

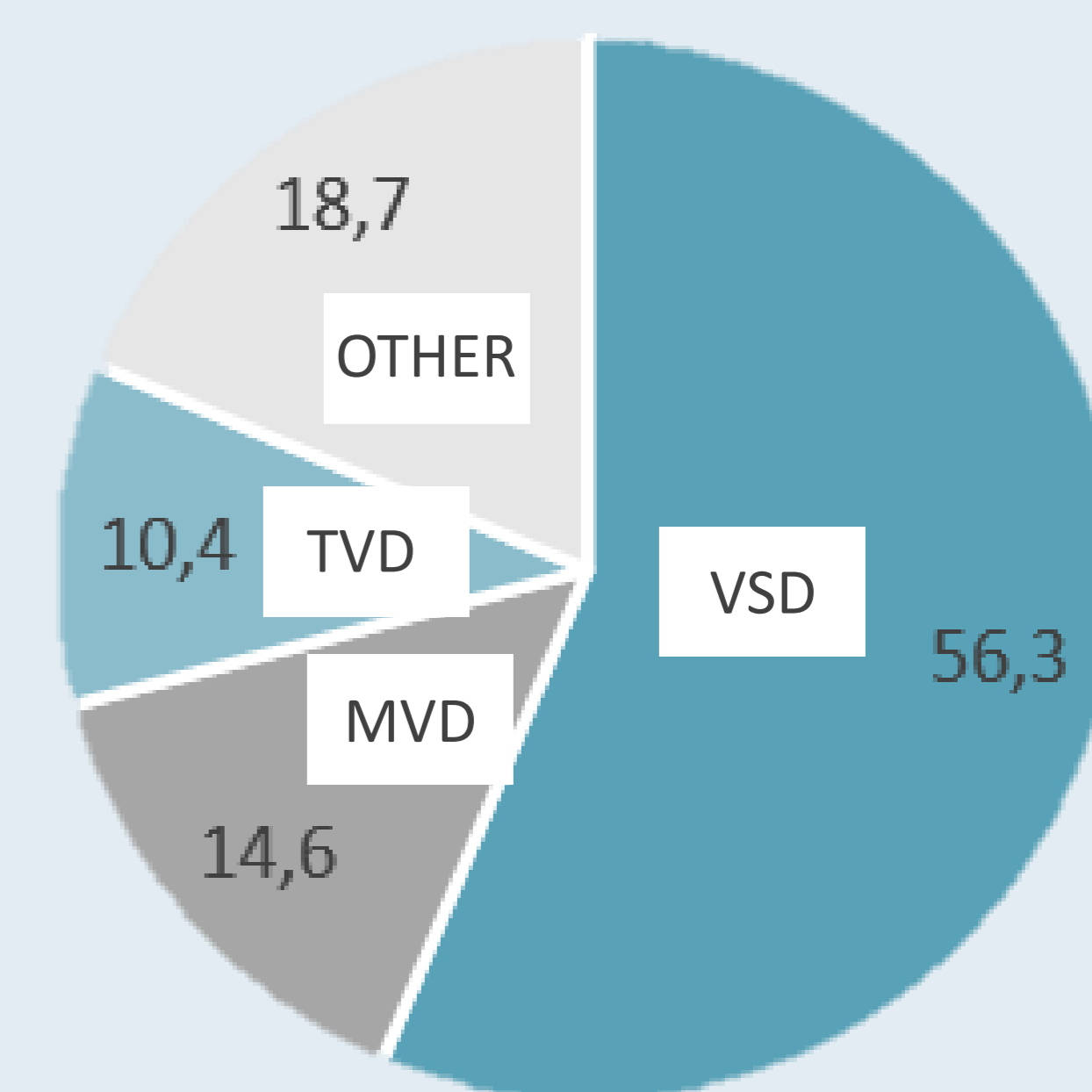
OBJECTIVES

- Describing and studying in detail the main congenital cardiovascular malformations in the cat.
- Evaluating their incidence and importance in small animal clinical practice.

INTRODUCTION

Congenital cardiovascular diseases are less common in cats, revealing an **incidence of 0,2 %** of total feline patients.

Ventricular septal defect is the most prevalent anomaly, followed by atrioventricular valve dysplasia and less prevalent malformations such as patent ductus arteriosus (Graph 1).



Graph 1 – Incidence of congenital cardiovascular diseases in the cat in %. Modified from Riesen et al., (2007). VSD, ventricular septal defect; MVD, mitral valve dysplasia; TVD, tricuspid valve dysplasia.

MOST COMMON CONGENITAL CARDIOVASCULAR ANOMALIES

VENTRICULAR SEPTAL DEFECT

Opening in the ventricular septum due to an inability to close the interventricular foramen resulting in an **intracardiac shunt**.

Genes like *NKX2.5*, *GATA 4*, *TBX5* and *HAND2* regulate the septation of the heart and have been related to this defect.

PATENT DUCTUS ARTERIOSUS

Lack of closure of the ductus arteriosus after birth, causing a connection between the aorta and the pulmonary trunk, creating a **continuous shunt**.

There is an **anatomical and functional closure** involving factors such as cyclooxygenases, prostaglandins and vascular components.

TRICUSPID VALVE DYSPLASIA

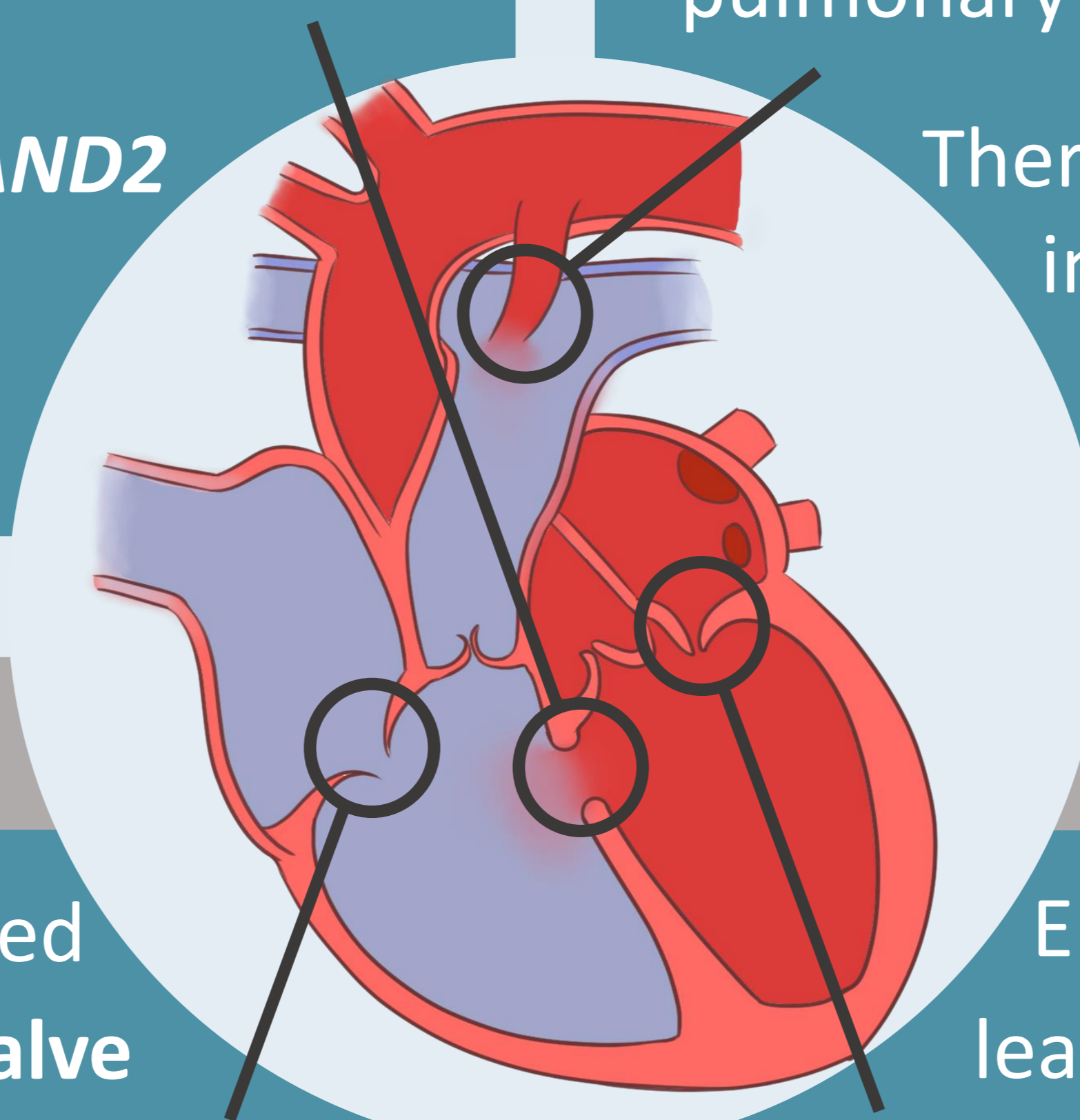
Enlargement of the tricuspid annulus, affected leaflets and *chordae tendinae* leading to a **valve insufficiency**.

This results in **blood regurgitation**, which induces right atrial and ventricular enlargement. Mutations in the *PDL1* gene have been related.

MITRAL VALVE DYSPLASIA

Enlargement of the mitral annulus, affected leaflets and *chordae tendinae* leading to a **valve insufficiency**.

This results in **blood regurgitation**, which induces left atrial and ventricular enlargement. Mutations in the *FLNA* gene have been related to this anomaly.



CLINICAL SIGNS AND DIAGNOSIS

The main clinical sign is usually the auscultation of a **murmur**. Congestive **heart failure** may also develop.

Radiographs and electrocardiogram can help in the diagnosis, but confirmation is performed through **echocardiography** (Figure 1).

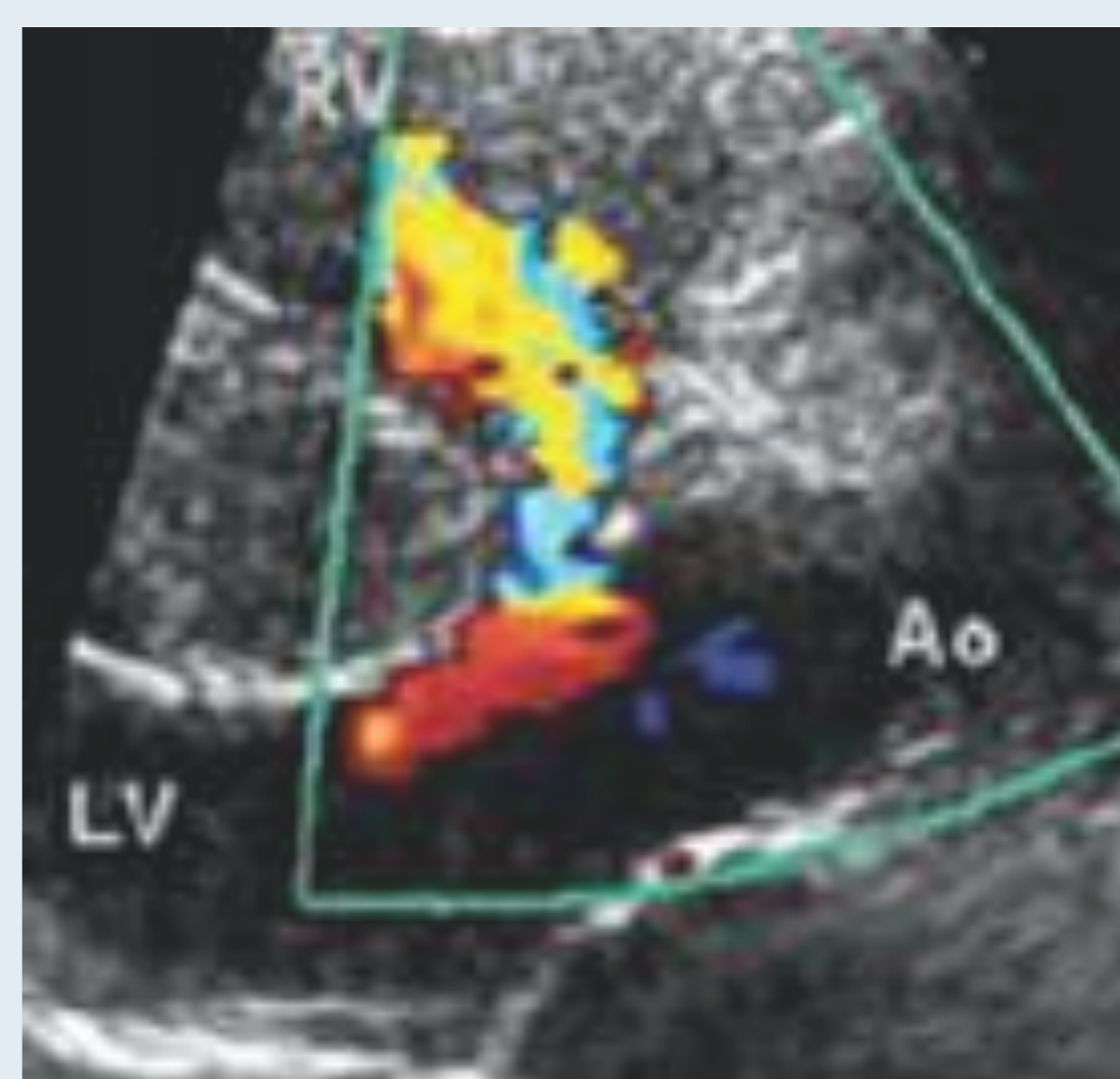


Figure 1 – Doppler echocardiography of a ventricular septal defect (Côté et al., 2011). RV, right ventricle; LV, left ventricle; Ao, aorta.

TREATMENT

The trend in human medicine toward minimally invasive **surgeries** will likely be mirrored in veterinary medicine.

However, currently most cats only receive **medical management** for the heart failure.

CONCLUSIONS

Despite the advances in human medicine, **questions remain regarding the dynamics** of congenital heart diseases, especially in the cat. **Early detection** of clinical signs and a **proper diagnosis** are key factors for treatment and prognosis. Further understanding of their mechanisms could change the direction of actual treatments.