Direct Intrapulmonary Injection of Iloprost in the Pulmonary Artery for Testing Vasoreagibility in Pulmonary Hypertension

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Introduction:
Diagnosis of severity of pulmonary hypertension (PH) requires right heart catheterization; gold standard for vasoreagibility testing is the use of pulmonary vasodilators. We present results of our test protocol and offer the alternative of direct intrapulmonary application of Iloprost.

Methods:
Retrospective analysis of 33 patients (23 female, mean age 15.1 ± 11.9 years, mean BSA 1.7 ± 2.8 m²) with PH who required invasive vasoreactivity testing between 2007 and 2013. Our standard protocol consisted of baseline measurements, followed by application of 4 l oxygen, then added 40 ppm iNO and thereafter applied Iloprost directly into the pulmonary artery (PA). All investigations were performed under deep conscious sedation. Underlying conditions were congenital shunt lesions (n=22), patients after corrective surgery (n=8) or suspected primary PH (n=3). In 24 patients testing was done with oxygen, iNO and intrapulmonary Iloprost. 4 patients did not receive iNO, and 5 no oxygen because of oxygen dependency. Standard measurements were obtained and pulmonary vascular resistance (PVR) and cardiac output (CO) were calculated.

Results:
The PVR at baseline was 15.2 ± 9.4 WU*m² and could be reduced by oxygen to 13.4 ± 10.0 WU*m² (p=0.002), by iNO to 8.0 ± 3.6 WU*m² (p<0.001) and by Iloprost to 6.8 ± 7.1 WU*m² (p<0.001). The comparison between Iloprost and iNO and oxygen as well as oxygen and iNO was also statistically significant (p<0.001). The CO rose from 4.4 ± 2.3 l/min at baseline to 4.8 ± 2.6 l/min after oxygen (p=0.814), to 5.2 ± 2.0 l/min after iNO (p=0.476) and to 6.4 ± 3.0 l/min after intrapulmonary Iloprost (p<0.001). The comparison between CO after oxygen and iNO application did not gain any significance (p=0.495) but the comparison of CO after Iloprost and iNO or oxygen (p<0.001) did.

Conclusion:
Iloprost did effectively reduce the RVP and raise the CO in our patients with pulmonary hypertension even after maximal application of oxygen and iNO. The intravenous application of Iloprost in the PA is certainly as effective as the inhalative application in testing vasoreactivity of the pulmonary circulation and it is much easier to use.