Abstract

The perioperative management of severe pulmonary hypertension in adult cardiac surgery:

The presence of severe pulmonary hypertension increases the perioperative mortality in patients undergoing cardiac surgery and has been included in the EUROscore model of risk stratification[1]. When pulmonary hypertension occurs with, or causes, right ventricular failure in the immediate postoperative period, haemodynamic management can be particularly challenging. A combination of drugs is usually required in an attempt to facilitate pulmonary vasodilatation whilst maintaining systemic vascular resistance and right ventricular contractility.

Inhaled nitric oxide (iNO) has been used in transplant centres throughout the world, but drug delivery and monitoring is complex and may not be readily instituted in the operating room in centres where, because of caseload and case-mix, it would rarely be required.

There are several case series and reports of the use of other drugs, with apparently good outcomes, which avoid the need for a special drug delivery system. Because of the simplicity of administration, sildenafil, nebulised prostacyclin and nebulised milrinone appear to be attractive options, if they are efficacious[2,3,4].

In order to assess current UK practice with regard to the management of perioperative pulmonary hypertension in adult cardiac surgery, we performed a survey. We were particularly interested to determine if therapies other than intravenous phosphodiesterase inhibitors and iNO had been incorporated into practice.

Methods:

We did an online survey using www.surveymonkey.com. The electronic link to the simple ten question survey was sent to the ACTA linkmen at all UK NHS hospitals performing adult cardiac surgery. The survey was completed in a span of two weeks in the month of January, 2011.

Results:

We received responses from 15 centres. Three centres had transplant programs, 11 did not and data was incomplete in one. This gave a final response rate of 42%, considering there are thirty-six cardiac centres in the UK.

All centres reported using phosphodiesterase inhibitors (milrinone in 86%, enoximone 14%) and monitored patients with pulmonary hypertension using a pulmonary artery catheter. The use of other drugs is displayed in the table below:

Drug	Proportion of responding centres using the drug perioperatively
Inhaled Nitric Oxide	66%
Sildenafil	73%
Inhaled prostacyclin	26%
Intravenous epoprostenol	20%
Intravenous isoprenaline	20%

Inhaled nitric oxide was used intraoperatively in all of the transplant centres but only in two of the other centres. Sildenafil, although used widely in the perioperative period, was used intraoperatively in only two centres. One centre reported using inhaled prostacyclin intraoperatively and a total of four centres used this drug at some time in the perioperative period. One centre reported using inhaled milrinone.

Extracorporeal support may be provided in cases of severe right ventricular failure in eight (53%) centres. Two centres had a guideline or protocol for managing patients with severe pulmonary hypertension.

Conclusion:

Given the low response rate it would be inappropriate to suggest that these findings are truly representative of current UK practice. However one of the most interesting findings was the widespread use of sildenafil, mostly in the postoperative period. This is hardly surprising given its established role in the medical management of primary pulmonary hypertension, its ease of administration and reported efficacy in case series, and its safety profile. It appears to be used infrequently intraoperatively, despite case reports having suggested a possible role in this settling.

Inhaled prostacyclin appears to be less frequently utilised than might be expected, being less complicated to administer than inhaled nitric oxide, although an ultrasonic nebuliser is required for its administration. Inhaled nitric oxide remains standard management in the transplant centres.

The various modalities of treatment for severe pulmonary hypertension and right ventricular failure include optimisation of right ventricular preload, pharmacological support, maintenance of electrical synchrony and optimal ventilator strategy. A flowchart for the management of patients with pulmonary hypertension with or without right ventricular failure is likely to be helpful in this settling similar to the care bundles that are practised in critical care areas[5].

References:

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