Introduction: Malfunction of cardiopulmonary bypass machine components is rare but may have devastating consequences. Here we present a case in which a leak developed between the interface of the oxygenator and heat exchanger during AVR. We discuss our management and the results of a brief literature review of this rare or underreported phenomenon.

Case: Our patient is a 70-year-old female with known aortic stenosis that presented to our for elective AVR. Previous TTE demonstrated an aortic valve area of 0.8 cm², a peak gradient of 56 mmHg, and preserved left ventricular function. Her past medical history was also significant for diabetes, atrial fibrillation, hypertension, hyperlipidemia, and renal insufficiency.

On the morning of surgery, general endotracheal anesthesia was induced and followed by an uneventful prebypass period. The AV was then replaced without difficulty. However, during the bypass period, the perfusionist noted blood-tinged water in the tubing of the heat exchanger system. Due to apparent leak, this tubing was disconnected and water from the system, as well as blood samples, were sent for culture because of the potential for contamination. These cultures were later reported as negative. In addition, electrolytes, hemoglobin, and hematocrit remained stable. No hematuria was noted. Before separation from CPB could be achieved, the patient became hypothermic. An attempt was made to use the heat exchanger from the cardioplegia circuit but was unsuccessful. Therefore, the pump was replaced and the patient rewarmed. CPB was terminated and followed by an uneventful postbypass period.

The patient was extubated on POD 0. The remainder of her stay was uneventful and she was discharged on POD 9.

Discussion: Leakage between the membrane oxygenator and heat exchanger interface is rare or underreported. The incidence of emergency oxygenator changeover due to oxygenator leakage is around 1/16219 cases. Signs of water-to-blood leakage may include sudden rise in blood volume, acidosis, decreased hematocrit, and hematuria secondary to hemolysis. Leakage may result in septic shock, multiorgan system failure, and death.

All manufacturers have protocols in place to test heat exchanger integrity. Only 0.1% of manufactured units are found to be defective. Manufacturers also recommend testing for leaks prior to use in the operating room by attaching the heater-cooler to the heat exchanger and allowing water to recirculate for 10 minutes. This method should allow for detection of larger leaks but smaller leaks may be overlooked. In addition, this test is time consuming. Another recently described method involves pressurizing the water inlet side of the heat exchanger to 250 mmHg while the water outlet side of the system is blocked. Any drop in pressure is indicative of a leak.

REFERENCES