

Preparing an Echocardiography Study for Submission to IDEXX Telemedicine Consultants

Follow the general recommendations below to prepare a study for review. Follow the protocols on the remaining pages to capture the appropriate images for the study.

General recommendations

File length, type, and size

Set your machine to record videos of either **5 beats** or **no more than about 3 seconds** in duration. Longer cineloops do not improve the diagnostic value of the study and often cause technical problems.

If you are not making all measurements before submission, submit a file format that allows acquisition of off-line measurements. **DICOM* is the ideal format.** Note that we cannot make off-line measurements on cineloops submitted as .avi or .wmv files.

Ideally, **individual file size** should not exceed 20–25 MB (20,000–25,000 KB).

Digital compression

It is important to use the **appropriate amount of digital compression** to optimize both data transfer and the diagnostic value of the study.

Doppler data

If your study includes spectral Doppler data, make sure that the **scale and baseline** are set to document accurate peak velocity and to show the entire waveform either above or below baseline.

If **aliasing** is noted on a pulsed-wave (PW) Doppler study, acquire a continuous-wave (CW) Doppler study to capture high-velocity jets.

If your study includes color Doppler data, make sure you **optimize the Nyquist limit** (the velocity scale setting above which aliasing occurs) to show what you are trying to demonstrate. A fixed and low Nyquist limit causes turbulent flow to appear in every part of the circulation and is of poor diagnostic value.

For most applications the **color Doppler scale** should be set at the highest limit allowed by imaging depth and probe frequency (usually >70 cm/sec).

Set **color Doppler gain** just below the point that allows elimination of random color speckles from nonmoving parts.

The **color Doppler box size** should be as narrow as possible to optimize the frame rate but large and long enough to adequately interrogate the structure(s) of interest. Specifically, when abnormal flow is detected (such as mitral regurgitation), you should adjust the box size to encompass the entirety of the abnormal jet.

Prepare an accompanying ECG

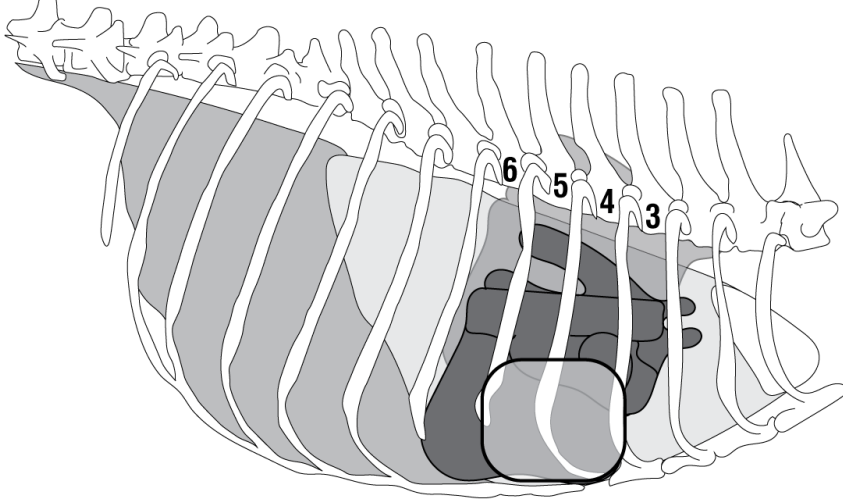
If possible, **record an electrocardiogram** (ECG) while performing your study. This ECG is not used for diagnostic purposes but is used to identify the proper timing of cardiac events and to optimize measurement acquisition.

Submit **cineloops at natural speed**. Slow-motion cineloops are more difficult to interpret and often less diagnostic.

Protocols

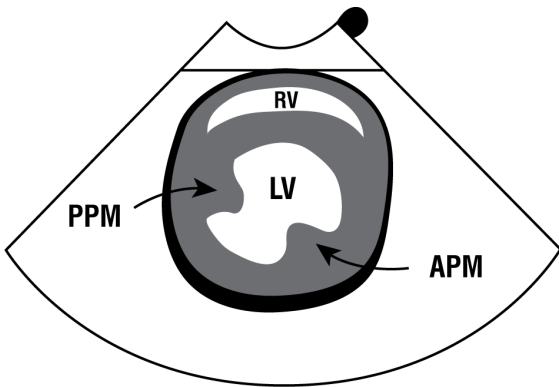
A standard echocardiogram should include the following images, for a total of 40–50 images. This count includes both still images and cine-loops.

Right parasternal window



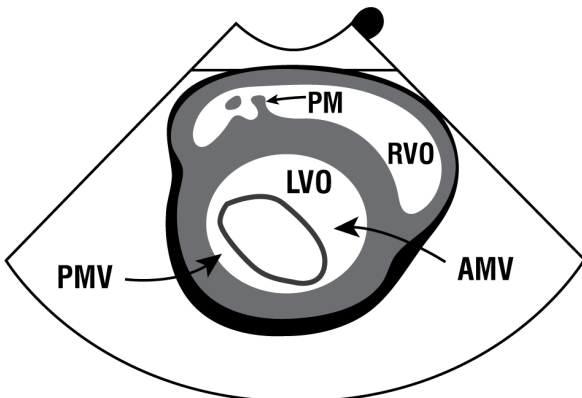
Right parasternal short axis view at the papillary muscles

Record one or two 2D cine-loop(s) and one or two M-mode still images.



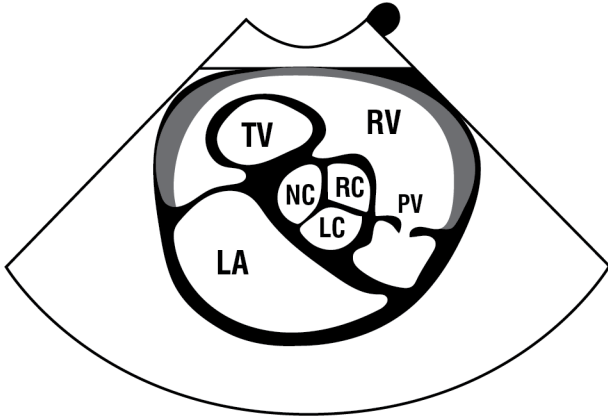
Right parasternal short axis view at the mitral valve (MV)

Record one 2D cine-loop with color Doppler and one without color Doppler, plus one or two M-mode still images.



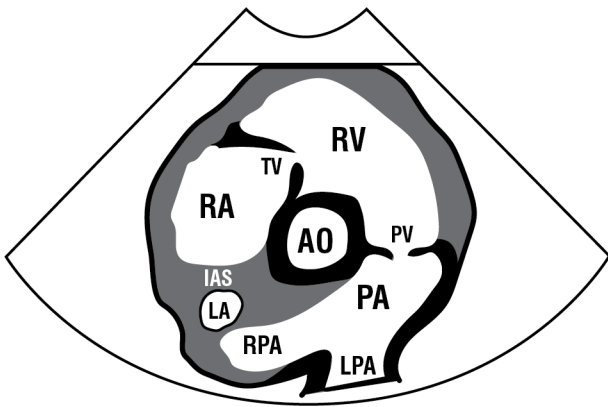
Right parasternal short axis view at the level of the aortic root and left atrium (LA)

Record one 2D cine loop with color Doppler and one without color Doppler, plus one or two M-mode still images, ensuring the M-mode cursor crosses the body of the LA rather than the auricle.



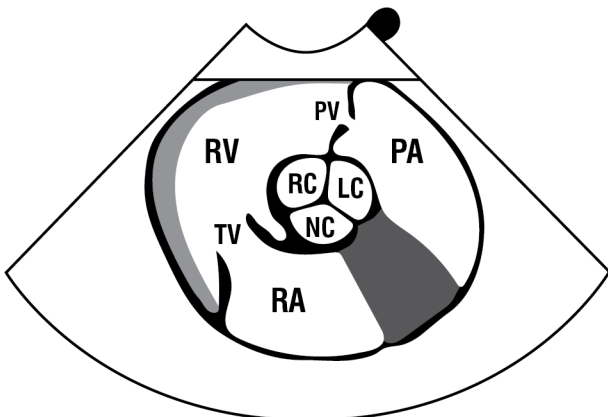
Right parasternal short axis view at the level of the pulmonic valve (PV)/pulmonary artery (PA)

Record one or two 2D cine loop(s) with and without color Doppler, plus one or two PW Doppler studies of the PV. One or two additional 2D cine loops of distal PA and branch pulmonary arteries (LPA and RPA) with and without color Doppler should also be acquired, particularly if a patent ductus arteriosus (PDA), pulmonary thromboembolism (PTE), or heartworm disease is suspected.



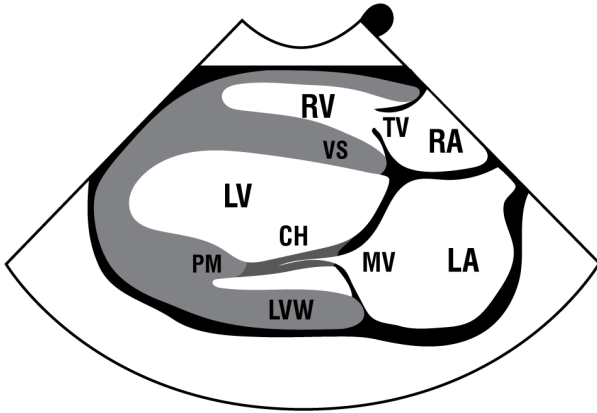
Right parasternal short axis optimized for tricuspid valve (TV)

Record one or two 2D cine loop(s) with and without color Doppler, plus CW Doppler of tricuspid regurgitation (TR) (if applicable and alignment is appropriate).



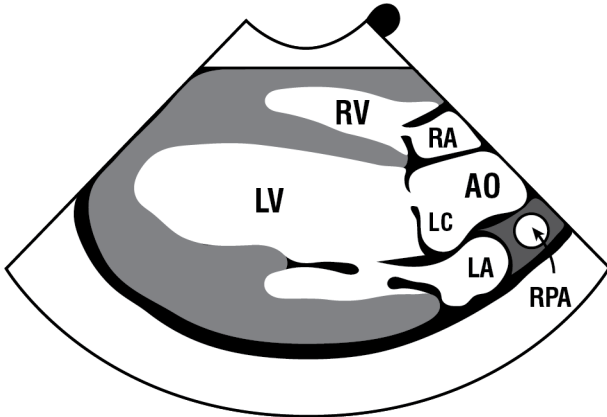
Right parasternal long axis 4-chamber view

Record one or two 2D cine loop(s) with and without color Doppler of mitral valve (MV) and TV.

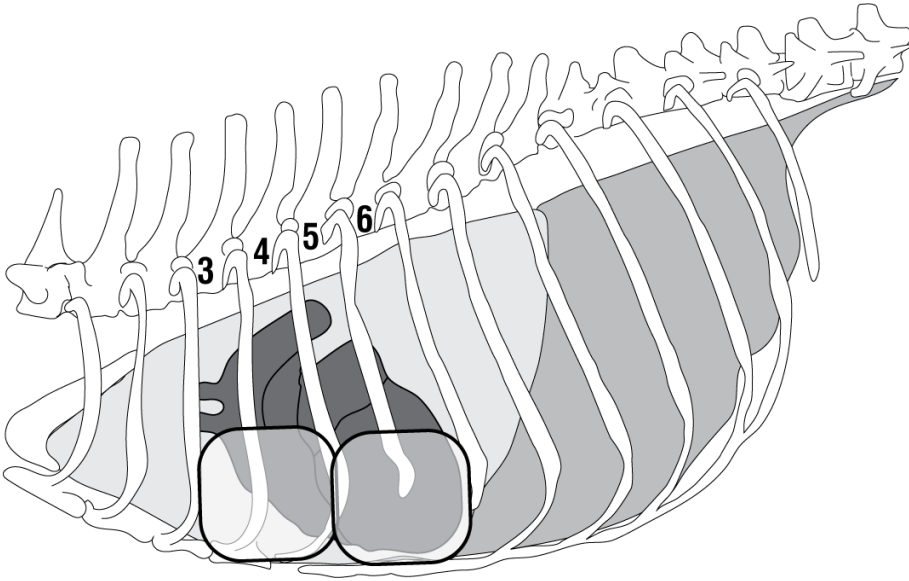


Right parasternal long axis view optimized for the left ventricular outflow tract (LVOT)/aortic valve (AV) (5 chamber)

Record one or two 2D cine loop(s) with and without color Doppler of LVOT and AV.

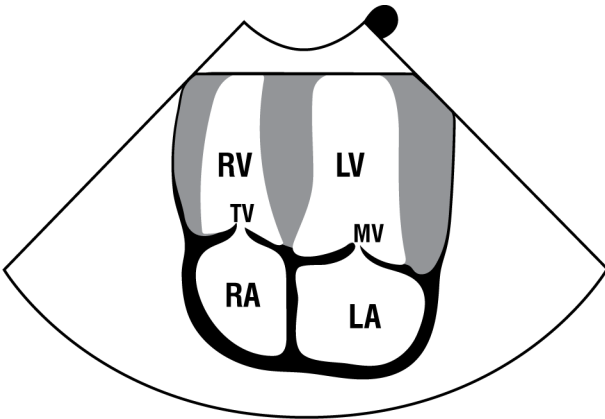


Left parasternal window



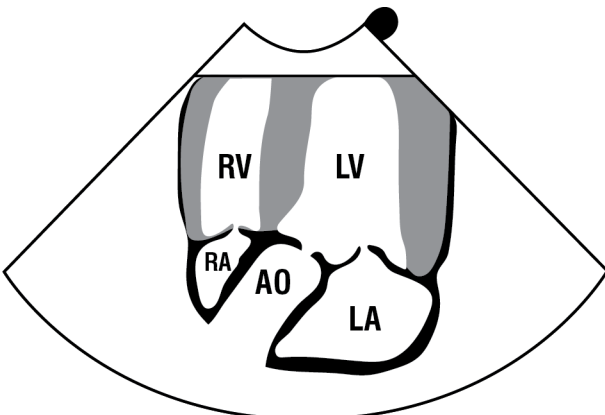
Left apical 4-chamber view

Record one or two 2D cine loop(s), plus one or two color Doppler cine loops of MV and TV, plus one or two MV inflow PW Doppler still images, plus one or two mitral regurgitation (MR) and TR CW Doppler still images (if applicable).



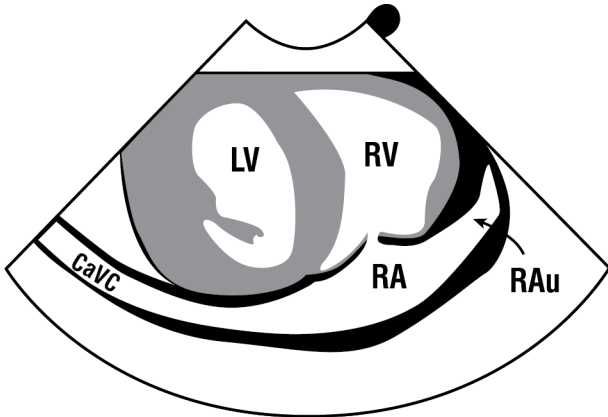
Left apical 5-chamber view

Record one or two 2D cine loop(s) with and without color Doppler of LVOT/AV, plus spectral Doppler still images of LVOT/AV.



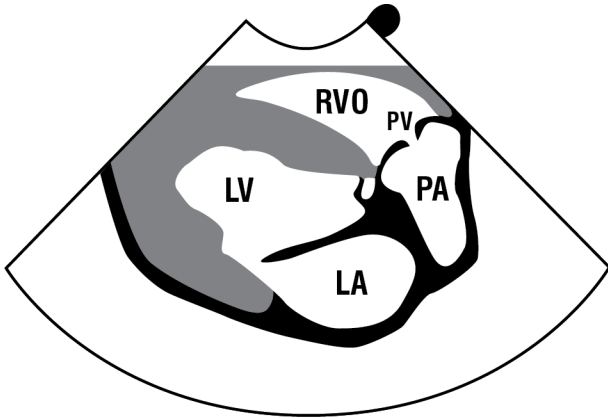
Left apical cranial view optimized for TV/right atrium (RA)/right auricle (RAu)

Record one or two 2D cineloops with and without color Doppler. Tricuspid regurgitation, if present, can often be documented from this view (color Doppler and CW Doppler).



Left apical cranial view optimized for MPA

Record one or two 2D cineloops with and without color Doppler.



Note: It is important to include images of caudal vena cava and hepatic veins if right-sided structural heart disease is noted or suspected, such as in patients with ascites (one or two 2D cineloops with and without color Doppler).