

Cardiac Case Presentation

History:

Florence, a 6 month old, female spayed, 2.5 kg DSH cat was evaluated at St. Elsewhere Animal Hospital at which time a heart murmur was detected. It was noted that she was adopted 3 to 4 weeks prior from a rescue group, so her previous history was unknown. She had already been spayed, without any anesthetic complications. There was interest in a declaw procedure, but with concern of heart disease, additional testing was requested.

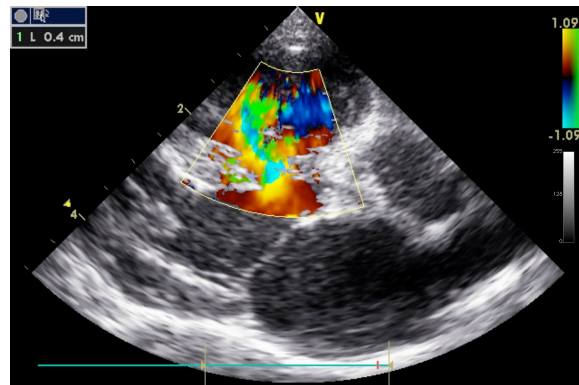
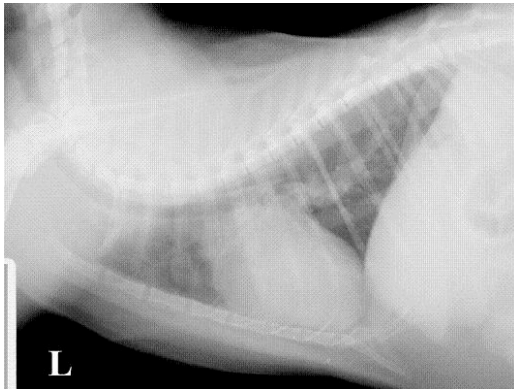


Physical Examination Findings:

Florence was bright, alert and responsive. Heart rate was approximately 160 beats per minute. Femoral pulse quality was fair. Mucous membranes pink with a capillary refill time < 2 seconds. 4/6 left and right sided systolic murmurs were present. She was breathing comfortably at a normal rate, without labor or distress.

Diagnostic Tests Performed:

Thoracic radiographs and an echocardiogram were performed



Findings:

Thoracic Radiographs: Cardiac silhouette with generalized cardiomegaly based on a vertebral heart score of 10.6 with < 8.1 being normal. The pulmonary vasculature was dilated with a diffuse mild pulmonary interstitial pattern present. Pleural and mediastinal spaces, unremarkable.

Echocardiogram: Based on 2D and M-mode echocardiography with color flow and spectral Doppler analysis with standard left and right sided views, Florence was found to have the following:

- 1) defect at the level of the interventricular septum with a 0.4 cm orifice with relatively low velocity, left to right flow: 3.45 m/sec translating to a gradient of 47.72 mmHg
- 2) dilated main pulmonary artery
- 3) dilated left atrium and left ventricle
- 4) trivial to mild tricuspid regurgitation
- 5) no mitral regurgitation
- 6) Pulmonary outflow velocity relatively high
- 7) Pulmonic insufficiency

What's Your Diagnosis?

Florence was diagnosed with a perimembranous, left to right shunting, ventricular septal defect (VSD).

VSDs are typically associated with right sided heart murmurs, as the blood flow is typically shunting from the high pressure left ventricle into the lower pressure right ventricle. The blood, with a high, perimembranous shunt, immediately flows from the left ventricle into the pulmonary artery, recirculating blood back through the lungs, resulting in a dilated main pulmonary artery and volume overload to the left side of the heart. Therefore, the radiographic changes are consistent with left sided heart enlargement and dilated, pulmonary vasculature consistent with pulmonary over-circulation (not to be confused with pulmonary edema).

Small, perimembranous VSDs can sometimes close over as the patient grows, or the tricuspid apparatus can, at times, modify itself to create a seal over the defect. Device implantation to plug the defect is not an option with high, perimembranous VSDs as the device would interfere with the aortic valve and create more harm than good. If the defect, however, was lower in the muscular region of the interventricular septum, device implantation may be an option.

If the left to right shunt is causing significant hemodynamic compromise, pulmonary artery banding can be surgically performed to try to normalize the pressures in the left and right ventricular chambers to help minimize the shunting process. Some patients will develop pulmonary hypertension as a way to try to do this on their own. If significant pulmonary hypertension develops, the shunting blood can reverse, leading to a right to left shunt. This leads to volumes of un-oxygenated blood bypassing the lungs and re-circulating back into the body, which is not favorable.