Methods We performed a retrospective cohort study of all patients presenting to a single center in Atlanta, Georgia, USA with aSAH between 2012 and 2020. COVID-19 was first reported in Georgia on March 2, 2020. All patients presenting from March 2nd through June 30th of a given calendar year were compared from the pre-COVID-19 era (2012-2019) to the COVID-19 era (2020). Patient characteristics, latency from ictus to presentation, and clinical outcomes were compared. Every index digital subtraction angiogram was scored for the presence of vasospasm, and all cranial imaging studies were reviewed for infarcts consistent with delayed cerebral ischemia.

Results 470 patients presented with aneurysmal subarachnoid hemorrhage during the study period. 433 and 37 presented before and during the COVID-19 era, respectively. Compared to the pre-COVID-19 era patients, patients presenting during the early phase of the pandemic were more likely to delay presentation (2.3 ± 1.3 days vs. 0.9 ± 2.2 days, respectively, p<0.01). Delays to presentation were driven by low and mid-grade subarachnoid hemorrhage patients (2.8±3.1 days vs. 1.0 ± 2.2 days, p<0.01) with no differences noted in high-grade subarachnoid hemorrhage patients. The COVID-19 era was independently associated with significantly increased rates of angiographic vasospasm on presentation (aOR 2.52, 1.01 - 6.29, p = .048), delayed cerebral ischemia (aOR 3.84, 1.74 - 8.50, p=.001), and in-hospital aneurysmal re-rupture (aOR 5.75, 1.05 - 31.54, p=.044). Presentation during the COVID-19 era was independently associated with increased in-hospital death or hospice disposition in adjusted analysis (aOR 3.05, 1.03 - 9.04, p=0.04). In this retrospective cohort, aSAH the COVID-19 era is associated with delayed presentation and attendant increases in cerebral vasospasm, delayed cerebral ischemia, aneurysmal re-rupture, and increased in-hospital mortality/hospice disposition. These data demonstrate a novel association between the COVID-19 pandemic and aneurysmal subarachnoid hemorrhage care, highlighting increases in overall mortality in non-COVID-19 associated disease driven by the ongoing pandemic.


Abstract P-054 Figure 1 Left - 3 NeuroCURE samples imaged on a calibrated fluoroscope (day 49). Right - 8-month contrast elution from NeuroCURE. 72% of original radiopacity is maintained.
Introduction

High recanalization rates of large aneurysms embolized with current devices can be attributed in part to limited modeling of larger aneurysms during preliminary device testing in animal models. We developed a clinically-relevant in vivo canine model of large, wide-neck aneurysms to study aneurysms with traditionally high recanalization rates post-treatment. This model was then treated with a new liquid embolic device under development: NeuroCURE® (Aneuvas Technologies, Inc. (ATI) - Flagstaff, AZ). NeuroCURE® is a non-adhesive, elastic polymer gel (a form of polypropylene diacrylate – PPODA) that self-coalesces and completely fills the aneurysm sac in less than 10 minutes.

Materials and Methods

The canine large aneurysm model was developed by the Neurosurgery Research Center at Barrow Neurological Institute (BNI – Phoenix, AZ) and completed as a GLP study at American Preclinical Services (APS – Minneapolis, MN). The study included 10 canines (4 – 6 month, and 2 – 12 month survivals post-embolization) A lateral wall aneurysm was surgically created by anastomosis of the external jugular vein (EJV) segment onto the common carotid artery (RCCA) in the neck. The EJV segment was sewn to the RCCA to form a wide-neck aneurysm (5 – 7 mm diameter). The distal EJV was tied off at a dome height ≥ 10 mm. The animals were survived at least 2 weeks pre-embolization to allow for aneurysm maturation, stabilization, and vessel model healing. NeuroCURE® was then delivered under balloon protection using a single 10 minute inflation.

Results

Pre-treatment angiographic imaging verified a patent aneurysm with large dome height (>10 mm) and wide-neck morphology (>4mm neck diameter and midline Dome: Neck (D:N) ratio 1:1:1 to 2:1, figure 1A). Post-treatment histology verified healing of the aneurysm neck (full endothelialization and neointimal formation, figure 1A and B). Due to the near complete aneurysm filling, GLP histology verified no thrombus formation, no clot reorganization, no neo-angiogenesis, and minimal inflammation across all survival timepoints.

Conclusion

The canine model was adopted over other models (i.e. rabbit- elastase) because of comparable healing responses to humans, representative blood-flow, similar blood pressure, and vessel sizes that accommodate both large aneurysms and multiple microcatheters. The model and survival timepoints have been approved by the Food and Drug Administration (FDA) for clinical assessment of NeuroCURE®, for which an Investigational Device Exemption (IDE) application is underway.

Disclosures

T. Becker: 1; C; NIH grant # 5R42NS097069-03. W. Merritt: None. N. Norris: 1; C; NIH grant # 5R42NS097069-03. A. Ducruet: 1; C; NIH grant # 5R42NS097069-03.

Abstract P-055

Figure 1

A) continuous neointimal growth across the neck of a canine aneurysm (12-month survival); B) H&E stain showing neck neointimal formation (**) at the dimple created by balloon protection, > 90% aneurysm fill (white intrasaccular area is NeuroCURE), and a stabilized remnant of a microcatheter track inside the NeuroCURE gel (*)

Abstract P-056

Figure 1

Method of obtaining high-resolution coil geometry

Improvised fluid dynamics simulations of coiled cerebral aneurysms using microtomography and homogenization techniques

Hemodynamic changes after aneurysm coiling can be simulated using computational fluid dynamics (CFD) to better predict treatment outcomes. Since the geometry of the coil mass is not visible using conventional imaging, most CFD simulations represent coils as a simplified, uniform porous medium. This