FIRST TIME DATA RELEASE: Impact of stent structure on venous flow

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LINC 2020

Disclosure

I have the following potential conflicts of interest to report:

- Receipt of grants/research support

  Medtronic, BD BARD, Cook, Ab medica, Bentley, Optimed, Boston Scientific

- Receipt of honoraria and travel support

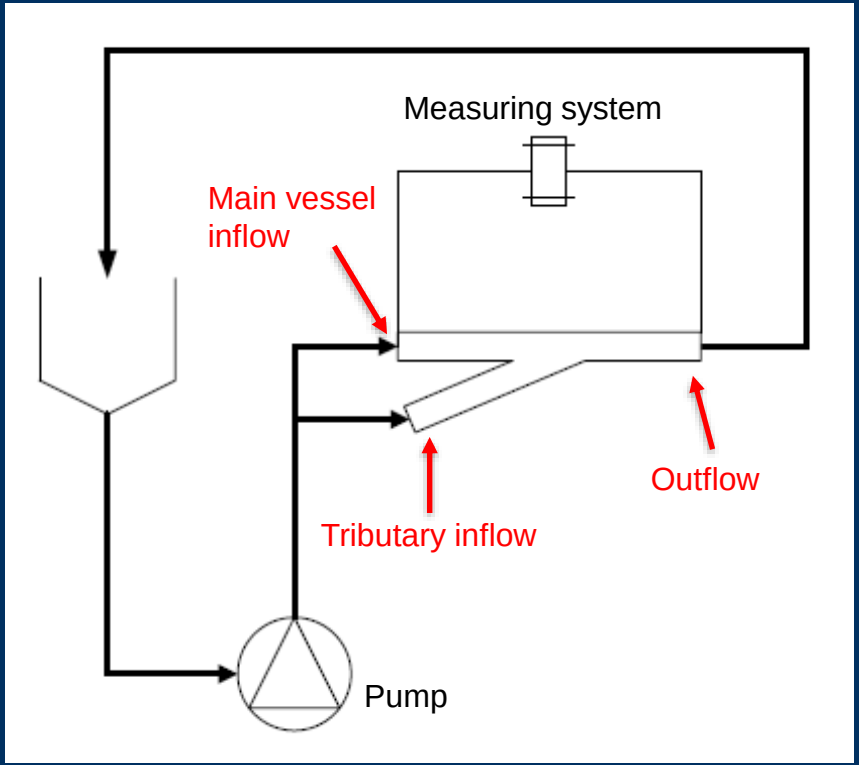
  Medtronic, BD BARD, Cook, Ab medica, Bentley, Optimed, Boston Scientific

Objectives

- Impact of cross sectional area reduction on pressure drop (Δ P mm H_2O)
- Impact of length of stenosis on pressure drop
- Impact of the stent diameter on pressure drop
- Impact of stent on tributaries pressure drop after jailing

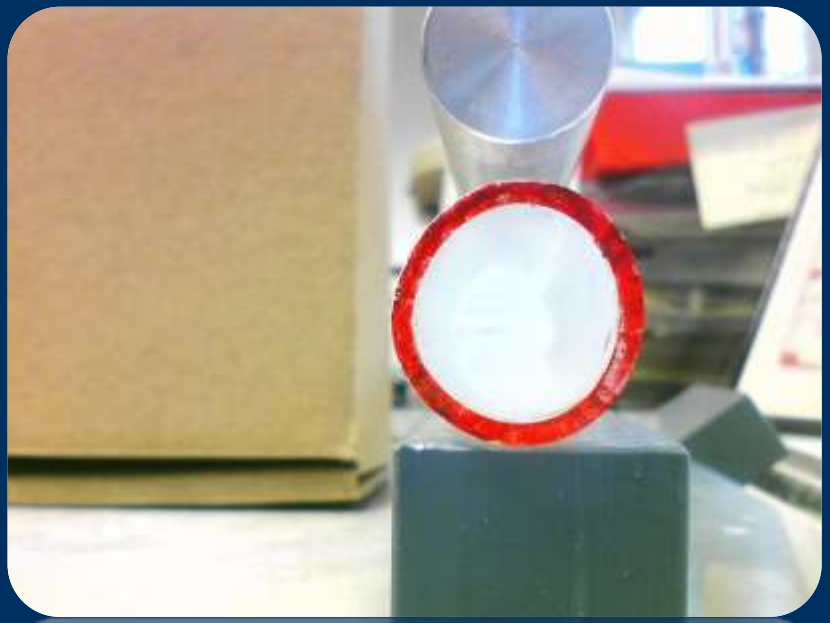
Materials

- Tube material: silicon (1mm, soft, transparent)
- Tube diameter: 12 & 14 mm
- Fluid: water & blood (porcine)
- Type of stenosis: spherical & cylindrical
- Pump: rotary pump (more venous like**)**
- Stents: 4 dedicated venous stents have been evaluated till now



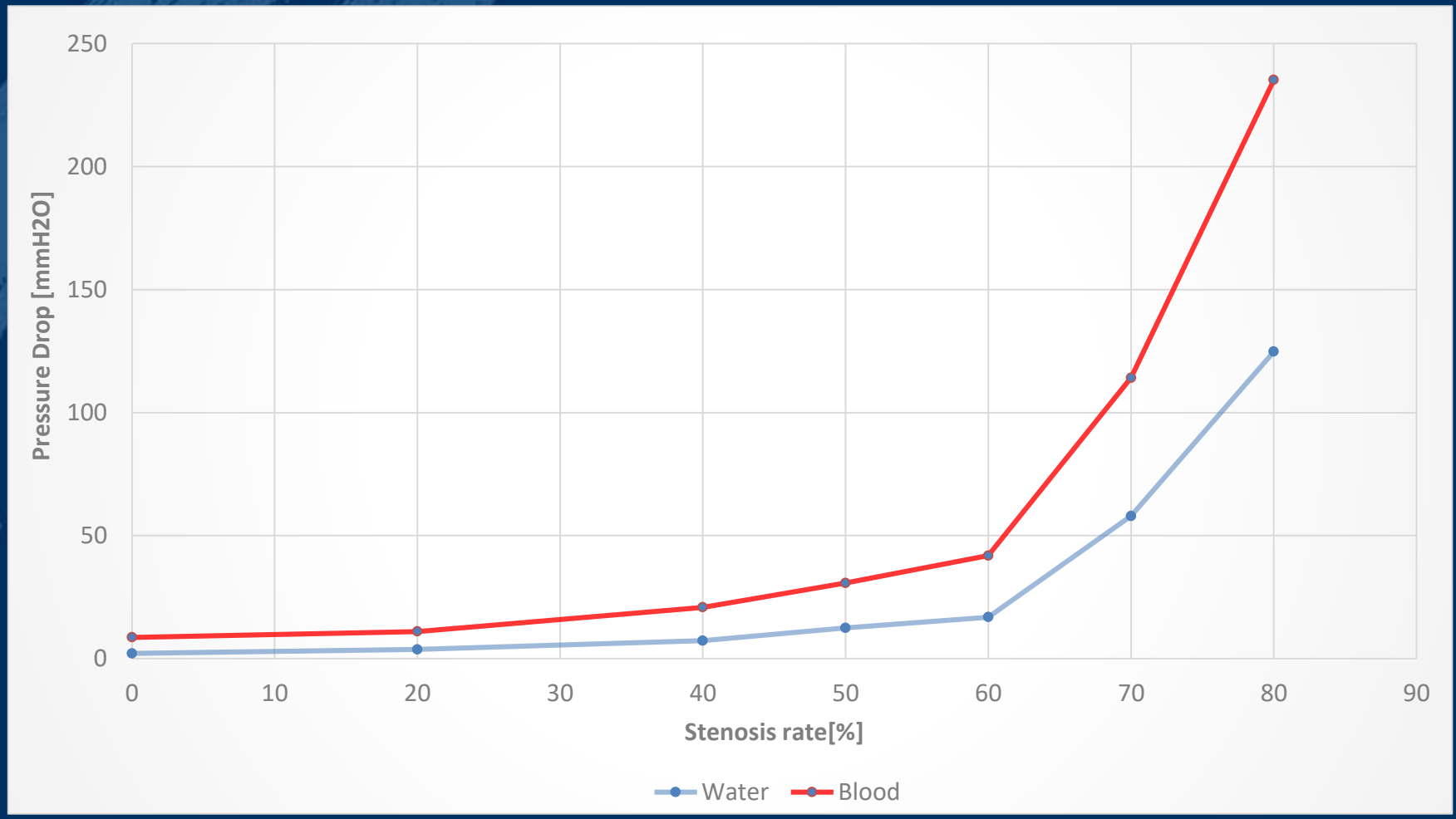
Experiment

- Tube 12mm: reduction of cross section area using ImageJ software

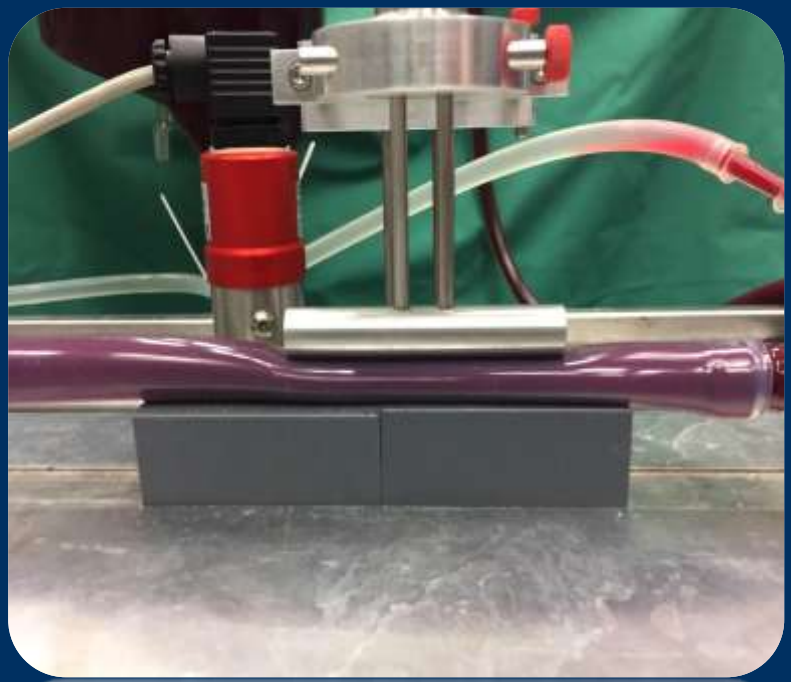


- Tube 12 mm
- Fluid: Blood & Water
- Stenosis: Cylindrical (7 cm)
- Flow: 1.5 L/min

Impact of stenosis rate

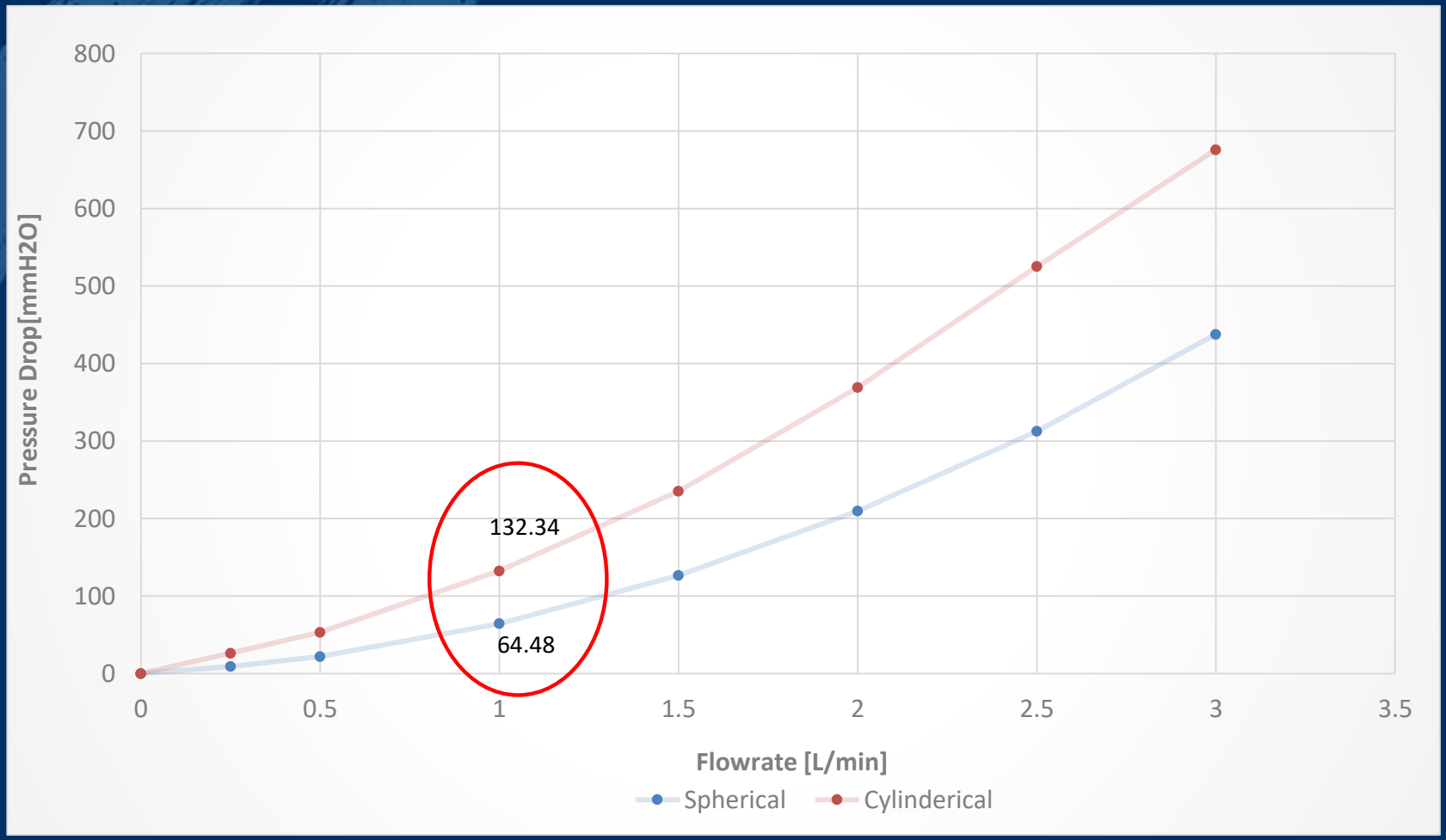


Spherical and cylindrical stenosis



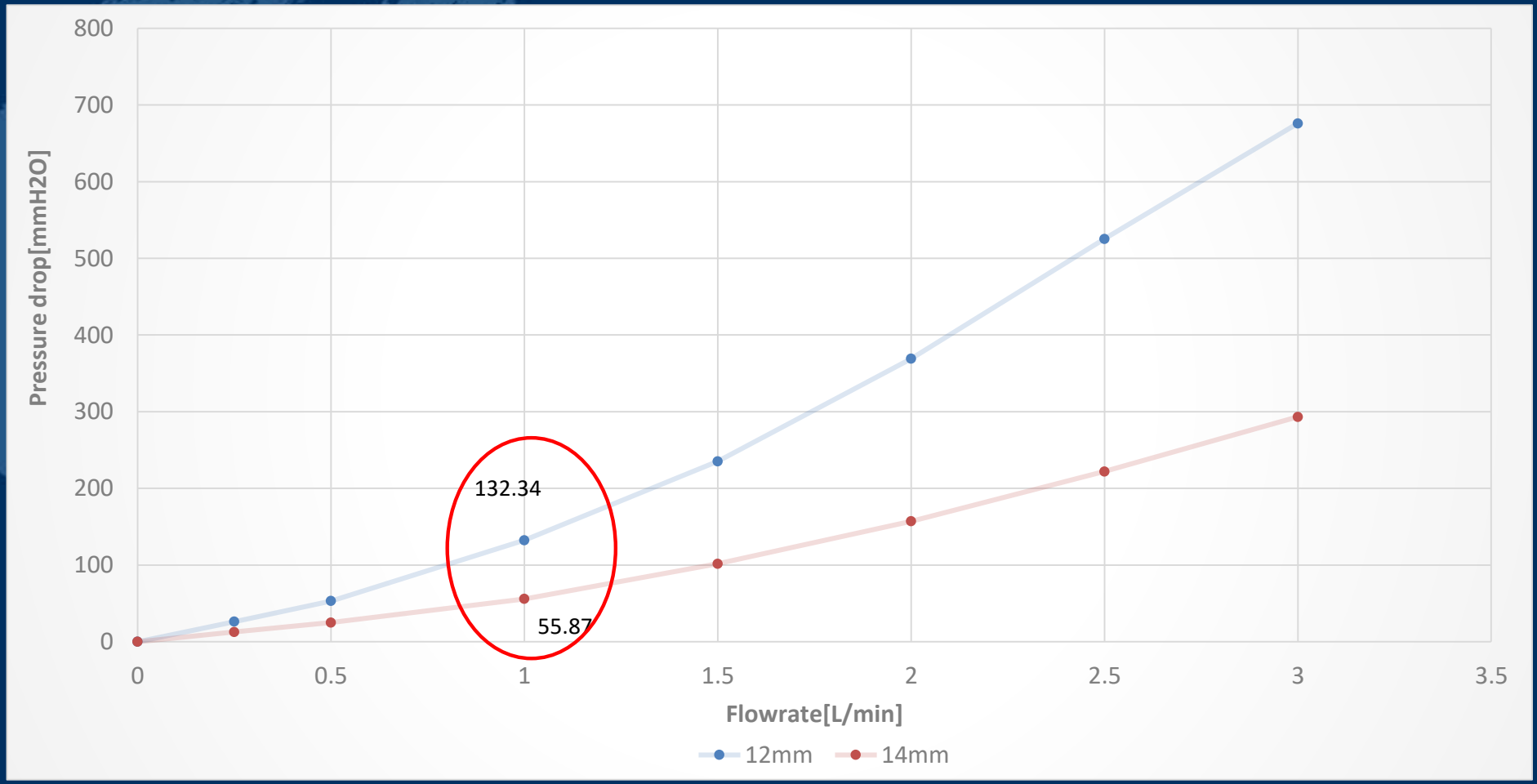
- Tube 12 mm
- Fluid: Blood
- Stenosis: Cylindrical & Spherical (7 cm)
- Stenosis Rate : 80%

Impact of stenosis length



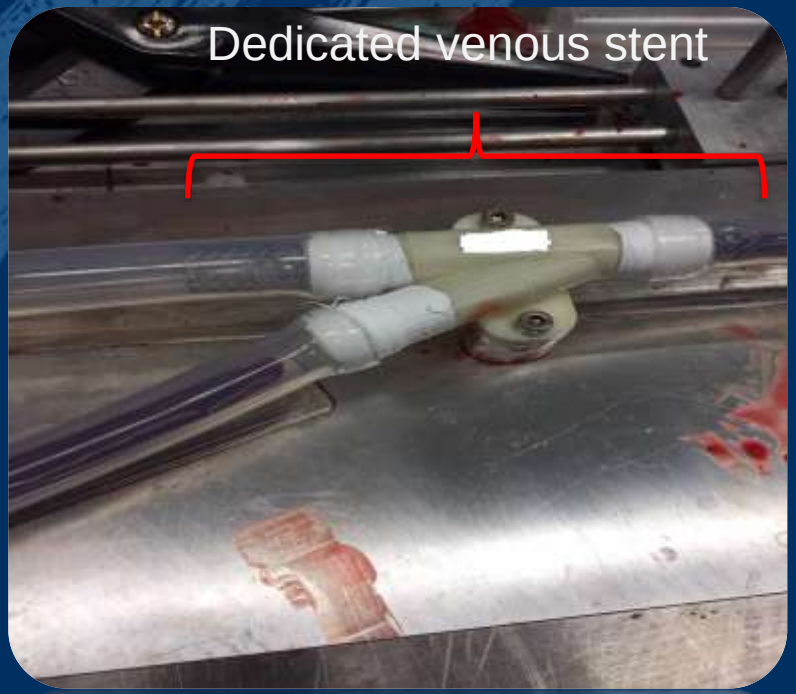
- Ø Stent 12 mm & 14 mm
- Fluid: Blood
- Stenosis: Cylindrical
- Stenosis Rate: 80%

Impact of stent diameter



Impact of stent on tributaries

Experiment

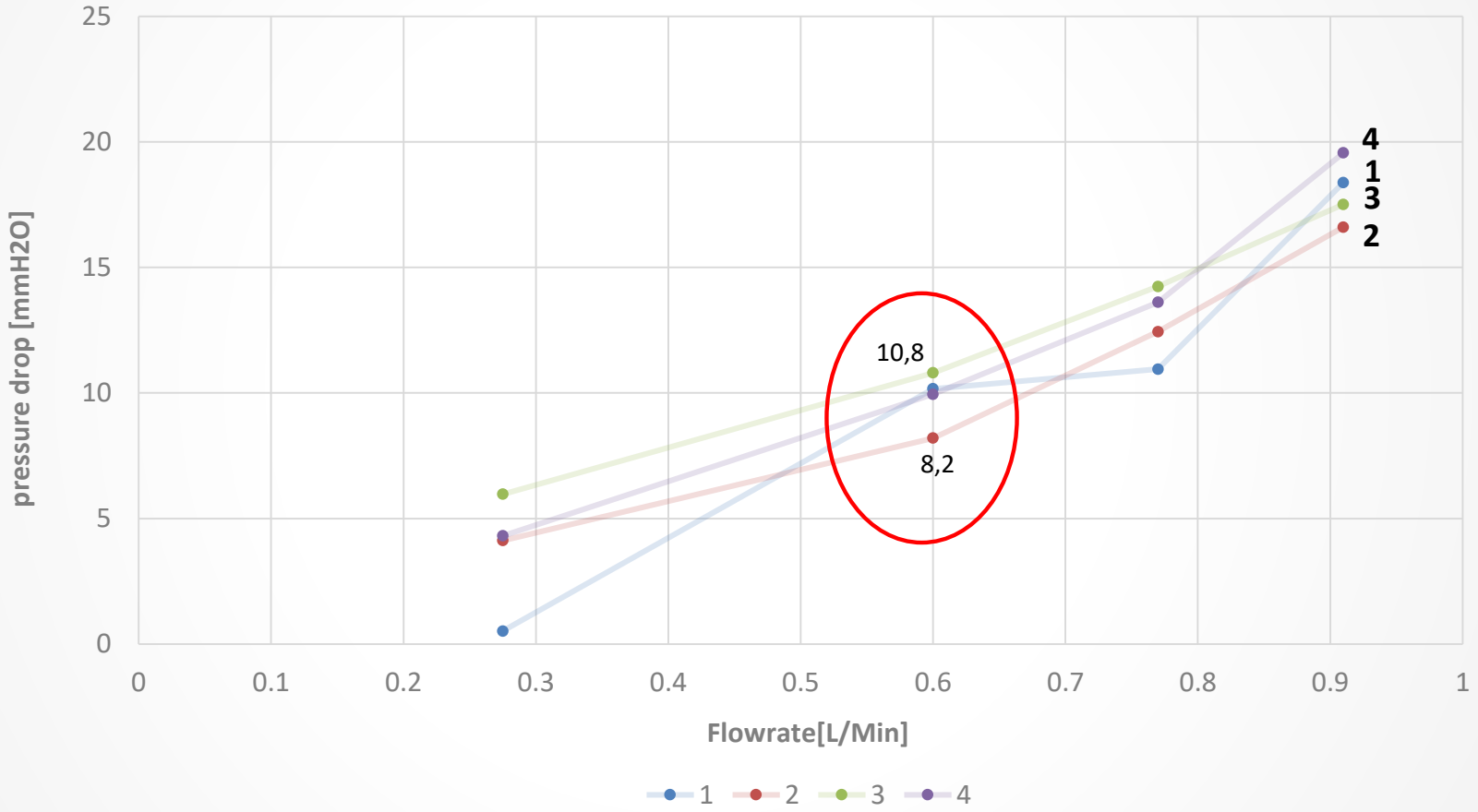


Test with physiological solution

Test with blood

Red arrows showing points of measurments

Impact of stent on tributary



Venous stent: 1, 2, 3 and 4

Diameter: 14 mm , **Length**: 100 mm

Fluid: blood, **Hematocrit value**: 37.9%

Flow: different flows in main vessel (L/min), **Flow in tributary**: 75% of main vessel flow

Conclusion

- There is a clear and significant impact of area reduction on delta P
- There is a clear and significant impact of the length of stenosis on delta P
- There is a clear and significant impact of the stent diameter on delta P
- There is a difference between the impact of stent design on delta P after overstenting of a tributary, but its clinical translation remain unclear

Thank you very much

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