

Haemodynamic effects and potential clinical implications of inhaled nitric oxide during right heart catheterization in heart transplant candidates

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Abstract

Aims Right heart catheterization (RHC) is indicated in all candidates for heart transplantation (HT). An acute vasodilator challenge is recommended for those with pulmonary hypertension (PH) to assess its reversibility. The effects of inhaled nitric oxide (iNO) on pulmonary and systemic haemodynamics have been reported only in small series. Our purpose was to describe the response to iNO in a larger population and its potential clinical implications.

Methods and results From 210 RHC procedures performed between 2010 and 2019, vasodilator challenge with iNO was used in 108 patients, of which 66 had advanced heart failure undergoing assessment for HT (55±11 years old; 74.2% male gender; 43.9% ischaemic cardiomyopathy; left ventricular ejection fraction $28.4 \pm 11.4\%$; and peak VO_2 12.1 ± 3.0 mL/kg/min). iNO was administered through a tight-fitting facial mask regardless of baseline pulmonary pressures. Clinical endpoints (all-cause mortality and acute right heart failure) were assessed according to baseline haemodynamic findings over the available follow-up period. There were no side effects from iNO administration. Typical response consisted of a reduction in pulmonary vascular resistance, consequent to an increase in left ventricular filling pressures, no significant change in mean pulmonary artery pressure (resulting in a lower mean transpulmonary gradient) and a mild increase in cardiac output. Pulmonary arterial compliance increased significantly, whereas systemic vascular resistance was only mildly affected. In five cases (7.6%), pulmonary vascular resistance increased paradoxically. All-cause mortality and post-HT right heart failure events were overall low and similar in patients without PH or reversible PH.

Conclusions Vasodilator challenge with iNO is safe in advanced heart failure patients undergoing RHC prior to HT listing. It produces a reasonably predictable haemodynamic response, which occurs predominantly at the pulmonary circulation level. Clinical implications of iNO-induced reversibility may be relevant, but further systematic validation is warranted in larger cohorts.

Keywords Heart failure; Right heart catheterization; Heart transplantation; Pulmonary hypertension; Vasodilator challenge; Nitric oxide

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Introduction

Severe pulmonary hypertension (PH) and elevated pulmonary vascular resistance (PVR) have been considered independent risk factors for post-operative right heart failure (RHF) and

early death after heart transplantation (HT).^{1–5} Therefore, right heart catheterization (RHC) should be performed on all patients being considered for HT. Also, the extent of PVR reversibility with pulmonary vasodilators predicts better outcomes in candidates for HT, provided that systemic

Haemodynamic Effects Of Nitric Oxide

**Henry Liu, Alan D. Kaye, Jonathan S.
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Haemodynamic Effects Of Nitric Oxide:

The Haemodynamic Effects Of Nitric Oxide Tudor M Griffith, Robert T Mathie, 1999-08-30 Since the discovery of nitric oxide as an endothelium derived relaxing factor in 1987 investigations on its precise modes of action have been carried out at an extraordinary rate Nitric oxide is now implicated in many physiological and pathological processes not just in the control of vascular resistance but in nerve transmission cell proliferation inflammatory responses and so on Despite such rapid progress no attempt has been made to combine the current knowledge of this subject matter in a single textbook This volume has been written with the above in mind and presents a topical comprehensive overview of the biochemistry and the physiological and pathophysiological effects of nitric oxide as they relate to the cardiovascular system The therapeutic implications of nitric oxide are also considered The text comprises contributions from many of the leading international authorities on the topic including Professor L J Ignarro winner of the 1998 Nobel Prize in Physiology or Medicine

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Abman, David H. Rowitch, William Benitz, 2021-07-29 Offering the comprehensive authoritative information needed for effective diagnosis treatment and management of sick and premature infants Fetal and Neonatal Physiology 6th Edition is an invaluable resource for board review clinical rounds scientific research and day to day practice This trusted two volume text synthesizes recent advances in the field into definitive guidance for today s busy practitioner focusing on the basic science needed for exam preparation and key information required for full time practice It stands alone as the most complete text available in this complex and fast changing field yet is easy to use for everyday application Offers definitive guidance on how to effectively manage the many health problems seen in newborn and premature infants Contains new chapters on Pathophysiology of Genetic Neonatal Disease Genetic Variants and Neonatal Disease and Developmental Biology of Lung Stem Cells as well as significantly revised chapters on Cellular Mechanisms of Neonatal Brain Injury Neuroprotective Therapeutic Hypothermia Enteric Nervous System Development and Gastrointestinal Motility and Physiology of Twin Twin Transfusion Features 1 000 full color diagrams graphs and anatomic illustrations 170 chapters and more than 350 global contributors Includes chapters devoted to clinical correlation that help explain the implications of fetal and neonatal physiology as well as clinical applications boxes throughout Provides summary boxes at the end of each chapter and extensive cross referencing between chapters for quick reference and review Allows you to apply the latest insights on genetic therapy intrauterine infections brain protection and neuroimaging and much more Pediatric Cardiac Anesthesia

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