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P-030 VOXEL-BASED CALCULATIONS OF INTRASACCULAR ANEURYSM AND DEVICE VOLUME FILL

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Introduction Various embolization techniques are available for intracranial aneurysms. The precise volume measurement of an aneurysm sac can help improve embolization techniques, such as: coils, liquid embolics, flow disruptors, and flow diverters. Aneurysm sizing and volumetric information help interventionalists assess flow and stability pre-treatment and potential remnant or recanalization risks post-treatment.

Materials and Methods This research project applies voxel-based volume calculations, from CT or MRI medical imaging data, to determine accurate 3-D aneurysm volume calculations. Additionally, the application can display clinically relevant parameters, such as aneurysm neck diameter, dome height and midline-dome width (for dome:neck (D:N) ratio calculations). To develop the measurement techniques, wide-neck canine aneurysm models (n=10) were scanned with a Siemens Inveon Micro-CT scanner (University of Arizona TBIR, Tucson, AZ) and analyzed with InVesalius 3.0 software (Ministry of Health, Brazil).

The software loads the imaging data, discretizes the intrasaccular aneurysm, separating the device volume from the aneurysm sac. This data was compared to physical measurements of excised aneurysms and calibrated 2-D angiographic images.

Results Invesalius image processing techniques helped determine the domain of aneurysms with less than 5% volumetric error, when compared to measurements recorded during the aneurysm creation surgery. Current measurement techniques in 2-D planes have errors as high as 30%. This technique helps determine the macroscopic properties of aneurysms, as well as the volumes of abnormal aneurysm shapes. The software was also used to measure% fill of a liquid embolic (NeuroCURE) delivered to the 10 canine aneurysms. In all 10 cases the precise delivery of NeuroCURE resulted in 90-100% aneurysm sac filling, versus < 30% for traditional coiling techniques.

Conclusion As new aneurysm treatment devices are developed and greater% fill of the aneurysm sac is attempted, the need for precise aneurysm volume calculations will be of high priority. This project brings together clinical and engineering expertise to translate medical imaging data directly into volumetric measurements with highly precise calculations that are currently not available from 2-D angiographic images. Measuring the size and dimensional properties of aneurysms with voxel-based volume calculations provides a fast, reliable and repeatable resource for aneurysm assessment. This technique will help interventionalists appropriately assess risk and treatment options for a broad range of aneurysm morphologies.

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P-031 EFFECT OF COVID-19 ON ACUTE ISCHEMIC STROKE: POPULATION-LEVEL EXPERIENCE

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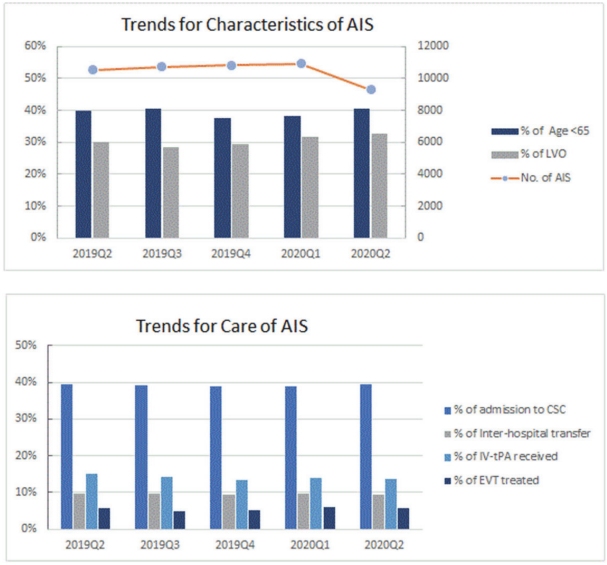
Introduction Several studies report substantial decreases in the volume of acute ischemic stroke (AIS) during the early stage of coronavirus disease 2019 (COVID-19) pandemic. Differences in characteristics of strokes such as increasing rates of large vessel occlusion (LVO) stroke were also observed comparing between pre-COVID and COVID eras. However, these findings were often based on data from selected hospitals or networks and estimates may be biased by level of stroke care and baseline case mix. A population-based study including rural hospitals and non-stroke centers covering a longer observation period beyond the early-pandemic epoch may lead to more accurate insights.

Methods We conducted a retrospective population-based study using the Texas Inpatient Public Use Data File, capturing all discharges from hospitals in the State of Texas excluding federal hospitals. We assessed quarterly changes in volume, characteristics, care of AIS, and patient outcomes from April 1, 2019-June 30, 2020 and compared two time periods. 2020Q2 was defined as the pandemic period and the previous one year as the pre-pandemic period. Cases were defined as inpatient hospitalizations to acute care hospitals with a primary diagnosis of AIS. ICD-10 diagnosis and procedure codes were used to identify AIS, LVO, use of intravenous tissue plasminogen activator (IV-tPA) and endovascular treatment (EVT). Hospitals were determined as CSC (Comprehensive Stroke Center)



Abstact P-031 Figure 1