

## *in vivo* Animal Model for Clot Evaluation

### OBJECTIVE

- Thrombectomy devices are used to treat conditions like Pulmonary thromboembolism, Stroke, and Deep Vein Thrombosis.
- Establishment of new animal models of thrombotic venous occlusion is important for mechanistic and treatment studies.
- *in vivo* clot models are used for evaluation of the efficacy of medical devices for thrombectomy, aspiration catheters, and embolic protection devices.

### CHALLENGES

The challenges in developing a clot model include the ability to:

- Develop a clot with desirable characteristics of consistency and firmness
- Deploy the clot in a desirable location for device evaluation
- Control the volume of the clot
- Keep the clot at the target location for an extended period
- Allow for clot maturation
- Facilitate high throughput so that devices can be evaluated numerous times within a short period of time in the least number of animals to achieve the **3Rs (Reduction, Refinement & Replacement)** and cost savings

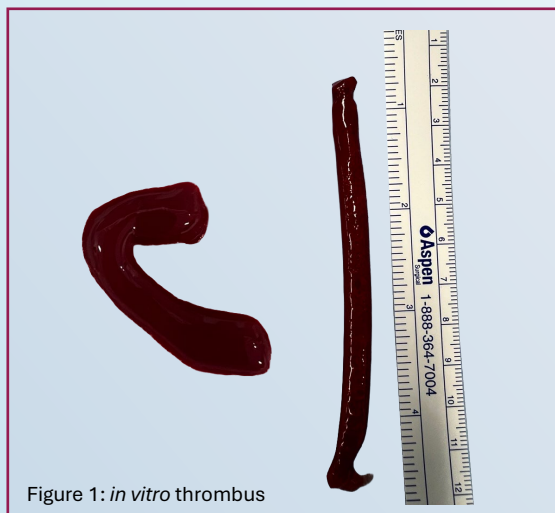


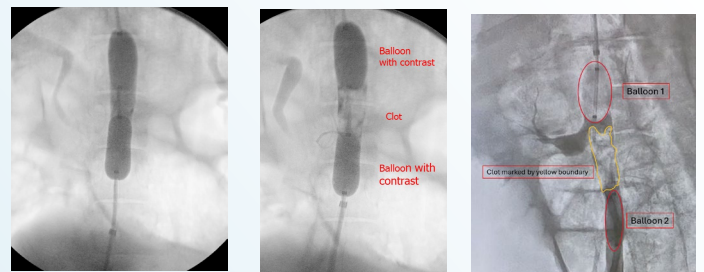
Figure 1: *in vitro* thrombus

### RESULTS

Here we develop a clot model in which is created *ex vivo*. The *in vivo* clot is deployed to the target location in a swine model, such as the inferior vena cava. The clot can be deployed numerous times to evaluate thrombectomy as well as aspiration catheters. The clots were developed by incubating blood with a cocktail of clot ingredients overnight prior to the procedure day. The clots can be delivered efficiently in a matter of a few minutes to the target location. A volume of up to 30cc of clot was deployed into the inferior vena cava (IVC). IVC partial occlusion was confirmed using a venogram. A Thrombectomy device was used to break the clot, and aspiration catheters were to aspirate the clot. The procedure was repeated multiple times to allow for iteration of the device evaluation.

Future studies: This is an acute clot model, and a chronic model needs further exploration.

The clot consistency can be further refined based on the intended clot characteristics.



### CONCLUSIONS

- A large animal acute clot model was developed for efficacy evaluation of the thrombectomy and aspiration catheter devices.
- Clot model can be developed fast, efficient and cost-effective manner without the use of expensive commercial clotting agents.
- The model is repeatable and can be expanded for various target locations.

