moderate, 1 severe), while 6 (50.0%) ApoE vessel segments had lesions (5 mild, 1 moderate). No lesions occurred in NZW animals. Two-tailed t-tests confirmed lesion occurrence more frequently in model animals ($p < 0.001$). There was no statistical difference in disease occurrence between WHHL and ApoE animals ($p = 0.178$). The observed presence of more advanced disease noted in WHHL rabbits compared to ApoE rabbits was not statistically significant ($p = 0.296$).

Conclusion ICAD can be reliably produced in rabbit models. Mature ApoE rabbits demonstrated less advanced ICAD after short term exposure to a hyperlipidemic diet compared to WHHL counterparts. Further analysis is needed to better characterize development and progression of disease in ApoE rabbits.

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E-020 SUSTAINABILITY IN INTERVENTIONAL RADIOLOGY: ARE WE DOING ENOUGH TO SAVE THE ENVIRONMENT?

¹P Shum*, ^{2,3}H Kok, ^{4,5}J Maingard, ^{5,6}C Barras, ^{4,7}H Asadi. ¹Monash Health, Clayton, AUSTRALIA; ²Interventional Radiology Service, Department of Radiology, Northern Health, Epping, AUSTRALIA; ³School of Medicine, Faculty of Health, Deakin University, Geelong, AUSTRALIA; ⁴Interventional Neuroradiology Unit, Monash Imaging, Monash Health, Clayton, AUSTRALIA; ⁵Department of Radiology, Royal Adelaide Hospital, Adelaide, AUSTRALIA; ⁶South Australian Health and Medical Research Institute, Adelaide, AUSTRALIA; ⁷Interventional Neuroradiology Service, Department of Radiology, Austin Health, Heidelberg, AUSTRALIA

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Learning Objectives Global warming is a pressing issue. Healthcare waste contributes substantially to the world's carbon footprint. With IR playing an indispensable role in contemporary healthcare, the environmental impact of waste generated by IR procedures cannot be underestimated. The purpose of this literature review is 1) To identify waste generated and ways of reducing waste in Interventional Radiology (IR) practice. 2) To understand potential barriers of implementing green initiatives. 3) To quantify the environmental and financial impacts of waste generated and green initiatives. **Materials and Methods** A literature review was performed through electronic search of MEDLINE (PubMed, Ovid, SpringerLink and Wiley Online Library), ProQuest Nursing & Allied Health Source and WorldCat.org databases using keywords 'radiology', 'interventional radiology', 'endovascular', 'recycling', 'waste', 'environment friendly', 'sustainability', 'greening', 'cost', 'climate change', 'global warming' and 'operating theatre'.

Results Greening initiatives include reducing, reusing and recycling waste, as well as strict waste segregation. Interventional radiologists can engage with suppliers to reformulate procedure packs to minimize unnecessary items and packaging. Opened, unused items can be prevented if there is better communication between doctors and support staff and increased awareness of wasted equipment cost amongst staff. Incentives to use soon-to-expire equipment can be offered. Power consumption can be reduced by powering down operating room lights and workstations when not in use, switching to light emitting diode (LED) and motion-activated lighting. Surgical hand wash can be replaced with alcohol-based hand rubs to reduce water usage. Common barriers to improving waste management include lack of leadership, misconception regarding infectious risk, lack of data, concerns about increased

workload, negative staff attitudes and resistance to change. Education remains a top priority to engage all staff in sustainable healthcare practices.

Conclusion Interventional radiologists have a crucial role to make healthcare more sustainable. By making small changes in our practices, rewarding results in terms of financial savings and environmental sustainability can be achieved.

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E-021 EFFECT OF EARLY SANGUINATE® INFUSION ON CEREBRAL BLOOD FLOW TO THE ISCHEMIC CORE IN EXPERIMENTAL MIDDLE CEREBRAL ARTERY OCCLUSION

¹G Christoforidis*, ¹N Saadat, ²M Niekasz, ³S Roth, ¹T Carroll. ¹Radiology, University of Chicago, Chicago, IL; ²Surgery, University of Chicago, Chicago, IL; ³Anesthesiology, University of Illinois at Chicago, Chicago, IL

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Purpose Sanguinate (Prolong Pharmaceuticals, South Plainfield, NJ) is an investigational bio-pharmaceutical blood substitute that facilitates the transfer of oxygen to oxygen-deprived cells and tissues using a bovine PEGylated carboxy-hemoglobin-based oxygen carrier designed to release oxygen in hypoxic tissue. Through its vasodilatory effects at the pial arteriolar level, its ability to deliver oxygen to severely hypoxic tissues, oncotic effect and anti-inflammatory effects, Sanguinate shows promise in slowing the progression of ischemic insult in acute stroke. We hypothesize that Sanguinate improves cerebral blood flow to the ischemic core in the early stages of MCA occlusion (MCAO).

Methods Using an IACUC approved protocol, eight mongrel canines (20–30 kg) underwent angiographically-guided endovascular permanent MCA occlusion. Four subjects received Sanguinate (8 mL/kg) starting 30 minutes following MCA occlusion and four subjects received a similar volume of normal saline (controls). Physiologic parameters pH, PaO₂, PaCO₂, glucose, hematocrit, mean arterial blood pressure, ET/CO₂, temperature and glucose were monitored and kept within physiologic limits. Anesthetics were chosen to minimize cerebrovascular effects. Cerebral blood flow (CBF) was assessed using neutron-activated microspheres (Biopal, Inc, Worcester, MA, USA) at three time points: 1) prior to MCAO, 2) 30 minutes following MCAO and 3) 30 minutes following Sanguinate/saline infusion. Pial collateral recruitment was scored and measured by arterial arrival time 30 minutes post MCAO (immediately prior to Sanguinate/saline infusion) and 30 minutes post Sanguinate/saline infusion. Diffusion-weighted MRI (3T Achieva, Philips Healthcare, Best, Netherlands) was used to assess infarct volume 2 hours following MCAO. CBF values, infarct volumes and arterial arrival time in the control and treatment groups were compared using one-way analysis of variance assuming equal variances with significance defined at the 5% level.

Results Mean infarct volumes two hours following MCAO for control and Sanguinate treated subjects were 2122 mm³ and 2440 mm³ ($p = 0.8173$), respectively. Relative to pre-treatment post-MCAO CBF, CBF measured 30 minutes following Sanguinate infusion increased by a mean of 25.2% whereas in controls CBF increased by a mean of 1.44% following saline infusion ($p = 0.0270$; figure 1). Pre-treatment pial collateral recruitment between treatment and control groups were nearly

identical. Arterial arrival time following treatment decreased by a mean of 0.49 seconds in the treatment group and increased by a mean of 0.12 seconds in the control group ($p=0.0081$).

Conclusion Preliminary results indicate that Sanguinate administered in the early acute phase of ischemic stroke improves CBF to the core infarct zone in experimental MCAO immediately following its administration.

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E-022 **IN VIVO ENDOTHELIALIZATION OF VEGF-COATED STENTS IN A RABBIT MODEL**

¹K Panchendrabose*, ²B Har, ³A Mitha. ¹Biomedical Engineering, University of Calgary, Calgary, AB, Canada; ²Libin Cardiovascular Institute, University of Calgary, Calgary, AB, Canada; ³Clinical Neurosciences, University of Calgary, Calgary, AB, Canada

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Introduction Implantation of cerebral stents are used in several disease conditions. Although stenting procedures offer many benefits, metal stents can elicit acute/subacute thrombosis and increase the chance of stroke. The risk of in-stent thrombus formation significantly decreases after formation of an endothelial cell layer over the stent, which typically takes several weeks to occur. One potential way to reduce the formation of thrombus is through biologic modifications that hasten endothelialization. In past studies, vascular endothelial growth factor (VEGF) has been shown to facilitate the recruitment and proliferation of cells that leads to endothelialization.

Methods In this study, VEGF was coated onto Solitaire stents using polylactic-co-glycolic acid (PLGA). Coated stents were deployed into the infrarenal abdominal aorta of New Zealand White rabbits for 72 hours ($n=5$) (72h VEGF group) and compared to uncoated stents at 72 hours ($n=3$) (72h Control group) and seven days ($n=3$) (7d Control group). Optical coherence tomography (OCT) was performed through the stented portion of the vessel, and representative images taken every five millimetres were used for analysis. Images were analyzed for neointimal area (stent area – lumen area), neointimal ratio ($[\text{stent area} - \text{lumen area}] / \text{stent area}$), minimal and maximal neointima thickness, stent-strut neointima coverage ratio (number of struts covered by a neointimal layer over the total number of struts), as well as thrombus area formation.

The analysis was performed by a cardiologist with clinical expertise in OCT imaging, who was also blinded to group allocation.

Results Post-deployment digital subtraction angiography demonstrated that VEGF-coated stents were deployed similar to uncoated stents, and without any obvious acute thrombus formation. Using two-tailed unpaired *t*-tests, the 72h VEGF group showed significantly higher ($p<0.01$) neointimal area and neointimal ratio compared to 72h Control group. The minimal neointimal thickness of 72h VEGF group was significantly higher ($p<0.05$) than the 72h Control group, but not statistically different from the 7d Control group. There was a trend toward decreased thrombus formation in 72h VEGF group versus the 72h Controls ($p=0.07$). The 7d Controls had significantly higher stent-strut neointimal coverage ratio, neointimal area, neointimal ratio and maximum neointimal thickness compared to the 72h VEGF group ($p<0.05$) and 72h Control group ($p<0.05$).

Conclusion VEGF-coated stents are a promising biomodification to reduce secondary complications that may occur in the initial days following the procedure.

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E-023 **INTRAVENOUS OXYGEN CARRIER THERAPY DELAYS INFARCT SIZE PROGRESSION IN A CANINE LARGE VESSEL OCCLUSION MODEL**

^{1,2}R King*, ¹M Shazeeb, ¹J Kolstad, ¹C Raskett, ³J Winger, ³L Kelly, ¹Z Vardar, ¹A Kraitem, ¹V Anagnostakou, ³A Krtolica, ¹N Henninger, ¹M Gounis. ¹Radiology, University of Massachusetts Medical School, Worcester, MA; ²Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA; ³Omniox Inc, San Carlos, CA

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Introduction Neuroprotective strategies represent a significant opportunity to delay infarct progression in patients suffering a Large Vessel Occlusion (LVO), allowing more time for treatment by mechanical thrombectomy. Oxygen carrier therapy has the potential to deliver oxygen to hypoxic tissues, allowing for a longer window of treatment before cell death.

Methods Twenty-three dogs were used in this study, with an additional 14 historical controls. Autologous clot was injected into the left MCA, confirmed on DSA, and the dog was transferred to a 3T MRI. In order to determine infarct evolution rate, Perfusion Weighted Imaging was performed and relative Time to Peak (rTTP) maps were generated.¹ Based on the initial infarct evolution pathway (slow or rapid progressors), animals were randomized to either receive oxygen carrier or vehicle control. Regardless of evolution pathway, or treatment group, IV bolus was given 45 minutes after clot placement. Following bolus, diffusion weighted imaging (DWI) was performed every 30 minutes to assess infarct evolution. After 5 hours, dogs were removed from the MR, euthanized and the brain was explanted for histological processing. To calculate the true infarct volume, apparent diffusion coefficient (ADC) was calculated from the DWI images, and a threshold value of $0.533 \times 10^{-3} \text{ mm}^2/\text{s}$ was used to differentiate infarct. The predicted final infarct size was taken from rTTP maps as the area with greater than 4.5s delay and used to normalize infarct volume.