



GROSS AND HISTOMORPHOLOGICAL OBSERVATIONS OF HEART OF KING COBRA (*Ophiophagus hannah*)

Received- 05.07.2014

Accepted- 16.02.2015

Reptile cardiology itself is in its infancy and is known to have a three-chambered heart (except in crocodiles) with a complete atrial septum and a single ventricle is subdivided by an incomplete septum. The conus arteriosus is absent and the arterial trunks have separate origins from the lumen of the ventricle. The reports of gross and histomorphological observations on the heart of snakes are rare. Hence an attempt was made to describe gross and microscopical features of the heart of an eight year old male King Cobra (*Ophiophagus hannah*), brought for post-mortem to the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Mannuthy, from Snake Garden, Malampuzha, Palghat.

Detailed necropsy was conducted by opening the coelomic cavity of the snake completely, exposing the visceral organs. After recording the topography and the morphological features of the heart, representative samples taken from the right ventricle, right auricle and atrio ventricular junction of heart were fixed in 10% neutral buffered formalin. Fixed tissue pieces were processed for paraffin embedding and 4 μ thick sections were subjected to routine Haematoxylin and Eosin staining (Luna, 1968) and Gomori's one step trichrome staining (Bancroft and Gamble, 2008).

The snake had a length of 3.2 m from the tip of the head till the tail end and 2.6m up to cloaca. The heart was located 0.85m caudally from the tip of the head, which was exactly a point one fourth caudal to its head (Kik and Mitchell, 2005). It was found secured in a pericardial sac (Fig. 1) and grossly the heart was 69 mmlong from base to apex and had 32 mm diameter at the coronary groove. The heart was observed to be three chambered, where in the

right and left atria were completely separated with an interatrial septum and the ventrally placed muscular septum partially divided the ventricles as the right cavum venosum and left cavum arteriosum, which were comparable to right and left ventricles of mammalian heart. Similar to the observations of Girling and Hynes (2004) in reptilian hearts, the right atrium was observed to be larger than the left in the present study (Fig. 2). Left atrium drained to cavum arteriosum, and the opening was regulated by an atrioventricular valve. These observations were in accordance with that of Kik and Mitchell (2005).

Histologically, the cardiac wall consisted of the outer epicardium, middle myocardium and the inner endocardium (Fig. 3). The epicardium contained dense connective tissue fibres wherein the coronary blood vessels were lodged (Fig. 4). The myocardium was made up of cardiac muscles supported by connective tissue. The endocardium was thinner with continuous squamous epithelial cells forming the endothelial layer. No evidence of Purkinje fibres could be found in serial sections from the different parts of heart.

SUMMARY

The study was carried out on the heart of an eight-year-old King Cobra (*Ophiophagus hannah*), brought for post-mortem in the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Mannuthy, from Snake Garden, Malampuzha, Palghat, Kerala. The gross observations were recorded and histological analysis was carried out on representative samples. The heart was found to be three chambered as in most reptiles with the ventricles partially divided by a ventrally placed muscular septa. The serial sections

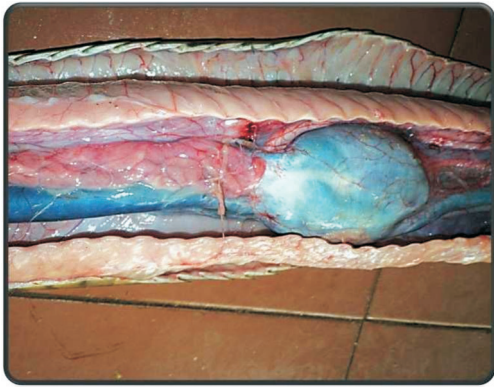


Fig. 1 – Photograph of heart of King Cobra covered with pericardium

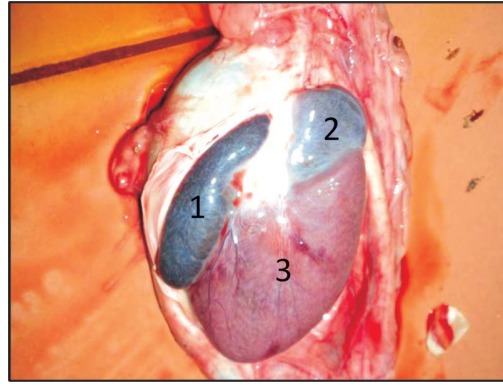


Fig. 2 – Photograph of heart of King Cobra showing larger right atrium (1), left atrium (2) and ventricle (3)

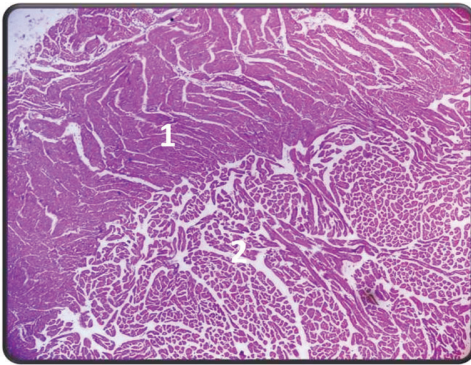


Fig. 3 – Cross section of heart showing epicardium (1) and myocardium (2) (H&E X50)

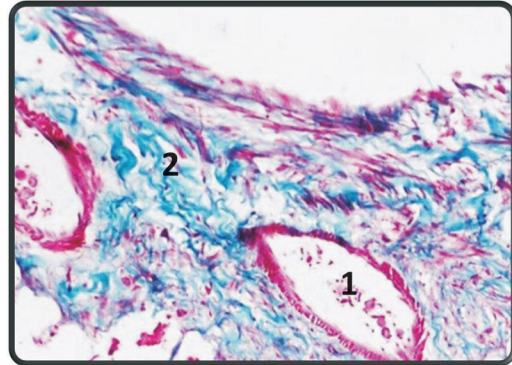


Fig. 4 – Cross section of heart showing coronary vessels (1) in epicardium (2) (Gomori's one step trichrome X400)

from different parts of heart couldn't trace the evidences of Purkinje fibres.

References

- Bancroft, J.D. and Gamble, M. 2008. *Theory and Practice of Histological Techniques*. (6th Ed.). Churchill Livingstone, United States of America. pp. 83-134.
- Girling, S.J. and Hynes, B. 2004. Cardiovascular and haemo-poietic systems. In: Girling, S.J. and Raiti, P. (eds): *BSAVA Manual of Reptiles*. (2nd Ed.). Quedgeley, Gloucester, BSAVA. pp. 243-260.
- Kik, M.J.L. and Mitchell, M.A. 2005. Reptile Cardiology: A review of anatomy and physiology, diagnostic approaches, and clinical disease. *Semin. Avian Exotic Pet. Med.* **14**: 52–60.
- Luna, L.G. 1968. *Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology*. (3rd Ed.). Mc Graw Hill Book Company, New York. pp. 12-21.
- P. Suvaneeth¹, C. Divya², N.D. Nair³, N. Vijayan⁴ and A. R. Sreeranjini⁵**
 Department of Veterinary Pathology,
 College of Veterinary and Animal Sciences,
 Mannuthy, Thrissur, Kerala- 680 651.

1. Ph. D scholar

2. Assistant Professor

3 Professor & Head, Department of Veterinary Pathology, CVAS, Pookode, Wayanad.

4 Professor & Head

5 Assistant Professor, Department of Veterinary Anatomy and Histology, CVAS, Mannuthy.