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Pulmonary Hypertension and LVAD Updates

In prior protocol updates Maine EMS emphasized individual patient Special Circumstances Protocols for unique patient-specific conditions. Over the subsequent years, the MDPB has approved a number of Special Circumstances Protocols. In the process of discussing and deliberating these individual patient protocols, the MDPB recognized that certain protocols were commonly requested, including protocols surrounding the management of patients suffering complications from Pulmonary Hypertension. This recognition, including health care system investment in the management of patients with complex medical conditions or devices (such as pulmonary hypertension and ventricular assist devices) lead the MDPB to develop protocols specific to these conditions in the 2017 MEMS Protocol update. This process was performed collaboratively with some of the state's current medical specialists in pulmonary hypertension and ventricular assist device management and was undertaken in an effort to disseminate information about these conditions statewide.

Pulmonary Hypertension

Pulmonary hypertension is a disease in which the pulmonary arterial pressures are elevated. There are multiple causes of pulmonary hypertension including heart disease, chronic lung disease and thromboembolic disease/pulmonary embolism. In some patients, the etiology is uncertain. Symptoms of pulmonary hypertension can include shortness of breath, chest pain, and syncope. This is not a disease that will be diagnosed in the pre-hospital setting; however, with expanded long-term, in-home treatments for pulmonary hypertension, it is essential that pre-hospital providers are aware of the condition, its treatment and potential complications of this treatment.

At present, one possible therapy for pulmonary hypertension is a medication called Remodulin. Remodulin is a long-acting pulmonary vasculature vasodilator that needs to be delivered by a pump through a central line. Remodulin is typically provided in combination with oral medications. Increasingly, patients in Maine with pulmonary hypertension are being offered Remodulin therapy through Dr. Joel Wirth's practice in Portland. Dr. Wirth is a pulmonologist whose practice stretches across the entire state. As of the summer of 2017, Dr. Wirth is the only Maine-based physician offering this therapy.

In Dr. Wirth's experience, there are two important considerations for patients with pulmonary hypertension being managed with Remodulin that are highlighted in the 2017 protocol updates:

1) Transport Destination – Patients with pulmonary hypertension managed with Remodulin are complex and commonly require specialty care. Whenever feasible or operationally reasonable, consider transporting patients to the specialty hospital managing their pulmonary hypertension. If operational circumstances or the patient's condition dictate other destinations, please refer to on line medical control.
2) Management of Medication Interruptions – Prolonged disruptions of Remodulin delivery can lead to increased symptoms of pulmonary hypertension. Medication interruptions are rare, but when they do occur, the vast majority of cases are due to loss of central access rather than problems with the pump. In the case of medication interruption due to loss of central access, AEMTs and Paramedics are encouraged to establish IV access and paramedics are asked to verify the patient's medication and dose, then re-initiate the medication through the patient's pump. Remodulin and other IV medications used to treat pulmonary hypertension have a high pH and can cause peripheral vein phlebitis and sclerosis if left running through a peripheral line more than 4 hours. Please alert on line medical control and treating Emergency Medicine staff of the time the medicine was initiated though the peripheral line.

Ventricular Assist Devices

The Maine EMS protocols have historically addressed the management of ventricular assist devices (VADs) in the Brown Section. With the development of a VAD Program at Maine Medical Center and the associated understanding that more patients with end-stage heart failure may be managed by VADs as well as evolution of the devices, the MDPB has worked closely with the VAD Program to update the VAD protocol in the 2017 protocol updates. At present, there are two devices being placed, the HeartMate II Axial Rotary Pump and the HeartWare HVAD Centrifugal Rotary Pump. The protocol focuses on recognizing pump failure by assessing for alarms, listening for pump "hums" (best heard in the left chest) and assessing for signs of hypo-perfusion (such as pallor, diaphoresis, and alterations in mental status). The protocol then helps EMS providers trouble-shoot VAD malfunctions, provides guidance on determining destination into the health care system and finally discusses

HeartMate II Axial Rotary

HeartWare HVAD Centrifugal Rotary Pump

when to perform CPR. The protocol ends with a number of additional pearls for the management of VAD patients.

This protocol was developed with the assistance of the VAD Program Medical Directors at Maine Medical Center and is adopted from the National Association of State EMS Officials' Model Guidelines VAD Protocol.

For further questions, please contact your Regional Medical Director or Maine EMS.