogeneity is assessed via forest plots, chi2 test (Q test), and I2 statistic. Sensitivity analysis is conducted to assess robustness of the findings. RESULTS/ANTICIPATED RESULTS: The literature search resulted in 3,419 abstracts, of which 176 were included and thus require a full text review. Cohen's Kappa coefficient was 0.64, indicating substantial agreement and high inter-rater reliability. We describe four categories of patient characteristics influencing the growth of asymptomatic TAAs: demographics, genetic or inheritable conditions, hemodynamic or biomechanical factors, and serum biomarkers. We describe the measure of effect for all variables. We anticipate there is a significant level of heterogeneity between studies, and potentially moderate risk of bias for many of the included studies as they are retrospective and observational in nature. Furthermore, we anticipate publication bias and evaluate

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