Pulmonary Arterial Catheterization Through a Persistent Left Superior Vena Cava

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Pulmonary arterial catheterization has proven useful in the management of patients who have a variety of illnesses, including myocardial infarction, shock from various causes, and respiratory failure, and during anesthesia.

This case is presented as a demonstration of a rare and previously unrecognized cardiac anomaly discovered in such a patient at the time of Swan-Ganz catheterization.

REPORT OF A CASE

A 51-year-old man was admitted with an acute abdomen of one day's duration. The principal feature of his past history was a series of episodes of atrial flutter, diagnosed as the Lown-Ganong-Levine variant of the ventricular pre-excitation syndrome. At the time of admission, medications included propranolol, 60 mg, four times per day, digoxin, 0.25 mg, three times per day, and diazepam, 5 mg, at night.

A diagnosis of superior mesenteric arterial embolus was established at laparotomy. Infarcted bowel was resected. During closure of the abdomen, atrial flutter suddenly developed, with a rapid ventricular response and hypotension. The arrhythmia could not be corrected with propranolol, 4.0 mg, or digoxin, 0.125 mg, iv, but reverted to a sinus rate of 100/min after external DC countershock of 50 joules. Hypotension responded to a dopamine infusion, and the patient was taken to the intensive care unit for postoperative care.

At the time of the patient’s admission to the intensive care unit, systemic blood pressure was 130/90 torr at a ventricular rate of 110/min with infusion of dopamine at 15 μg/kg/min. A 7F Swan-Ganz catheter was introduced through the right internal jugular vein. Catheterization of the left pulmonary artery was achieved after some difficulty in entrance and transit through the right ventricle. The post-catheterization anteroposterior roentgenogram of the chest (fig. 1) demonstrates the path of the catheter from the right internal jugular vein to a left superior vena cava, then presumably through the coronary sinus to the right atrium, right ventricle, and into the left pulmonary artery.

Fig. 1. Anteroposterior roentgenogram of the chest, showing passage of the catheter from the right internal jugular vein across to the left superior vena cava, presumably through the coronary sinus to the right atrium, right ventricle, and into the left pulmonary artery.

Fig. 2. Schematic diagram of the left superior vena cava, illustrating the major venous drainage and its embryologic origin.

the left cephalic area into the left duct of Cuvier.3-5

When the left anterior cardinal vein persists and becomes a left superior vena cava, it usually drains through the coronary sinus into the right atrium (fig. 2).3 A left superior vena cava itself confers no known

DISCUSSION

Persistence of the left superior vena cava is an anomaly that has been reported to occur with frequencies of 0.3-0.5 per cent in cadaver series.1,2 This anomaly is usually attributed to persistence of the left anterior cardinal vein, which in early embryologic life drains

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hemodynamic disadvantage, but is frequently associated with other congenital anomalies, especially atrial septal defect, and septal defect with anomalous connections of pulmonary veins. Electrical instability, dysrhythmia, and sudden death in patients with left superior vena cava have also been reported. The absence of the right superior vena cava is rare.

In summary, a relatively uncommon cardiac anomaly, a left superior vena cava, was discovered during Swan-Ganz catheterization. Although a left superior vena cava is not hemodynamically important, it is frequently associated with other anomalies. Electrical instability in association with left superior vena cava is also reported. Coblenz et al. have recently reported two cases where a left superior vena cava was entered from the left. In this case, the left superior vena cava was entered from the right, suggesting absence of the right superior vena cava, a rare event. Those anesthesiologists utilizing pulmonary arterial catheter monitoring in the care of critically ill patients in the operating room or intensive care unit should be aware of this anatomic variant and its associated lesions.

REFERENCES


Orally Administered Dantrolene for Prophylaxis of Malignant Hyperthermia

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Malignant hyperthermia (MH), a condition characterized by a rapid increase in body temperature with or without muscle rigidity, is a rare but often fatal condition associated with anesthesia. There is no simple noninvasive test to identify the susceptible individuals. A history of hyperpyrexia and/or muscle rigidity during previous general anesthesia or a family history of such a condition provides the anesthesiologist with valuable information. Avoidance of potent inhalational anesthetic agents, succinylcholine, and amide-type local anesthetic drugs, and selective use of regional block techniques with ester local anesthetic agents, are the usual acceptable guidelines in the anesthetic management of susceptible individuals.

Dantrolene sodium (Dantrium, Eaton Laboratories), a hydantoin derivative and skeletal muscle relaxant, has been shown to be highly effective in the prevention and treatment of malignant hyperpyrexia in MH-susceptible swine. We have used orally administered dantrolene successfully as a part of the prophylaxis of malignant hyperpyrexia in a susceptible individual undergoing a major gynecologic operation.

REPORT OF A CASE

A 26-year-old white woman (57 kg) was referred to the gynecology service with a pelvic mass. Apart from the pelvic mass, she had been healthy, with no other systemic disorder. She had not had any condition necessitating surgical treatment in the past. Her father had died unexpectedly during a relatively minor operation with general anesthesia at the age of 44 years. It had been his second surgical operation with general anesthesia. Specific details were unavailable. The patient's 8-year-old son had received halothane and succinylcholine for tonsillectomy at the age of 7 years. He had become rigid and hot, cardiac dysrhythmias developed, and dark-colored urine was produced in the postoperative period. He survived the episode after being treated in the intensive care unit for several days. The anesthesiologist diagnosed the condition as malignant hyperpyrexia and issued him a Medic-Alert bracelet.

All available blood relatives of the patient were interrogated and investigated. More than half had elevated resting serum creatine phosphokinase (CPK) values (fig. 1). Many also had histories of unusual muscle cramps, especially in the calf muscles; however, the patient did not have this symptom, and her CPK value was normal. No member of the family except the two already described had ever been exposed to general anesthesia. Since the patient had a significant risk of developing malignant hyperpyrexia during general anesthesia, it was decided to hos-