Non-invasive cerebral oxygenation might reflect global perfusion and hemodynamic conditions

Costa D., Boa A., Coimbra L.
Centro Hospitalar de Vila Nova de Gaia/Espinho EPE
Anaesthesiology Department

BACKGROUND: Transcatheter aortic valve implantation (TAVI) emerged as minimally invasive treatment for aortic stenosis in high surgical risk patients. Near-infrared spectroscopy (NIRS) is used for noninvasive monitoring of cerebral oxygenation and may reflect global perfusion and hemodynamic conditions in critical patients.¹

IDENTIFICATION: 68 years old female; ASA IV; medical past of valvular aortic stenosis, poor ventricular function and renal chronic disease

CASE REPORT:

- ❖ Admitted at intensive care with cardiogenic shock
- ❖ Transesophageal echocardiography (TE) confirmed progression of the aorta stenosis (LV/AO gradient 79/49), LVEF 23% and thrombus on left ventricle
- ❖ Aortic valve replacement was refused due to EUROSCORE II
- ❖ Patient was submitted to life-saving percutaneous aortic balloon valvuloplasty, despite contraindications
- ❖ Owing to the improvement on hemodynamics and echocardiographic (LV/AO gradient 40/13) it was decided to proceed urgently to TAVI with a filter in aortic arch and TE
- ❖ Intervention was performed under general anesthesia with traqueal intubation. Monitoring was held with ASA standard, invasive arterial pressure, BIS® and bihemispherical NIRS (INVOS®). Initial NIRS (left/right hemisphere) was 15/14, blood pressure 112/72mmHg and saturation 95%. In order to achieve the endpoint of 60% on cerebral oximetry, regardless hemodynamic and respiratory values, vasopressor/inotropic was started and adjustments on ventilator parameters were made
- ❖ During the implantation of valve Edwards Sapiens 3® 26mm, hemodynamic stability was reported with surprisingly good recover after rapid ventricular pacing and a remarkable enhancement of more than 250% of the baseline of NIRS
- ❖ Discharge was 11 days after, patient was on class I/IV NYHA without major neurologic deficits

Fig.1 – Thrombus on left ventricle

Fig.2 – Enhancement of more than 250% of the baseline of NIRS

Fig.3 – Implantation of the valve

DISCUSSION: Tissue hypoxia occurs frequently in the perioperative setting. Therapy to optimize oxygenation should be directed to specific goals.

LEARNING POINTS: NIRS provides real-time information about regional cerebral oxygenation and it enables monitoring of therapeutic interventions. Regional saturation of O₂ can reflect the cardiopulmonary function despite cerebral autoregulation mechanisms.

REFERENCES

- 1 - ¹Paarmanna H. et al. Noninvasive cerebral oxygenation reflects mixed venous oxygen saturation during the varying haemodynamic conditions in patients undergoing transapical transcatheter aortic valve implantation. Interact CardioVasc Thorac Surg 14 (2012) 268-272