AIMI-HF

PROCEDURE MANUAL

TECHNICAL GUIDE FOR ECHOCARDIOGRAPHY

MHI Core Laboratory
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GENERAL REMARKS

Please record a minimum of 3 consecutive cardiac cycles for each item (5 if arrhythmia is present). Please note that <u>no measurements</u> or calculations will have to be done by you (only images), the Montreal Heart Institute (MHI) central echo laboratory will do all measurements and calculations. All images for a given patient must be stored on <u>one</u> CD-ROM, and recording in <u>DICOM mode should be done whenever possible</u> to ensure reliable measurements. For other recording mode options please check options 2-5 of the attached guide "Transferring Echo Studies to the Central Echocardiography Laboratory".

- The eight items in **BOLD** are **mandatory**.
- The items in NORMAL characters **should be recorded,** allowing the evaluation of important criteria such as cardiac output, pulmonary pressures and diastolic dysfunction.
- The items in *ITALICS* are **optional,** but should also be recorded **whenever possible.**

PARASTERNAL VIEWS [1]

1. **Live 2D Parasternal long axis view**
   2. *M-mode at aortic root and left atrium (no measurements should be shown)*
3. M-mode of the left ventricle (at the extremity of the mitral valve leaflets)
4. 2D zoom of the LVOT and aortic valve in parasternal long axis view
5. Color Doppler of mitral and aortic valves in parasternal long axis view
   6. *Color Doppler of the aortic valve in parasternal short axis view*
   7. *Color Doppler of the pulmonic valve in parasternal short axis view*
8. Color Doppler of the tricuspid regurgitant (TR) jet in parasternal short axis view
9. Continuous wave (CW) Doppler of the TR jet in parasternal short axis view
   10. *Pulsed wave (PW) Doppler at RVOT*
11. **2D imaging of the LV at mitral valve level in parasternal short axis view**
12. **2D imaging of the LV at papillary muscles level in parasternal short axis view**
13. **2D imaging of the LV at apex in parasternal short axis view**

APICAL VIEWS

14. **2D- apical 4-chamber view**
15. **2D- zoomed apical 4-chamber view, showing well defined LV endocardial borders (for LVEF measurement)**
16. Color Doppler of the MR jet in apical 4-chamber view
    17. *Zoom of the MR jet Color Doppler*
    18. *Zoom for PISA of the MR (after lowering of aliasing velocity baseline) in apical 4-chamber view (provide 3-5 live loops)*
    19. *CW Doppler of the MR jet in apical 4-chamber view*
20. PW Doppler at tip of mitral valve leaflets, aligned with LV inflow, in apical 4-chamber view (for diastolic function evaluation)

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[1] If no parasternal window exists, please provide all required images , where possible, using the sub-costal short-axis view

21. PW Doppler of right superior pulmonary vein in apical 4-chamber view (for diastolic function evaluation and MR severity gradation)
    22. *Pulsed TDI [2] at septal mitral annulus in apical 4-chamber view (for diastolic function evaluation)*
    23. *Pulsed TDI at lateral mitral annulus in apical 4-chamber view (for diastolic function evaluation)*
24. 2D imaging in apical 5-chamber view
25. PW Doppler of the LVOT flow in apical 5-chamber view
    26. *CW Doppler of the aortic flow in apical 5-chamber view*
27. CW Doppler showing mitral and aortic flows (to measure IVRT) in apical 5-chamber view
    28. *2D imaging of the RV in apical 4-chamber view*
29. *C*olor Doppler of the TR jet in apical 4-chamber view
30. CW Doppler of the TR jet in apical 4-chamber view
    31. *Pulsed TDI at lateral tricuspid annulus in apical 4-chamber view, including all systolic and diastolic curves in the image (will be used for evaluation of RV systolic function). Follow indications for TDI as above.*
    32. *PW Doppler at tricuspid valve leaflet tips (RV inflow) in apical 4-chamber view*
33. **2D imaging in apical 2-chamber view**
34. **2D zoomed imaging of LV in apical 2-chamber view (for EF and volume measurements)**
35. Color Doppler in apical 2-chamber view
    36. *2D imaging in apical long-axis view*
    37. *Color Doppler apical long-axis view*

SUB-COSTAL VIEWS

38. 2D imaging of the inferior vena cava, showing respiratory variations
    39. *Color Doppler of hepatic vein flow in sub-costal view*
    40. *PW Doppler hepatic vein flow in sub-costal view*
    41. *2D imaging in sub-costal 4-chamber view (please see number 14)*
    42. *Color Doppler of sub-costal 4-chamber view*

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[2] *Tissue Doppler Imaging: Please provide images made at 150 FPS – minimum 100 FPS Please note that all TDI recordings should be made at end expiration (follow patient's respiration and tell patient to stop at spontaneous end-expiration for a few seconds). This significantly reduces the variability of measurements and improves the quality of tracings. TDI recordings may not be available in all centers.*

Transferring Echo Studies to the Central MHI Echocardiography Laboratory

Be sure that CD-ROM is identified only by the study code number and without personal identification.

1. The recommended recording mode is DICOM Format on CD-ROM, burned directly on the Echo machine

Centers with recent echo machines (Vivid7, Acuson, Toshiba Aplio) can easily provide echocardiographic examinations in the above described format. This is the best choice for this study.

Users should set the burning process in DICOM mode with NO Compression or with LossLess compression to ensure data integrity.

Other recording modes are possible, ONLY IF the above described technique of choice (1) cannot be provided:

2. DICOM Format on a CD-ROM burned on a remote computer or PACS

Some of the older echo machines may be linked to a computer running an echo review software (EchoPAC PC for example). The DICOM CD ROM can be burned on this remote computer ensuring that:

- The DICOM data transfer between the echo machine and the remote computer is done using NO Compression or LossLess data compression.

- The CD Burning process on the remote computer is set to DICOM Mode with NO Compression or with LossLess compression to ensure data integrity.

3. Non DICOM format on a CD-ROM burned directly on the echo machine

If DICOM format is not available on the Echo machine, then another format could be considered.
Three goals have to be achieved:

1) Ensure that the internal conversion from the manufacturer proprietary format to a public domain format (JPEG. MPEG) is done with NO or Minimal image compression.

2) Ensure that each loop, or still frame, recorded on the echo machine is converted as an independent file. Echo images (loops and still frames) should not be gathered together in one huge MPEG file for example.

3) Ensure that a calibration scale is present on every echo image. 0

4. Non DICOM format on a CD-ROM burned on a remote computer or PACS.

The same three goals described for number 3 have to be achieved:

Sites where solutions 3 or 4 have to be used should await instructions from the Central Echo Lab after sending a test echocardiographic examination, to ensure that essential measurements can be made before randomizing patients in the study. They must clearly specify the Echo machine model which was used, the software release number and information on image compression settings being used.

5. Other transfer solutions

Sites that do not have CD Burning capabilities will have to consider other solutions. For example some centers use Sonos 5500 echo machines that may have a MagnetoOptical disk (MOD) burner. The main drawback of this scenario is that images on MOD are in a manufacturer proprietary format (DSR TIFF modified for the Sonos 5500).

A simple procedure is not possible here since the technical situation is too complex. Solutions for such sites will have to be explored individually, with the Central Echocardiography Lab.

6. Echocardiography Shipment Instruction

Plastic pocket, CD and a permanent ink marker will be provided to each participating sites. Make sure that the identification label **is applied on the plastic pocket.**

SITE # ☐☐ PT # ☐☐☐ INIT.☐☐☐

WEIGHT: ☐☐☐.☐ kg HEIGHT: ☐.☐☐ cm

DATE OF BIRTH: ☐☐ ☐☐ ☐☐
JJ MOIS AA

DATE OF EXAM: ☐☐ ☐☐ ☐☐
JJ MOIS AA

Using the permanent ink marker, **identify the CD** with:
- AIMI-HF Study
- Patient Number
- Initials
- Date of exam

Once a month you will make a shipment to the Montreal Heart Institute using the "READY TO SHIP" kit provided by the MHI Coordinating Center. Prior to the shipment, be sure to fax to the MHI your "Shipping Log".

Contact people at MHI:

Aude Turgeon
Montreal Heart Institute
5000 Belanger Street
Research Center Room S- 2700
Montreal, Quebec, Canada
Tel.: 514-376-3330 ext. 3947
Fax: 514-593-2575
E-mail: aude.turgeon@icm-mhi.org

Address for CD Shipment

A FedEx account number will be provide with the supplies
Aude Turgeon
Montreal Heart Institute
5000 Belanger Street
Research Center, S-2700
Montreal, Quebec, Canada
Tel : 514-376-3330 ext. 3947
Fax : 514-593-2575
E-mail : aude.turgeon@icm-mhi.org

AIMI-HF *Montreal Heart Institute Coordinating Center – Shipping Log*

Date : _____

À : Aude Turgeon
     Institut de Cardiologie de Montréal
     Centre de recherche

Fax : 514-593-2575

Site : _____

De : _____   **No. de suivi de Fedex** (Tracking No.) ☐☐☐☐☐☐☐☐☐☐☐☐

Inclus dans l'envoi :

Patient No.	Date d'écho	Date d'envoi	Reçu ICM	Initiales
☐☐-☐☐☐	☐☐-☐☐☐-☐☐ (JJ / MOIS / AA)	☐☐-☐☐☐-☐☐ (JJ / MOIS / AA)	☐☐-☐☐☐-☐☐ (JJ / MOIS / AA)	
☐☐-☐☐☐	☐☐-☐☐☐-☐☐ (JJ / MOIS / AA)	☐☐-☐☐☐-☐☐ (JJ / MOIS / AA)	☐☐-☐☐☐-☐☐ (JJ / MOIS / AA)	
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