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ABSTRACTS

Abstracts Accepted for Oral Presentation at the ESVS Spring Meeting on Vascular Biology and Basic Science

The following abstracts were accepted for oral presentation at the ESVS Spring Meeting on Vascular Biology and Basic Science.

Advantages and Disadvantages of Different Animal Models for Studying Ischemia/Reperfusion Injury of the Spinal Cord

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Introduction: Ischemia and reperfusion injury of the spinal cord are central problems of vascular surgery procedures on the aorta. This might result in paraplegia of the patient. To study this problem animal models are warranted that can imitate clinical situation. As different animal models offer different advantages, but also disadvantages, several models are needed to study I/R injury.
Methods: Our research group gained research experience in several different animal models over the past 12 years. Three animal models were used and examined namely large animal model in pigs, rabbits as a medium animal model and at last also mouse as small animal model. In the large animal model different strains, including genetically modified animals, were examined. In the middle and small animal models only wild type animals were used. The aim in all this models was to establish an experimental setup to study spinal cord ischemia and reperfusion injury.
Results: Large animal models are as close to the clinical situation as a model can be. Organs, blood supply and common physiology are relatively close to humans. This model can even be further pushed by using genetically modified animals suffering from atherosclerosis. Disadvantages are high costs, high personal and work effort, limitation of follow-up period and availability of markers to study special histological issues. Middle sized animal models in rabbits offer the possibility to provoke paraplegia by clamping the infrarenal aorta only. This reduces operating time and work effort. It is possible to investigate animals for several days. The disadvantages is a little marker offer to examine special questions in the laboratory.
Small animal models offer the easiest way to keep animals at low costs for longer time with a high reproduction rate. The offer of markers for laboratory use is the biggest in the market. There is also the possibility to work with knock-out animals. On the other hand clinical situation is far away. Results must be interpret very carefully and often require further studies in larger animal models.
Conclusion: Animal models only can attempt to reflect clinical situation of patients, so several models are needed to investigate it. Each animal model has its own advantages and disadvantages that must be considered carefully before initializing a study. As animal models are very complex new studies should be discussed with experienced researchers to avoid unsuccessful work.

Morphing Control of Steerable Wire Guide Based Electroactive Material for Cardiovascular Surgery Application

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Introduction: Current steerable wire guide used in clinical practice employs a complex mechanism at the handle, where the wire is configured to be pushed or pulled along a longitudinal axis to bend the wire tip. The main drawback of the existing procedure is the time needed to achieve the task, as the control of such architecture is challenging and complicated. For this reason, the goal of our proposed concept involves in developing electric steerable wire guide based electroactive material (Figure 1).
Methods: Electroactive polymers (EAP) are considered as one of the latest flexible actuator's generations enabling to provide new approaches to propulsion and manoeuvrability. The recent advances in the field of EAP consisting a development of all organic composite have been investigated by LGEF's team. The main advantages of the developed polymers are easy preparation, simple process, high strain, and high electro-mechanical activities under relatively moderate actuation voltages, making them appropriate materials for future application in active wire guide. The proposed material probably allows to overcome some of the current technological issues relating to the development and control of the steerable wire guide; for instance, high cost and complex integration of micro-motor, delay response of SMA, etc.
Results: The wire guide (TERUMA Radiofocus Guide Wire M – REF-GA18263M) used in the experiment is a cardiovascular tool with a thin and flexible tip, allowing to manipulate through narrow and curved arteries. The wire guide tip is coated with the electroactive polymer based

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