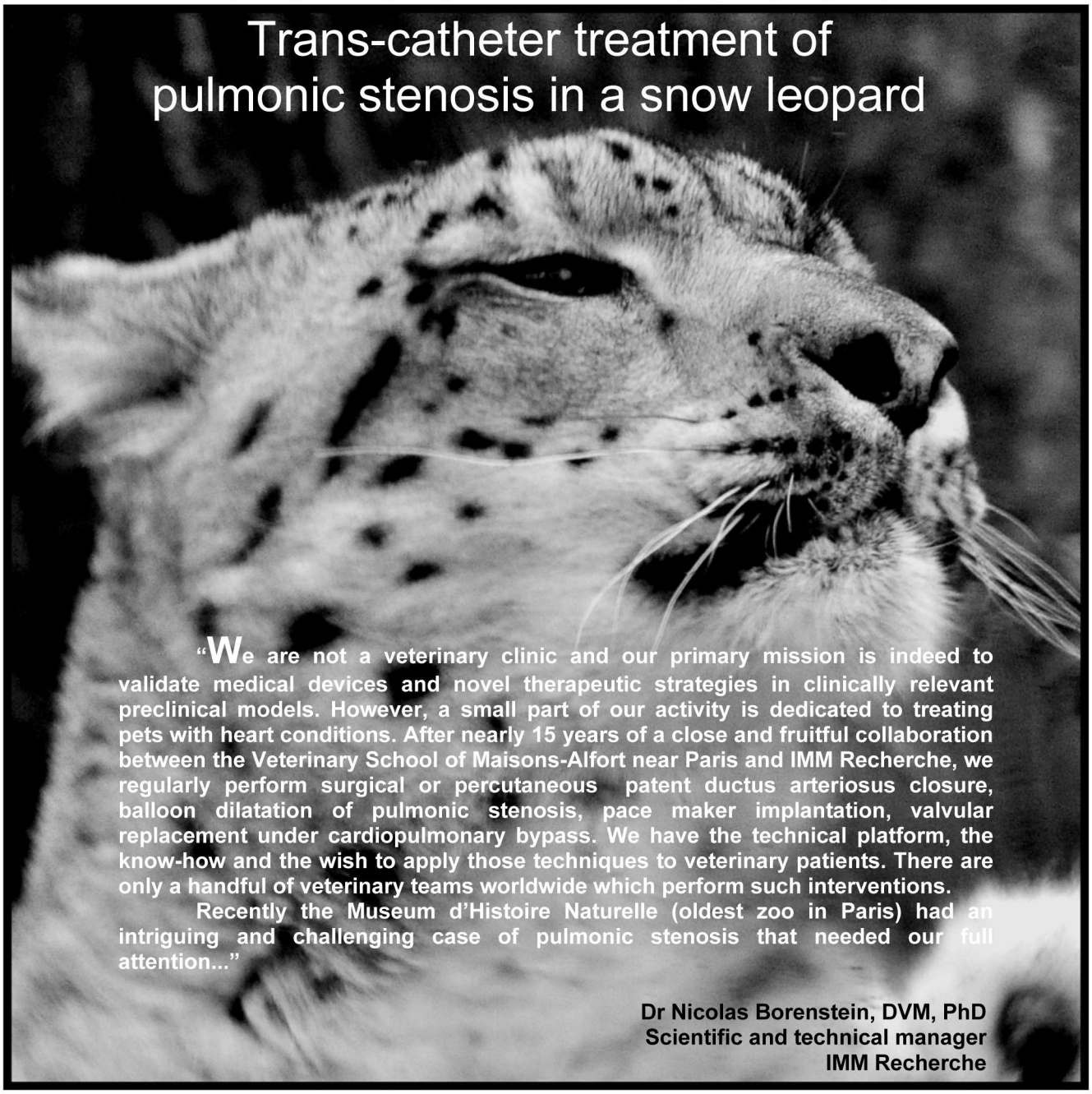
IMMR
Accelerating your innovative research

World first at IMM Recherche:

Trans-catheter treatment of pulmonic stenosis in a snow leopard

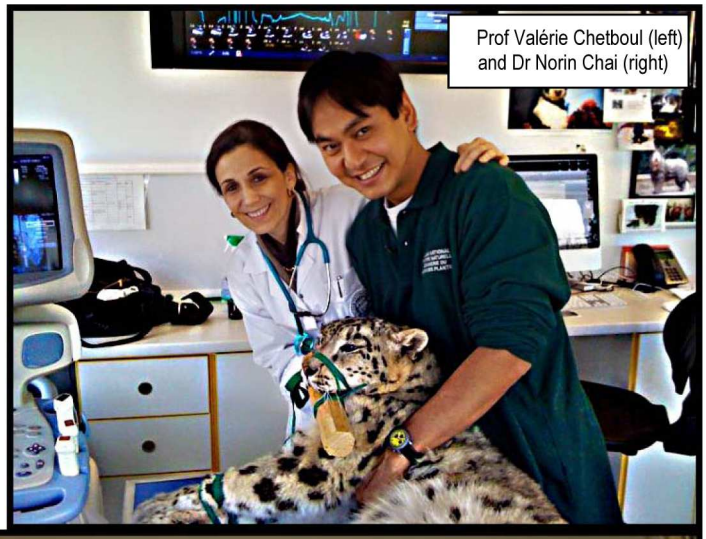


"We are not a veterinary clinic and our primary mission is indeed to validate medical devices and novel therapeutic strategies in clinically relevant preclinical models. However, a small part of our activity is dedicated to treating pets with heart conditions. After nearly 15 years of a close and fruitful collaboration between the Veterinary School of Maisons-Alfort near Paris and IMM Recherche, we regularly perform surgical or percutaneous patent ductus arteriosus closure, balloon dilatation of pulmonic stenosis, pace maker implantation, valvular replacement under cardiopulmonary bypass. We have the technical platform, the know-how and the wish to apply those techniques to veterinary patients. There are only a handful of veterinary teams worldwide which perform such interventions.

Recently the Museum d'Histoire Naturelle (oldest zoo in Paris) had an intriguing and challenging case of pulmonic stenosis that needed our full attention..."

Dr Nicolas Borenstein, DVM, PhD
Scientific and technical manager
IMM Recherche

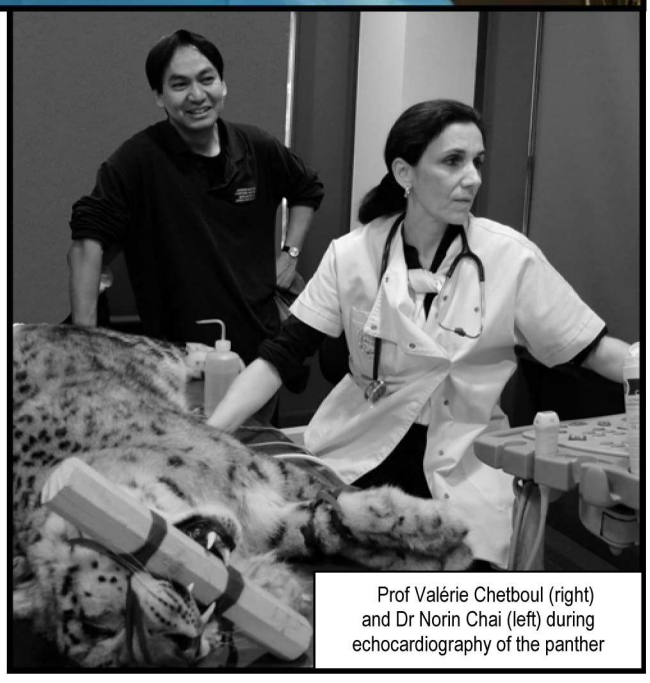
Congenital pulmonic stenosis rarely occurs in cats. However, it is considered one of the most common congenital cardiac defects in dogs and it is a well-described condition in humans. We have a vast experience with pulmonic stenosis dilatation in dogs and have been one of the only veterinary centers to perform such interventions, as well as other cardiovascular operations in veterinary patients.



Prof Valérie Chetboul (left) and Dr Norin Chai (right)

The snow leopard is being prepared for surgery

Dr Norin Chai (DVM, PhD) is the senior staff veterinarian of the Ménagerie du Jardin des Plantes, Muséum National d'Histoire Naturelle, Paris France. He presented to Prof Valérie Chetboul (DVM, PhD, diplomate ECVIM, Ecole Nationale Vétérinaire d'Alfort, Head of the Cardiology Unit) a three year old captive-born female snow leopard (Uncia uncia) with moderate, chronic apathy. The animal arrived at the Ménagerie du Jardin des plantes - National Museum of Natural History at the age of two years old. Echocardiogram confirmed a severe pulmonic valvular stenosis. The lesion was



Prof Valérie Chetboul (right) and Dr Norin Chai (left) during echocardiography of the panther

managed by balloon valvuloplasty at IMM Recherche, resulting in a marked pressure gradient reduction. Prof Chetboul and Dr Chai give us a bit more detail about this world first.

1- Prof Chetboul, can you tell us a little bit about pulmonic stenosis? Is it a common cardiac condition in veterinary patients?
Pulmonic stenosis is one of the most common canine isolated congenital heart diseases. Valvular stenosis is usually associated with fusion of the cusps but sometimes there is also pulmonary annulus hypoplasia, sometimes with malposition of the right coronary artery such as in the English or French Bulldog.

2- What are your diagnostic tools and what are the best treatment options?
Definitely echocardiography with colour and CW Doppler examination. It can be performed in the standing position such that the animals are not stressed. Medical treatment is an option for moderate stenosis but for severe stenosis balloon valvuloplasty is the preferred option, usually with favourable outcome.

3- What are the specific precautions you had to take for the ultrasound examination of this wild animal? Was the echocardiogram any different from that of a cat or a dog?
As opposed to echocardiography in cats and dogs, it had to be performed under anesthesia for personnel safety reasons. The heart resembled that of a cat, namely with small papillary muscles, but it was 3 times bigger!

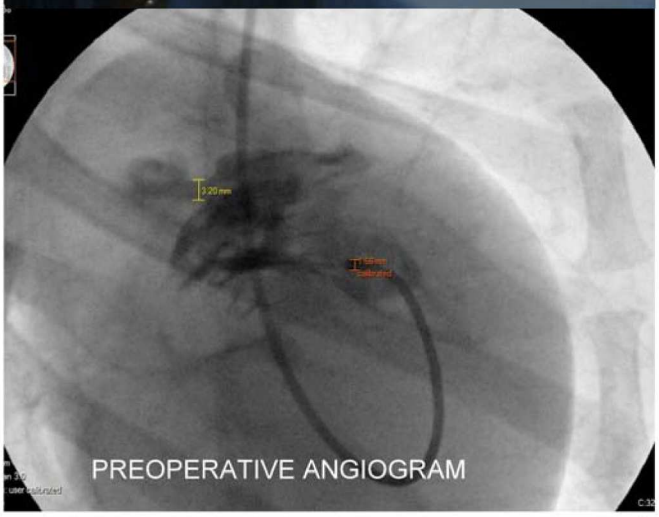
4- What did you observe after the trans-catheter angioplasty performed at IMM Recherche? What were the most striking modifications of the cardiovascular examination of the panther?
The most striking improvement was clinical, the animal gained weight and was more alert. From a hemodynamic standpoint, there was a much better opening of the pulmonary valve and a marked decrease of the systolic right ventricular-pulmonary artery gradient.

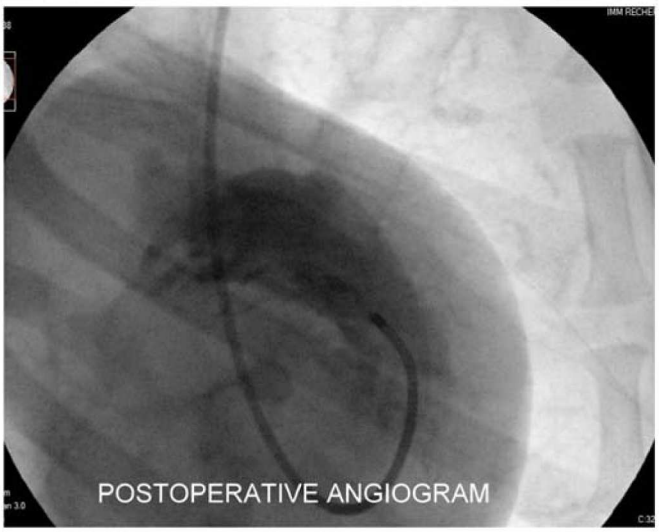
1- Dr Chai, is this a common diagnosis in zoo animals? What were the symptoms that led you to believe there was a heart condition involved?
No, congenital pulmonic stenosis are rarely diagnosed in zoo animals. Moreover, this was the first description of a pulmonary valve stenosis in a wild felid. The animal showed progressive apathy, lethargy and decreased appetite. The cardiac auscultation revealed an important left systolic ejection murmur.

2- Is this the first time that a wild felid undergoes pulmonic angioplasty?
Yes the very first time.

3- Did you launch a communication campaign?
Not yet, to be honest. And yes, a communication campaign would be most welcome.

Dr Nicolas Borenstein (left) and Dr Luc Behr (right)
during the cut-down of the jugular vein before placement of an introducer





4- Did the animal benefit really from the treatment? In what way?

Absolutely. The treatment has already shown to be effective in very short-term follow-up : the animal became more active and appetite increased. The following days, it had gained weight, was more alert and appeared clinically healthy.

Dr Nicolas Borenstein (left) and Dr Luc Behr (right) during trans-catheter balloon dilatation under fluoroscopic guidance

Long term follow-up of the animal will tell if one time treatment is sufficient or needs to be repeated. As pulmonic stenosis is known to have a genetic basis in some species, we recommend echocardiography be part of the standard physical examination of captive snow leopards to help determine the prevalence of this disease in the captive population. This is the first description of a pulmonary valve stenosis in a wild felid managed by balloon valvuloplasty.

IMM RECHERCHE VIDEOS
http://www.imm-recherche.com/movies

IMM Recherche know-how

Cardiovascular surgery
Interventional cardiology
Surgical research
Complete pathology services
Physician training
Good Laboratory Practice
Full undertaking of your project

We have more than 20 years experience in large animal surgical research, interventional radiology, validated procedures, cutting-edge equipment and state of the art surgical suites. We have a strong know-how in cardiovascular research but also in, ophthalmology, thoracic surgery, neuro-surgery, orthopedics, dentistry, urology, fetal surgery and robotics. In addition IMM Recherche offers a state-of-the-art medical device pathology service. We follow the methods of Good Laboratory Practice to assure the highest professional standards. Our team will strive to service your study and bring your medical device to market in a timely and cost effective manner.

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Short list of our publications in the field of veterinary cardiovascular interventions and surgery

1-Behr L, Chetboul V, Sampedrano CC, Vassiliki G, Pouchelon JL, Laborde F, Borenstein N. Beating heart mitral valve replacement with a bovine pericardial bioprosthesis for treatment of mitral valve dysplasia in a Bull Terrier. Vet Surg. 2007 Apr;36(3):190-8.
2-François L, Chetboul V, Nicolle A, Carlos C, Borenstein N, Pouchelon JL. Pacemaker implantation in dogs: results of the last 30 years. Schweiz Arch Tierheilkd. 2004 Jul;146(7):335-44.
3-Borenstein N, Behr L, Chetboul V, Tessier D, Nicole A, Jacquet J, Carlos C, Retortillo J, Fayolle P, Pouchelon JL, Daniel P, Laborde F. Minimally invasive patent ductus arteriosus occlusion in 5 dogs. Vet Surg. 2004 Jul-Aug;33(4):309-13.
4-Borenstein N, Daniel P, Behr L, Pouchelon JL, Carbognani D, Pierrel A, Macabet V, Lacheze A, Jamin G, Carlos C, Chetboul V, Laborde F. Successful surgical treatment of mitral valve stenosis in a dog. Vet Surg. 2004 Mar-Apr;33(2):138-45.
5-Nicolle A, Borenstein N, Tessier Vetzel D, Rouby M, Behr L, Pouchelon JL, Chetboul V. Exploration of a third degree atrioventricular block by standard echocardiography, tissue Doppler imaging, and treatment with a cardiac pacemaker in a German wire-haired pointer. Schweiz Arch Tierheilkd. 2004 Feb;146(2):81-7.
6-Chetboul V, Tessier D, Borenstein N, Delisle F, Zilberstein L, Payen G, Leglaive E, Franc B, Derumeaux G, Pouchelon JL. Familial aortic aneurysm in Leonberg dogs. J Am Vet Med Assoc. 2003 Oct 15;223(8):1159-62, 1129.
7-Borenstein N, Chetboul V, Rajnoch C, Bruneval P, Carpentier A. Successful cellular cardiomyoplasty in canine idiopathic dilated cardiomyopathy. Ann Thorac Surg. 2002 Jul;74(1):298-9.