ROUTINE CARDIAC PLANNING

Tip Sheet

Additions and modifications often used for base Routine Cardiac protocol, according to the ...

1. Cardiac Radiologist for the day. If for...
   - Eric Williams: add LVOT CINE SSFP and AORTIC ROOT CINE SSFP prior to REST PERFUSION pre.
   - Dagmar Hoegmann-Savellano: scan entire heart for SAX CINE SSFP, 4CH CINE SSFP, SAX DE, AND 4CH DE.
     Due to long length of scanning entire heart on SAX and 4CH post GAD, you will need to replace two of the DE sequences with DE SS’s, unless told otherwise.

2. Dx of exam. If for...
   - Amyloid
     Include an additional pre-contrast TI Scout, prior to REST PERFUSION pre.
   - Thrombus: If for...
     - Williams: after post Rest Perfusion, run an immediate additional 2CH DE SS of entire heart, TI: 600. After sequence, proceed as normal, including usual 2CH DE.
     - Savellano: Same as Williams. She may also request an additional 4CH DE SS of entire heart, TI: 600.

3. Patient condition. If pt has...
   - Pacemaker/ICD: Whichever side of the body the generator is located, have pt raise that side’s arm above head. Moves generator more superiorly, further away from heart.
   - Arrhythmia: If undesirable motion noted during CINE SSFP, apply “Arrhythmia Detection: By Time.” This will only work on minor arrhythmias.
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Axial Haste
Increase FOV as needed
Straight axial, superior aspect of aortic arch through apex of heart
Capture cycle

Scout COR & Scout SAG
Scout 2CH

1 slice
Angle from mid-mitral valve through apex on AX from Scout
Line should appear perpendicular to interventricular septum

AXIAL from Scout
(+perpendicular)

Scout 2CH

SCOUT sequences
“Quick and dirty.”
No FOV changes.
Capture cycle
Scout SAX
Generally 10-14 slices.
Center mid-heart.
Angle with bottle-neck of mitral valve on 2CH.

Scout 2CH
(+perpendicular)

Scout S AX

SCOUT sequences
“Quick and dirty.”
No FOV changes.
Capture cycle
Scout 4CH
1 slice

SCOUT sequences
“Quick and dirty.”
No FOV changes.
Capture cycle

Scout SAX
(+perpendicular)

Scout 4CH
SAX CINE
Scan whole heart, extra slice past apex
1 concat per slice

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s, approx 320mm.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths

Scout 2CH & Scout 4CH → SAX CINE
2CH CINE

3 slices

SAX CINE & Scout 4CH

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s, approx. 320mm.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths

2CH CINE
3CH CINE
3 slices

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s, approx 320mm.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths

SAX CINE & Scout 4CH & 2CH CINE

3CH CINE
4CH CINE

*Scan whole heart, if for Dr. Hoegmann-Savellano
3 slices, otherwise.

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s, approx 320mm.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths

SAX CINE & 2CH CINE → 4CH CINE
LVOT CINE SSFP

*Include for Dr. Williams. Otherwise, OPTIONAL.*

3 slices
Make sure to use Copy Reference for “Adjustment Volume”

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s, approx 320mm.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths

3CH CINE
(+perpendicular)

&

SAX CINE

→

LVOT CINE SSFP
AORTIC ROOT CINE SSFP

(aka SAX LVOT, or AORTIC VALVE)
*Include for Dr. Williams. Otherwise, OPTIONAL.
5-6 slices, inferior of aortic tricuspid valve through tips
Make sure to use Copy Reference for “Adjustment Volume”

3CH CINE & LVOT CINE

AORTIC ROOT CINE SSFP

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s, approx 320mm.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths
TI Scout (pre-)

Additional pre-contrast sequence, if for Amyloid Capture cardiac cycle

SAX CINE

3 slices

“Copy Image Position” to best mid-ventricle slice
Rest Perfusion
Uncouple graphics before planning
Capture cardiac cycle

SAX CINE
3 slices
“Copy Image Position” to center slice in mid-ventricle

4CH CINE
1 slice
“Copy Image Position” to center slice in mid-ventricle
TI Scout (post)
Capture cardiac cycle
Ideal TI image is typically within 2-3 slices of “sub” image

SAX CINE
3 slices
“Copy Image Position” to center slice in mid-ventricle

"SUB"
IDEAL TI IMAGE
SAX DE
Scan whole heart, extra slice past apex
Do not adjust concats

DE sequences
Large FOV.
No oversampling, due to long BH’s.
Adjust Physio.
Adjust TI based on TI-Scout

Scout 4CH & Scout 2CH → SAX DE
4CH DE

*Scan whole heart, if for Dr. Hoegmann-Savellano
3 slices, otherwise.

DE sequences
Large FOV.
No oversampling, due to long BH’s.
Adjust Physio.
Adjust TI based on TI-Scout

SAX CINE & 2CH CINE → 4CH DE
(+perpendicular)
2CH DE
3 slices.

SAX CINE & 4CH CINE → 2CH DE

DE sequences
Large FOV.
No oversampling, due to long BH’s.
Adjust Physio.
Adjust TI based on TI-Scout
3CH DE
3 slices.

DE sequences
Large FOV.
No oversampling, due to long BH’s.
Adjust Physio.
Adjust TI based on TI-Scout

SAX CINE & 4CH CINE & 2CH CINE → 3CH DE
Less often used sequences below. (All are pre-contrast)
SAX LVOT CINE PC’s

(aka or AORTIC VALVE)

*Optional pre-contrast sequences

RAD to determine slice planning. Run sequence before REST PERFUSION PRE-
Uses 2D CINE PC VENC sequence, will be run 4 separate times. Addend each sequence
name to include plane name, which VENC was used, and if with or without Valsalva.
- Run the 250 VENC twice. Once without Valsalva. Once with Valsalva.
- Run the 500 VENC twice. Once without Valsalva. Once with Valsalva.

*Note: Depending on pt, RAD may request a different VENC instead of 500 VENC.

Increase oversampling and phase FOV as needed
Manual Valsalva instructions as directed.

3CH CINE SSFP & LVOT CINE SSFP → SAX LVOT CINE PC

RAD to determine slice planning on image
 RVOT CINE

*Optional pre-contrast sequence
Bifurcation of main pulmonary trunk

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths

AXIAL HASTE
(+perpendicular)

RVOT
PULMONIC VALVE CINE
(aka SAX RVOT)
*Optional pre-contrast sequence

CINE sequences
Adjust shim volume, focusing on aortic root.
Small FOV’s.
Increase oversampling and phase FOV as needed
Fine-tune slice position planning
Check breath hold lengths

RVOT
(+ perpendicular)

&

AXIAL HASTE

→

PULMONIC VALVE

OPEN PULMONIC VALVE
SAX GRID TAG

*Optional pre-contrast sequence
3 slices

GRID TAG sequences
Small FOV's, approx 320mm.
Capture cycle

SAX CINE
3 slices
“Copy Image Position” to center slice in mid-ventricle

SAX GRID TAG
LAX GRID TAG

*Optional pre-contrast sequence
*Like the Rest Perfusion, images are planned for two different planes
1 slice, best demonstrating 4CH
1 slice, best demonstrating 2CH

2CH CINE & 4CH CINE → LAX GRID TAG

“Copy Image Position” to center slice in mid-ventricle

GRID TAG sequences
Small FOV’s, approx 320mm.
Capture cycle
SAX cine_realtime_tf2d_8sl_trig_TPAT

*Optional pre-contrast sequence
Addend sequence name to add plane.
1 slice, best demonstrating SAX

Free Breathing Cine sequences
Small FOV’s, approx 320mm.
Maximize phases (usually 511)
Do NOT capture cycle
Approx 10-15 sec
Instruct pt to use exaggerated breaths

SAX CINE

“Copy Image Position” to center slice in mid-ventricle

SAX cine_realtime
LAX cine_realtime_tf2d_8sl_trig_TPAT

*Optional pre-contrast sequence
*Like the Rest Perfusion, images are planned for two different planes
Addend sequence name to add plane.
1 slice, best demonstrating 2CH
1 slice, best demonstrating 4CH

Free Breathing Cine sequences
Small FOV's, approx 320mm.
Maximize phases (usually 511)
Do NOT capture cycle
Approx 10-15 sec
Instruct pt to use exaggerated breaths

2CH CINE & 4CH CINE → LAX cine_realtime

“Copy Image Position” to center slice in mid-ventricle
“Copy Image Position” to center slice in mid-ventricle