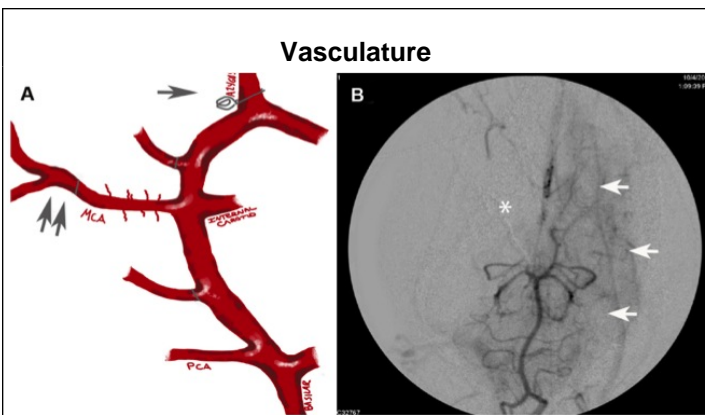


Introduction

Stroke remains a colossal problem worldwide. Despite the advances in medical technology only 4% of strokes are treated, making it the fourth leading cause of death. Several round table discussions have been held with industry leaders and consistently it has been recommended that large animal stroke studies are needed to evaluate new treatments.

Methods

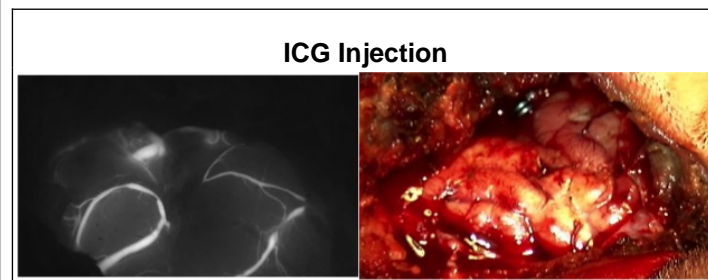
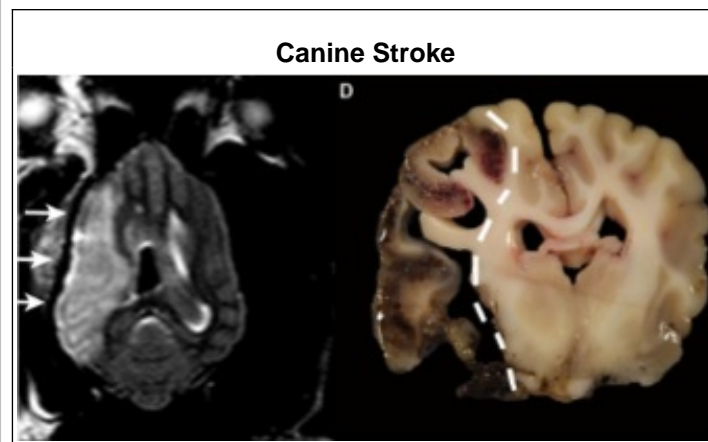
Twenty adult male Beagles were used in our study. We compared endovascular, combined endovascular/surgical and purely surgical methods for developing our model. A surgical approach modified from Yanaka et al, 1996 was used. Briefly, a pterional craniotomy is performed with drilling of the temporal floor, minimizing retraction on the temporal lobe. The azygous ACA is identified and clipped. The MCA is then identified and coagulated and cut distal to the lenticulostriate vessels. Using indocyanine green we then identify collateral blood flow to the distal MCA which is then occluded through vessel coagulation. After one hour the aneurysm clip is removed and the animals recovered. Neurological examination is then performed based on a modified protocol from Boulus et al.



Results

Our current approach has now been validated in our last 6 animals with no mortality. Stroke is seen on MRI at 24 hours with an average volume of 1469.5 ± 173.62 mm³. This remains stable at one week. The average stroke volume determined histologically at one month is 1763.1 ± 16.8 mm³. Neurological exam consistently demonstrates left sided weakness, neglect, and circling, falling to the left and unstable gait. While weakness improves in some animals the remainder of deficits are persistent in all animals. Average neurological score at 24 hours and one week are 25 ± 3.6

and 18.75 ± 7.9 respectively.



Canine Stroke Clinical Assessment Rating Scale		Neuro Exam	
Day #	0	0	0
Age	10	10	10
Sex	Male	Sex	Male
Weight	15	Weight	15
Temperature	38.5	Temperature	38.5
Heart Rate	70	Heart Rate	70
Respiration	20	Respiration	20
Blood Pressure	120/80	Blood Pressure	120/80
Spinal Reflexes	Present	Spinal Reflexes	Present
Consciousness	Alert	Consciousness	Alert
Orientation	Normal	Orientation	Normal
Motor Function	Normal	Motor Function	Normal
Sensory Function	Normal	Sensory Function	Normal
Autonomic Function	Normal	Autonomic Function	Normal
Neurological Exam	25	Neurological Exam	25
SUBTOTAL SCORE FOR NEUROLOGICAL EXAM			

Conclusions

We have developed a highly consistent and predictable large animal canine stroke model with very low mortality.

References

1. Yanaka KI, Camarata PJ, Spellman SR, McDonald DE, Heros RC. Optimal timing of hemodilution for brain protection in a canine model of focal cerebral ischemia. *Stroke*. 1996 May;27(5):906-12.
2. Boulus AS1, Deshaies EM, Dalfino JC, Feustel PJ, Popp AJ, Drazin D. Tamoxifen as an effective neuroprotectant in an endovascular canine model of stroke. *J Neurosurg*. 2011 Apr;114(4):1117-26
3. Qureshi, A. I., Boulus, A. S., Hanel, R. A., Suri, M. F. K., Yahia, A. M., Alberico, R. A., & Hopkins, L. N. (2004). Randomized comparison of intra-arterial and intravenous thrombolysis in a canine model of acute basilar artery thrombosis. *Neuroradiology*, 46(12), 988-995.