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### **Myocardial PtiO<sub>2</sub> Is The Most Reliable Variable To Assess Coronary Artery Stenosis With High Potential For Clinical Application**

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*Abstract:*

**Background]** A patient of effort angina who had 75% stenosis at #7 with high FFR 0.85 underwent PCI. Since PCI he has had no chest pain.

**Purpose]**To find a more reliable variable to assess coronary artery stenosis (CAS), animal experiments were conducted to cover three variables – coronary artery blood flow (Flow), myocardial PtiO<sub>2</sub> (PtiO<sub>2</sub>) and FFR. These variables were compared with each other to find the most reliable one among three. This study was approved by Clinic's ethical committee and all procedures were performed in accordance with the Declaration of Helsinki of the World Medical Association.

**Method]** In twelve pigs, vascular occluders and vascular flow meters were set at #6 and/or #7 and #11 and/or#13. PtiO<sub>2</sub> sensor wires were inserted into the anterior and lateral wall transeptically. FFR sensor wires were placed across the LAD and LCX stenosis. All of the data were analyzed by a paired t-test and receiver operating characteristic (ROC).

**Results]** Flow(ml/min): normal  $54.23 \pm 5.24$  and 50%  $27.88 \pm 5.53$ ,  $p < 0.0001$ ; sensitivity(sen.) 1.00, specificity(spe.) 1.00, accuracy(acc.) 1.00 by ROC 38.9. 50% and 75%  $17.60 \pm 6.06$ ,  $p < 0.0001$ ; sen. 0.92, spe. 0.83, acc. 0.88 by ROC 21.8. PtiO<sub>2</sub>(mmHg) : normal  $54.91 \pm 6.44$  and 50%  $27.87 \pm 3.40$ ,  $p < 0.0001$ ; sen. 1.00, spe 1.00, acc. 1.00 by ROC 32.1. 50% and 75%  $16.85 \pm 2.73$ ,  $p < 0.0001$ ; sen. 0.92, spe. 0.92, acc. 0.92 by ROC 21.7. FFR: normal  $0.97 \pm 0.01$  and 50%  $0.89 \pm 0.06$ ,  $p < 0.0001$ ; sen. 0.92, spe. 1.0, acc. 0.96 by ROC 0.96. 50% and 75%  $0.83 \pm 0.04$ .  $p < 0.0002$ ; sen. 0.75, spe. 0.75, acc. 0.75 by ROC 0.86. As the results PtiO<sub>2</sub> was the most reliable variable to assess CAS among three.

To confirm clinical application of PtiO<sub>2</sub> , animal experiments of its via coronary artery measurement were performed in ten pigs. 0.5 mm transeptical sensor wires were stuck on the tip of an upside down 0.014 inch guiding wire. The guiding wires perforated LADs and were pushed into myocardium to measure PtiO<sub>2</sub> (normal  $55.54 \pm 3.57$ , 50%  $28.08 \pm 2.48$ , 75%

17.1±2.85). These data had no significant differences from the transepicardially measured data described above. A leak of contrast agent through a tiny perforation had expired in fifteen minutes.

Conclusion] These results proved PtiO<sub>2</sub> was the most reliable variable with high potential for clinical application to assess CAS.