Heart murmurs are common in neonatal camelids and are often related to cardiac malformation. In many crias, ejection murmurs are detected in the setting of an echocardiographically-normal heart. We sought to characterize the origin for some of these innocent murmurs and identified a condition that appears similar to peripheral pulmonic stenosis (PPS) of infancy. PPS is a recognized cause of innocent murmurs in children and arises from flow turbulence due to physiologic narrowing and acute angulation of the branch pulmonary arteries (PA). This narrowing resolves within the first 3-6 months of life as pulmonary vascular resistance falls.

We performed an observational study of 13 camelids (10 alpacas, 3 llamas) with a mean age of 4.8 days (range 1-14 days). Each cria was evaluated for a systolic murmur (grade I to III/VI) by Doppler echocardiography (DE). No cardiac malformations were evident. However, in each case flow acceleration and turbulence were identified in the distal main and branch PAs. The maximal velocity (mean +/- SD) at the pulmonic valve measured by pulsed-wave DE was 0.86 m/s (+/- 0.14 m/s) and flow velocity increased significantly to 1.93 m/s (+/- 0.4 m/s) at the branch PAs (p<0.001; paired t-test). Mean aortic outflow velocities were 1.04 +/- 0.21 m/s in these crias.

Three cases were available for follow-up DE at a mean age of 63 +/- 9 days and revealed a maximal velocity at the pulmonic valve of 0.88 +/- 0.05 m/s and no significant difference in velocity at the branch PAs (mean 0.96 +/- 0.2 m/s; p=0.443). One alpaca underwent cardiac catheterization revealing a systolic pressure gradient of 25 mmHg between the main and branch PAs on the 8th day of life with no measurable gradient during repeated catheterization at 78 days of life.

Although observational in nature, these data suggest physiologic narrowing of the branch PAs may result in a systolic murmur in immature camelids. Physiologic PPS may therefore be a clinically important differential in newborn camelids with systolic heart murmurs. As in children, this narrowing may resolve during the first months of life. Further studies are warranted to more completely characterize this flow disturbance and related morphology in camelids as well as other domesticated species.