

Scientists make 3-D heart scan breakthrough for animals and humans

February 19 2021, by Michael Addelman

The University of Manchester scientists have created the most detailed ever 3-D scan of a rare form of congenital heart disease.

The 'walk through' 3-D video for the first time allows a precise anatomical classification of the disease and has important implications on future treatment for many of the [heart](#) defects humans- and animals—are born with.

The study, now published in the Journal of Veterinary Cardiology, started by chance when a Japanese veterinary researcher at Ritsumeikan University contacted the team at Manchester.

When the pet cat Dr. Shu Nakao had been treating called Mi-ke sadly died, Dr. Nakao had not been able to make an accurate diagnosis post mortem and decided to ask for the Manchester team's help.

According to Dr. Nakao, vets in Japan and beyond are not able to detect and report this type of congenital heart diseases in [domestic animals](#).

Using cutting edge technology which carries out Micro-Computed Tomography (Micro CT) – one of only 2 places in the UK where it is done- the team were able diagnose a rare but distressing condition called common arterial trunk.

Micro CT can create an intricately detailed scan of the heart at a resolution of 40 microns—a quarter the width of a human hair.

Treated with [heart surgery](#), it is found in humans and domestic animals such as cats and dogs.

Fewer than one in 10,000 babies are born with common arterial trunk—which causes acute breathlessness over the first month or so after birth; around 95 out of every 100 babies who have surgical repair will survive.

"This scan not only provides the most detailed ever anatomical description of the condition, but also demonstrates that it can be used for any congenital problem of the heart," says Dr. Andrew Atkinson.

In common arterial trunk, instead of leaving the heart as two separate arteries, a single large artery divides to form the aorta and the pulmonary artery.

There is also a large hole—called a ventricular septal defect- between the two main pumping chambers ventricles of the heart causing a mixing of blood flowing to the lungs and blood flowing to the rest of the body.

Dr. Andrew Atkinson said: "This scan not only provides the most detailed ever anatomical description of the condition, but also demonstrates that it can be used for any congenital problem of the heart.

"Micro-computed tomography improves our understanding of the complex morphology in congenital heart diseases which cannot be seen by the naked eye.

"And that can contribute to precise disease classification and treatment decision-making for surgeons and cardiologists.

"In animals , it's particularly hard to diagnose and treat, so this research will be of invaluable use to vets as well."

Dr. Halina Dobrzynski said: "Not only is this technology invaluable clinically, it could be of enormous benefit to the parents of new born babies who are struggling to come to terms with these rare but distressing conditions.

"Congenital heart [disease](#) it difficult to understand, so having this as an aid to explain what is going on would be incredibly helpful.

"Now we have the tools to do this, we are inviting clinicians and veterinary surgeons to get in touch if they wish to work with us to help map these conditions."

The paper, "Common arterial trunk in a cat: a high-resolution morphological analysis with micro-computed tomography," is published in the *Journal of Veterinary Cardiology*.

More information: S. Nakao et al. Common arterial trunk in a cat: a high-resolution morphological analysis with micro-computed tomography, *Journal of Veterinary Cardiology* (2020). [DOI: 10.1016/j.jvc.2020.12.003](https://doi.org/10.1016/j.jvc.2020.12.003)

Provided by University of Manchester

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