Pulmonary Hypertension and Perioperative RV Failure.

Dr Eric Jacobsohn MBChB, MHPE, FRCP

University of Manitoba Department of Anesthesiology and Section of Critical Care, and WRHA Cardiac Sciences Program

1. Describe the newest classification system (Dana Point) for pulmonary hypertension (PH);
2. Discuss the clinical findings, diagnosis and treatment of patients with PH;
3. Determine factors that cause perioperative decompensation in PH;
4. Describe the physiology of RV function and factors that cause acute RV decompensation;
5. Discuss prevention and treatment of RV decompensation.

PH is increasingly being diagnosed preoperatively. There are now effective advanced treatments for these patients. Patients with PH are at high risk for perioperative decompensation; there are many physiological aberrations that occur in this period that may exacerbate PH. There is a high morbidity and mortality in the perioperative period. However, this can be reduced with a complete understanding of the pathophysiology and treatment options in PH and acute RV failure, including novel perioperative techniques such as selective PA vasodilator therapy.

1. The Dana Point Classification identifies 5 major categories in PH;
2. Patients should be seen by a PH clinic familiar with advanced PH therapy;
3. Anesthesiologists should be familiar with the indications and side effects of the drugs used in advanced therapy;
4. Perioperative decompensation and acute RV failure/RV shock are major risks;
5. Factors leading to preoperative RV decompensation are often predictable and preventable;
6. Prevention and managing RV failure involves balancing the hemodynamic variables of the RV (rate, rhythm, correct preload, minimizing RV afterload, and optimizing RV contractility), and maintaining the transeptal gradient (TSG);
7. Inotropes, vasopressor and anesthetic agents/techniques have variable effects on the TSG;
8. The choice of anesthetic/technique and vasopressor/inotrope has to balance the systemic and pulmonary effects, so as to minimize deleterious effects on the TSG;
9. If RV shock develops, the onset of multi-organ system failure (MOSF) is more rapid than “equivalent” reduction in cardiac output and blood pressure due to LV failure (as a result of the severe venous congestion associated with the high CVP);
10. Rapid correction of RV shock is required to prevent MOSF, and in selected cases, mechanical support may be required;
11. In some patients with severe PH, the perioperative care should involve an experienced team-approach, preferably in a high-volume center.

Patients with PH should be identified well in advance of elective surgery. Their long-term medical management strategy, surgical options, and perioperative plan should be carefully planned. With judicious perioperative management, complications can be minimized. Advanced supportive therapies may be required in some patients. MOSF develops rapidly in the setting of RV shock.

1. Are there effective ways to administer phosphodiesterase inhibitors such as sildenafil other than the oral route in the perioperative period?
2. Further delineating the effect of vasopressin on pulmonary artery vasopressin receptors.
References: