Acute Thrombus in Percutaneous Right Ventricular Assist Device: Utilizing and Creating Real-Time Log Files

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INTRODUCTION

Right ventricle failure (RVF) after left ventricular assist device (VAD) implantation can be a devastating complication if not promptly identified and treated. Percutaneous RVAD is a contemporary, minimally-invasive strategy used to successfully treat RVF, however, adverse events are not absent. We present a case of a patient who developed an acute RVAD thrombus as diagnosed by real-time log files.

CASE PRESENTATION

19-year old female with a history of Adriamycin-induced dilated cardiomyopathy presented in acute decompensated heart failure with refractory cardiogenic shock despite home inotropic therapy

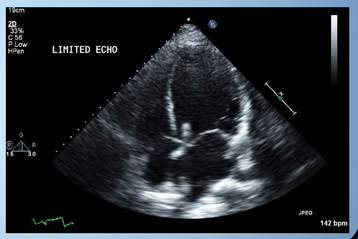

Figure 1: Pre-operative transthoracic echocardiogram. Left Ventricular End Diastolic Diameter was 6.6cm.

OPERATIVE COURSE

She required durable, implantable support as she was blood group O with a BMI of 37 kg/m^2. Intracardiac pressures were as follows: right atrium (9 mmHg), pulmonary artery (47/28), wedge pressure (19), cardiac index 1.6. She underwent implantation of a HeartMateIII® LVAD complicated by intraoperative RV failure. A percutaneous ProtekDuo® RVAD, via right IJV, was implanted for durable mechanical support.

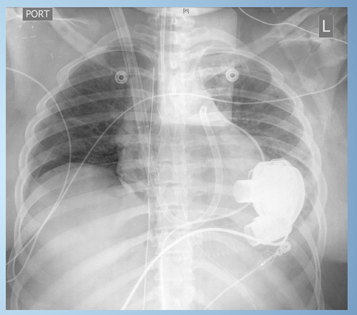

Figure 2: Post-operative chest x-ray with HeartMateIII® LVAD and ProtekDuo® RVAD

POST-OPERATIVE COURSE

On POD10, in anticipation of removal, the patient's RVAD was temporarily turned down (Fig. 3). Hemodynamics and LVAD parameters remained unchanged. Several hours after re-initiation of the RVAD to its baseline speed, decreased flow and multiple power spikes were noted on the device console. LDH and free hemoglobin were elevated, 757 U/L and 40 mg/dL respectively, and INR was 2.4. Device log-files were created in real time for further review and clearly demonstrated an inverse relationship in device flow and line pressure highly suspicious for device thrombus. The RVAD was removed and a large thrombus was found within the cannula. The patient's remaining hospital course was unremarkable, and she was discharged with LVAD support.

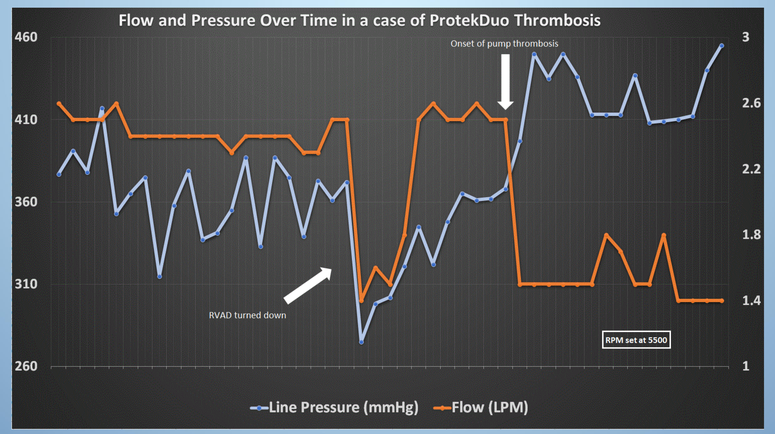

Figure 3: Post-operative flow and pressure over time in a case of ProtekDuo® Thrombosis

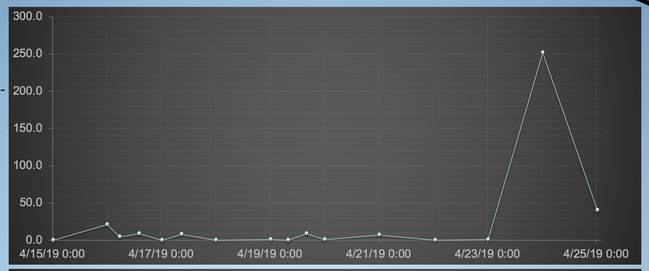

Figure 4A: Post-operative Free Hemoglobin in a case of ProtekDuo® Thrombosis

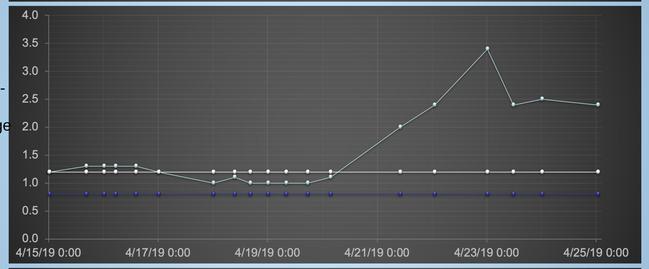

Figure 4B: Post-operative INR with normal range in a case of ProtekDuo® Thrombosis

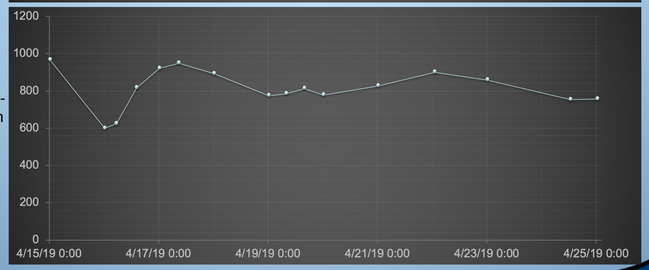

Figure 4C: Post-operative LDH in a case of ProtekDuo® Thrombosis

SUMMARY

The creation of a log-file in patients supported with a percutaneous RVAD is easily done utilizing real-time data collection from the device console. Utilization of this information is critical when diagnosing device thrombus. Urgent treatment includes removal of the cannula if physiologically possible.