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Title: Acute vasoreactivity testing with sildenafil vs nitric oxide in patients with PAH

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Body: Introduction: Vasoreactivity testing with inhaled nitric oxide (iNO) is recommended in patients with pulmonary arterial hypertension (PAH) because of therapeutical and prognostic implications. Sildenafil is a promising agent for acute vasoreactivity testing since it is more stable and easier to handle than iNO. But it is not known if the acute responses to sildenafil and NO are equal. Objectives: The aim of this study is to compare acute vasoreactivity in response to sildenafil vs iNO in patients with PAH. Methods: In this retrospective, open-label, and single-centre study we included all patients who were admitted to our adult pulmonary hypertension unit from 2002 to 2011, met the criteria for PAH, and underwent vasoreactivity testing with iNO and sildenafil. Results: 198 patients were included. 9.6% of the patients met the responder criteria (as defined by the current guidelines) for iNO and 11.6% for sildenafil. Intra-individually, the responses in mPAP and cardiac index (CI) after sildenafil and NO administration correlated ($r_{mPAP} = 0.516$, $p < 0.001$, $r_{CI} = 0.521$, $p < 0.001$). At mean there was a significantly higher CI after sildenafil than after iNO application ($CI_{NO} = 2.40 \pm 0.69 \text{ l/min/m}^2$; $CI_{sildenafil} = 2.56 \pm 0.76 \text{ l/min/m}^2$). Applying the current response criteria, the sensitivity to detect NO-responders by sildenafil vasoreactivity was 81.3%, the specificity was 94%, the positive predictive value was 56%. Conclusions: In PAH patients the vasoreactive response to sildenafil is stronger than to iNO. The intra-individual vasoreactive responses to both drugs correlate. The sensitivity to detect NO-responders by using sildenafil for vasoreactivity testing was moderate, but the positive predictive value was low.