PVDOMICS: Right Heart Catheterization

Cardiovascular Physiology Core
Cleveland Clinic, Cleveland OH
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NHLBI Pulmonary Vascular Disease Phenomics Program

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Introduction

This training is intended to serve as a reference document for PVDOMICS study coordinators who will be collecting and transmitting right heart catheterization (RHC) data. It will also include information and training on the blood draw that takes place during the right heart catheterization procedure.
Coordinator Responsibilities

• All right heart catheterizations will be performed by a trained and licensed medical professional.

• Study coordinators are responsible for ensuring that all data is obtained and transmitting that data to the Cardiovascular Physiology Core (CPC).

• Study coordinators may need to supervise the collection of “omics” blood during the RHC and assist in transporting this blood to the lab in a timely fashion.
Order of Procedures

- Resting Right Heart Catheterization in Supine Position
- Oxygen Challenge in Supine Position
  - Exclude patients who are CO₂ retainers
  - Exclude if PCWP ≥ 25
- Vasodilatory Challenge in Supine Position
- Fluid Challenge in Supine Position
- Invasive CPET in Upright Position

OR
### Data To Be Obtained

<table>
<thead>
<tr>
<th>Pressures</th>
<th>Saturations</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>SVC</td>
<td>Thermodilution</td>
</tr>
<tr>
<td>RV</td>
<td>PA</td>
<td>Direct Fick (optional)</td>
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<tr>
<td>PCWP</td>
<td>PCWP</td>
<td></td>
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<tr>
<td>PA</td>
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<tr>
<td>DPG</td>
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Data Obtained: Blood Samples

• The following blood samples will be obtained during the resting RHC per the blood protocol.
  • Venous (via introducer, before RHC) (27.5mL)
  • Systemic Arterial (optional, before RHC) (6.5mL)
  • Pulmonary Capillary (Wedge) (6.5mL)
  • Pulmonary Arterial (Mix) (6.5mL)

• All blood samples must reach the lab within 1 hour of the draw time.
Data Obtained: Blood Samples

1. Participant must rest for 15 min before blood collection

Side port of introducer

2. VENOUS blood collection
   - Discard 3ml
   - OMICS blood: 27.5ml*
     1. 2.5ml Red PAX gene (RT)
     2. 10ml Lavender (ice)
     3. 10ml Lavender (ice)
     4. 5ml Gold (ice)

Arterial access

OPTIONAL 2a. SYSTEMIC Arterial blood collection
   - Discard 3ml
   - Blood gas: 1ml §
   - OMICS blood: 6.5ml*
     1. 4ml Lavender (ice)
     2. 2.5ml Red PAX gene (RT)

3. Resting RHC hemodynamic measurements

4. Measure PCW pressure
   - Distal port

5. Pulmonary Capillary (Wedge) blood collection
   - Discard 3ml
   - OMICS blood: 6.5ml*
     1. 4ml Lavender (ice)
     2. 2.5ml Red PAX gene (RT)

6. Measure PA pressure
   - Distal port

7. Pulmonary Arterial (Mix) blood collection
   - Discard 3ml
   - OMICS blood: 6.5ml*
     1. 4ml Lavender (ice)
     2. 2.5ml Red PAX gene (RT)

Continue with the rest of the RHC procedure and challenges

* non-heparinized syringe
§ heparinized syringe
RT = room temperature
ice = place on wet ice
Blood Collection Supplies

• Vacutainers
  • Four 2.5mL PAXgene (Red)
  • Two 10mL EDTA (Lavender)
  • Three 4mL EDTA (Lavender)
  • One 5mL SST (Gold)

• Blood Transfer Device
  • Allows you to transfer blood from the syringe to the vacutainer tubes
Vacutainer Blood Tubes

- 2.5mL PAXgene
- 5mL SST
- 4mL EDTA
- 10mL EDTA
Blood Transfer Device

- Needs to have a female Luer adapter!
- Luer adapters and holders are also sold separately
Blood Draw: Venous

Venous “omics” Blood Draw

• Participant has to be resting for 15 minutes before drawing the blood.

• After the introducer has been placed, but before any other procedures or measurements are performed, draw the venous blood sample from the SVC through the side port of the sheath.

• Draw back 3mL of blood using a sterile syringe and discard the sample. Then, using a second sterile syringe, draw 27.5mL of blood for “omics” analysis.

• Team member or coordinator will then fill the tubes using a sterile transfer device.
Blood Draw: Venous & Optional Arterial

1. Participant must rest for 15 min before blood collection

Side port of introducer

2. VENOUS blood collection
   Discard 3ml
   OMICS blood: 27.5ml*
   1. 2.5ml Red PAX gene (RT)
   2. 10ml Lavender (ice)
   3. 10ml Lavender (ice)
   4. 5ml Gold (ice)

OPTIONAL
2a. SYSTEMIC Arterial blood collection
   Discard 3ml
   Blood gas: 1ml §
   OMICS blood: 6.5ml*
   1. 1.4ml Lavender (ice)
   2. 2.5ml Red PAX gene (RT)

3. Resting RHC hemodynamic measurements

Arterial access

* non-heparinized syringe  RT = room temperature
§ heparinized syringe  ice = place on wet ice
Blood draw must be done after all pressure measurements have been completed.

- Draw back 3mL of blood using a sterile syringe and discard the sample.

- Then use a second sterile syringe to draw 6.5mL of blood for “omics” analysis.

- Transfer the blood from the sterile syringe to the appropriate blood collection tubes using a blood transfer device.
Blood Draw: Pulmonary Capillary (Wedge)

4. Measure PCW pressure

↓ Distal port

5. Pulmonary Capillary (Wedge) blood collection

Discard 3ml

OMICS blood: 6.5ml*

1. 4ml Lavender (ice)
2. 2.5ml Red PAX gene (RT)
Blood Draw: Pulmonary Artery (Mix)

- Blood draw must be done after all pressure measurements have been completed.
- Draw back 3mL of blood using a sterile syringe and discard the sample.
- Then use a second sterile syringe to draw 6.5mL of blood for “omics” analysis.
- Transfer the blood from the sterile syringe to the appropriate blood collection tubes using a blood transfer device.
Blood Draw: Pulmonary Artery (Mix)

6. Measure PA pressure

Distal port

7. Pulmonary Arterial (Mix) blood collection

Discard 3ml

OMICS blood: 6.5ml*
1. 4ml Lavender (ice)
2. 2.5ml Red PAX gene (RT)

Continue with the rest of the RHC procedure and challenges
Recording Data: Pressure Tracings

• You should receive paper printouts of pressure tracings.
  
  • Total of 24 printouts
    • There should be 2 printouts per location (RA, RV, PWCP, PA) for each condition (resting, oxygen challenge, nitric oxide challenge and fluid challenge/iCPET)

• All pressure tracings need to have an ECG tracing on them

• Digitized or computer generated “mean line” should be recorded with all tracings.
ECG tracing

Condition should be noted

Measurement location must be noted somewhere

Mean Line

Pressure scale and Speed

Summary: SBP: 90/60

1. Rest Pressure Calculations
1. Label and De-identify the RHC printout (if necessary)
   a) Verify that each waveform printout has the participant’s 6 digit ID #, participant’s alphacode and the date of RHC test indicated on it somewhere
   b) If one of the 3 elements mentioned above is missing, hand write the missing element on the RHC printout
   c) Verify that no identifying information exists on the RHC printout
   d) Cross off or obscure any identifying information that does exist on the printout (e.g. name, date of birth, SSN, MRN, initials)
RHC Transmission to the CPC

2. Scan the de-identified RHC printout into a secure computer and save it as a PDF file.

3. Name the PDF file according to the following convention:

   RHC_######_ac_mmddyyyy.pdf

   - Type of Test
   - Alphacode
   - File Type
   - PVDOMICS ID#
   - Date of Test
RHC Transmission to the CPC

4. Submit RHC to DCC.
   - Log in to SSH with your assigned account name and password
   - Drag and drop the PDF file into SSH home directory for PVDOMICS on DCC server
   - DCC will then move the file out of the home directory for processing

5. Document the date you uploaded the RHC on Form 280
40.9 RHC Transmission to the CPC

6. Complete Form 280 (paper) and enter it into the PVDOMICS Study database.

7. Keep the paper copy of Form 280 and the original waveform printouts in the participant’s study file maintained at your site.
For Questions Please Contact

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