Case Report

SURGICAL MANAGEMENT OF PERSISTENT RIGHT AORTIC ARCH IN A GERMAN SHEPHERD DOG – A CASE REPORT

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ABSTRACT

A 2 month old male German shepherd dog was presented to Veterinary Clinical Complex, Small Animal Surgery Unit of Madras Veterinary College, Chennai with the history of persistent regurgitation for 15 days. Plain and positive contrast radiographic evaluation revealed the dilated oesophagus cranial to the heart and tracheal deviation with constriction at the base of the heart. Surgical correction through resection of persistent ligamentum arteriosum around the oesophagus under general anaesthetic procedure. Post operative plain and contrast radiographic procedure revealed no evidence of barium stasis in the course of oesophagus and complete resolution of regurgitation. Recovery was good and normal feeding habit noticed 14th post operative day.

Keywords: German Shepherd Dog, Persistent Right Aortic Arch, thoracotomy.

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INTRODUCTION

Persistent Right Aortic Arch (PRAA) is also known as Persistent 4th Right Aortic Arch and vascular compression. It is a congenital malformation of the aorta and their branches that causes oesophageal constriction and signs of oesophageal obstruction (Fossum,1997). The anomaly was a gastrointestinal disorder rather than a heart dysfunction (Fossum, 1997; and Morgan and Bray, 2019). The left pulmonary artery and the descending aorta are connected by ligamentum arteriosum during fetal growth. The oesophagus was encircled by the ligamentum arteriosum. Vascular "ring" anomaly causes extramural oesophageal constriction and begins to dilate cranially as food accumulates, which cause intermittent regurgitation. Chronic regurgitation predisposes to aspiration pneumonia. A genetic predisposition was noticed in German

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shepherd dogs and also in other breeds like Irish setters and Boston terriers (Fossum, 1997: Krebs *et al.,* 2014). This condition is present at birth, but clinical signs are evident at the time of weaning. Acute onset of the regurgitation, when solid or semisolid foods are fed. Thoracic radiography revealed dilated oesophagus cranial to the heart and tracheal deviation (Buchanan, 2004). Positive contrast radiography revealed oesophageal constriction near the base of the heart (Fossum, 1997). Surgery is the only treatment for PRAA. If vascular ring anomaly persists, the oesophageal dilatation worsens which leads to malnutrition related death (Caliskan *et al*., 2018). This case report describes about a clinical case of a dog with Persistent Right Aortic Arch that was surgically managed.

CASE HISTORY

A 2 month old male German shepherd dog was presented to Veterinary Clinical Complex, Madras Veterinary College, Chennai with the history of persistent regurgitation for past 15 days.

DIAGNOSIS

Physical examination revealed enlargement of cranial part of oesophagus in the neck region. Plain radiography of thorax revealed dilated oesophagus cranial to the heart (Fig.1). Positive contrast radiography of thorax using barium sulphate suspension was performed. The results showed oesophageal constriction near to the base of heart, with oesophageal dilatation extending cranially (Fig.2). The haemato-biochemical values were within the normal range.

TREATMENT AND DISCUSSION

After overnight fasting, the dog was prepared for aseptic surgery and anaesthetized for thoracotomy with atropine sulphate (0.02mg/kg-SC), followed by xylazine hydrochloride (1mg/kg-IM), ketamine hydrochloride (5mg/kg-IV) and diazepam (0.5mg /kg IV). Animal was positioned in right lateral recumbency for left lateral thoracotomy. Anaesthesia was maintained with 2.5% isoflurane and oxygen was delivered through 5 mm cuffed endotracheal tube which maintains the intermittent positive pressure ventilation. Surgery was performed at left 4th intercostal space. Vagal and phrenic nerves were identified and separated to avoid post operative complications. The dilated portion of oesophagus cranial to the stricture and ligamentum arteriosum was identified the ligamentum arteriosum over the stricture area were double ligated and transected (Fig.3). The thoracotomy closure was achieved by placing interrupted circumcostal sutures of 1-0 polyglactin 910 (Vicryl) encompassing the ribs immediately cranial and caudal to the incision. Before the sutures were tightened, pneumothorax was eliminated by inflation and expansion of the lung to re-establish negative intra thoracic pressure by using three ways stop cocker (Fig.4). The dog was monitored for signs of dyspnoea. The animal was maintained on fluid therapy for 5 to 7 days. Post operative radiography showed complete recovery from PRAA (Fig.**5**). The owner was advised to feed the animal in elevated position. Animal made an uneventful recovery after 14th post operative day. Pure breed dogs are more susceptible

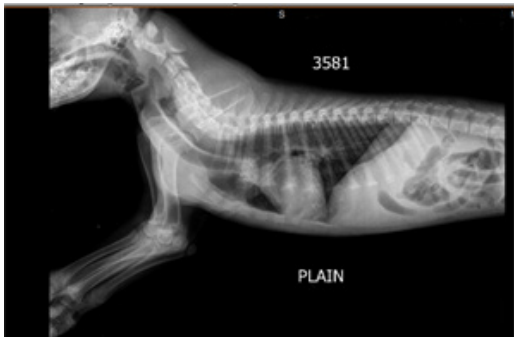

Fig. 1. Plain radiography of thorax revealed dilated. Oesophagus cranial to the heart

Fig2. Contrast radiographic studies (2 hr after barium administration) revealed barium stasis at the level of thoracic part of oesophagus cranial to the heart and clearance noticed from small intestines

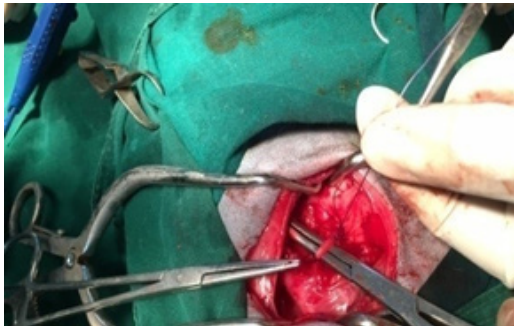

Fig. 3. Double ligation and transection of ligamentum arteriosum

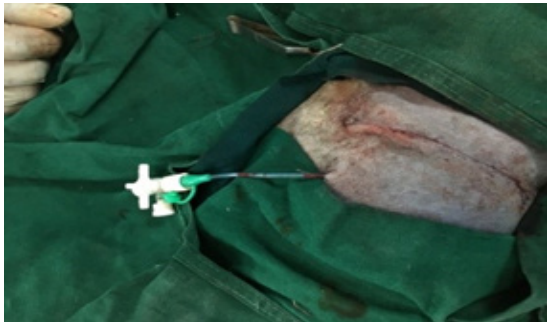

Fig. 4. Placement of three way stop cocker for re-establishment of negative pressure and drainage of exudates

Fig. 5. Postoperative positive contrast radiography of oesophagus showing clearance of barium stasis

than mongrels in PRAA (Bojrab *et al*., 1998) as with German shepherd dog in our case report. The affected animal showed slower growth rate and malnourished as reported by Caliskan *et al. (*2018). Caliskan *et al.* (2018) reported to stabilize the animal for surgical management by administering Ringer's lactate solution 20 ml /kg/hr and cefazoline sodium 20 mg/kg intravenously in concordance to our procedure. Definitive treatment for PRAA involves surgical ligation and division of ligamentum arteriosum by thoracoscopy and thoracotomy (Bojrab *et al*.,1998, Caliskan *et al*.,2018, Nucci et *al*.,2018, Krebs *et al.,*2014). However, thoracoscopy was found to be an acceptable method for treating dogs with PRAA for less post operative pain (Macphail *et al.,* 2001) and with less mortality rate (Nucci *et al.,* 2018). Post operative management of animals with PRAA should be of elevated feeding with moistened food in little quantities and should be continued for at least 8 weeks before attempting for normal feeding (Bojrab *et al.*, 1998).

CONCLUSION

This paper is to report the successful recovery of PRAA in a 2 month old male German shepherd dog.

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