WNBA Screening Protocol: Two-Dimensional Echocardiogram with Doppler

This protocol document describes the WNBA requirements for an echocardiogram screening examination for a WNBA player.

General Requirements

- Record name, height and weight, DOB
- Measure blood pressure
- **Echocardiogram Report**: Within three days of completing the examination, must upload to the WNBA electronic medical records system (the WNBA "EMR") the complete final echocardiogram report (no summaries)
- **Cardiac Imaging**: Within three days of completing the examination, must upload to the WNBA EMR the full set of echocardiogram images obtained during the screening; all files must be DICOM type and may not be .avi, .wmv, or other similar video files
- **Ambra "Gateways"**: To promote efficient upload of imaging studies and reports, and to avoid the need for manual uploads by team staff and/or consulting medical personnel, teams are strongly encouraged to establish digital "gateways" between Ambra Health (the EMR's integrated, cloud-based imaging platform) and any cardiology/medical affiliate(s) utilized by the team. (For questions about Ambra, or to establish a new gateway with an affiliated cardiology/medical center, please contact Davis Bitton (davis.bitton@intelerad.com, 208-713-7010) or the league office.)
- NOTE: Teams or their medical personnel are not required to make strain calculations

Please note that in addition to the requirements in this document:

1. The sonographer performing the echocardiogram may – and in certain cases should (e.g., to further evaluate the structure and function of a valve) – supplement the required views and measurements noted below with any additional views and/or measurements that they deem appropriate based on findings during the screening examination or that are additionally required at the medical center at which the echocardiogram is performed.

2. Based on findings from a player's screening examination, a team physician (which, for clarity, for this purpose, can include the team consulting cardiologist), in their clinical judgment (or at the direction of the league), also may determine that it would be medically appropriate to obtain additional views and/or measurements or for the player to undergo additional cardiac evaluation.

All measurements and findings, including that are obtained in addition to the requirements in this document, must be recorded in the team consulting cardiologist's final echocardiogram report.

Parasternal Views

1. 2D PLAX (ALL CLIPS to be ≥ 2 beats)

2. PLAX measurements:
   a. LV (diastolic and systolic measurements)
   b. LV wall thickness
   c. LA diameter (optional if LA volume can be measured and is recorded)
   d. Aortic root/sinus of Valsalva (obtain an additional 2D PLAX of aortic root if > 4cm at root)

3. 2D PLAX of ascending aorta (move up an intercostal space)
    a. Additional 2D PLAX of ascending aorta if > 4cm

4. PLAX with color box around both mitral and aortic valves (aliasing velocity 50-70 cm/sec)
    a. If > mild MR, measure vena contracta

5. Tricuspid valve inflow view

6. Tricuspid valve inflow view with color flow (aliasing velocity 50-70 cm/sec)

7. Measure TR jet velocity for RVSP if there is sufficient TR

8. Pulmonic valve outflow view (and image PA bifurcation if visible)

9. Pulmonic valve outflow CW

10. Pulmonic valve outflow view with color flow (aliasing velocity 50-70 cm/sec)

11. 2D PSAX at level of base of heart showing leaflets of AV in short axis

12. 2D PSAX at level of base of heart with color box on aortic valve

13. 2D PSAX at level of mitral valve

14. 2D PSAX level of papillary muscle

15. 2D PSAX at apical level

<u>Apical Views</u>

1. 2D Apical 4 chamber view:
    a. LV volumes and EF (use Simpson's biplane), LA volume (biplane)
    b. 2D Apical 4 chamber view with color box on MV (aliasing velocity 50-70 cm/sec)
        i. If > mild MR, record PISA measurements (measure in apical view where PISA is best seen)
    c. PW of MV at leaflet tips (measure and record peak E, Peak A)
    d. Tissue Doppler at lateral and medial annulus (measure and record both e' and E/e')
    e. Tissue Doppler of the Tricuspid annulus (measure and record s')
    f. Measure and record TAPSE using M-mode
    g. Apical 4 chamber view with color box on TV (aliasing velocity 50-70 cm/sec)
        i. Measure and record TR jet velocity for RVSP if there is sufficient TR

2. 2D Apical 5 chamber view:
    a. Apical 5 chamber view with color box on AV (aliasing velocity 50-70 cm/sec)
    b. PW at LV outflow tract
    c. CW of AV
    d. Pressure ½ time of AR if AR > mild

3. 2D Apical 2 chamber view:
   a. Apical 2 chamber view measurements:
      i. Measure LV volume and EF (using biplane Simpson’s)
      ii. Measure LA volume (using biplane)
   b. Apical 2 chamber view with color box on MV

4. 2D apical 3 chamber view:
   a. Obtain 3 chamber view
   b. Apical 3 chamber view with color box on MV and AV
      i. If > mild MR, record PISA measurements (measure in apical view where PISA is best seen)
   c. PW of aortic outflow tract (if not obtained on 5 chamber view)
   d. CW of aortic outflow tract (if not obtained on 5 chamber view)
   e. Pressure ½ time of AR if AR > mild

Subcostal Views

1. 4 chamber view

2. Additional short axis view of LV if PLAX views not adequate

3. IVC with sniff to measure RA pressure

4. Color Doppler across the interatrial septum to exclude an interatrial shunt (ASD, PFO)

Suprasternal Notch Views

1. View of aortic arch in long axis view

2. Color flow view of aortic arch

Thresholds for Required Notification to League Office
Following Echocardiographic and ECG Screening of Professional Basketball Players

Echo Thresholds for Required Notification	ECG Thresholds for Required Notification
LVEDD (mm) ≥ 63	**WPW (Pre-Excitation)**
Max LV Wall Thickness (mm) ≥ 14	**Any IVCD with QRS > 140 msec**
LVEF (%) ≤ 49	**LBBB**
Aortic Root Diameter (mm) ≥ 40	**QTc > 500 msec**
Valve regurgitation ≥ moderate	**T wave inversions lateral leads (I,aVL,V5,V6)**
Valve stenosis > mild	

If a player meets any of the thresholds noted above:

- Medical team physician and/or team consulting cardiologist must immediately email the league office (attn: Miheer Mhatre, mmhatre@nba.com or David Weiss, dweiss@nba.com)

- Medical team physician and/or team consulting cardiologist, must review echo/ECG and clinical data with Columbia, and if necessary, other specialists (including to determine any additional views and/or measurements that should be obtained and/or any additional evaluation that should be conducted) and discuss findings with player

Columbia cardiac consultants are available to teams at any time to discuss clinical cardiac data. Please contact:

- David Engel – 212-326-8920 (o) | de165@cumc.columbia.edu | 914-629-7324 (m)

Or if Dr. Engel is unavailable:

- Allan Schwartz – 212-305-5367 (o) | as20@cumc.columbia.edu | 646-240-9535 (m)