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Kalaiselvan Elangovan
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Swapan Kumar Maiti
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Shivaraju Shivaramu
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Yumpi Kamdak
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Amitha Banu
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Divya Mohan
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Rajendran Manikandan
Division of Microbiology, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Murali Dinesh
Division of Pathology, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Monalisa Sahoo
Division of Pathology, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Naveen Kumar
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Corresponding Author:
Kalaiselvan Elangovan
Division of Surgery, ICAR-
Indian Veterinary Research
Institute, Uttar Pradesh, India

Gross morpho-histological diagnosis and surgical treatment of pilonidal cyst in a German shepherd

Kalaiselvan Elangovan, Swapan Kumar Maiti, Shivaraju Shivaramu, Yumpi Kamdak, Amitha Banu, Divya Mohan, Rajendran Manikandan, Murali Dinesh, Monalisa Sahoo and Naveen Kumar

Abstract

Dermoid sinus is congenital condition occur in all species due to maldevelopment of skin and neural tube. A young German shepherd presented with an illness head itching. On general clinical examination fronto-parietal region there was a quadri irregular swollen mass with two small opening within which tufts of hair protruded. A tentative diagnosis of multiple cutaneous Dermoid sinus was made despite the atypical location and breed. Histopathologically it was confirmed as dermoid/pilonidal cyst, characteristic of cystic lumen with sebaceous structures and hair. The dog was recovered uneventfully after radical surgical excision with a course of antibiotic, analgesic and antiallergic therapy.

Keywords: German shepherd, dermoid sinus, fronto-parietal region

Introduction

Dermoid sinus is congenitally inherited condition consists of tubular skin defect due to incomplete separation of skin and the nervous system during early embryonic development in animals and humans (Donnell *et al.*, 2020 and Appelgrein *et al.*, 2016) ^[1, 2]. It's inherited in rhodesian ridgeback dogs and not clear in other dog breeds (Jones *et al.*, 2019) ^[3]. The tract may ends at just beneath the skin like a blind sac or may extend beneath the skin tissue or upto the dura mater which covers spinal cord (Kiviranta *et al.*, 2011) ^[4]. This often gets infected and chances meningitis common if tract associated with spinal cord. It's mostly reported in midline of cervical and thoracic regions. Due to association with midline, surgical intervention warranted meticulously to treat the patients. This case report explains histological findings and treatment of fronto-parietal multiple dermoid sinus of German shepherd dog.

Case presentation and clinical examination

A 1 ½ year old, 22 kg, intact female German shepherd dog was presented with a week history of discharge from a palpable, irregular swelling in the fronto-parietal region. The owner reported that the dog had scratched the head on wall almost daily since it was a puppy. Palpation of the head elicited a marked irregular swelling. The straight sturdy polyamide insertion in the aperture confirmed the intactness of skull.

Both anaerobic and aerobic culture of secretion could not reveal any specific microorganism. Routine parameters of clinical haematology and biochemistry did not have any significant.

Surgical procedure

Hair was clipped from the area about 6 cm radiuses, revealing abnormal skin which covered the area of right off center near right ear base of fronto-parietal portion of the skull (Fig. 1a). Atropine sulphate (0.04 mg/Kg intramuscular) and xylazine (1mg/Kg intramuscular) administered as pre anaesthetics from the 10 minutes later induction and maintenance done by using ketamine (2mg/Kg intravenously) in a Ringer lactate fluid line (10ml/Kg/hr).

The animal kept in prone position with supportive pads. The site prepared aseptically for surgery by chlorhexidine scrubbing and draping. The lump of multiple mass aggregated within 5 cm radiuses approximately (Fig. 1b). Hence with the help of 1.5 times of radiuses length of elliptical incision used in order to avoid dog ear. The area under incision was excavated meticulously. The underlying connective tissues closed in simple continuous fashion to avoid dead space and skin was closed with interrupted fashion (Fig. 1c).

After surgery the animal treated daily with diluted Povidone (0.05%) dressing, wound site protected by fastening of Elizabethan collar for 7 days, Ceftriaxone @ 20 mg/Kg body weight bid for 5 days, butorphanol @ 0.2 mg/Kg body weight bid for 3 days and Phentermine maleate @ 0.5 mg/Kg body weight per oral bid for 3 days. The skin sutures were removed on 12th postoperative day and advised the owner to look after for 3 months for any head scratching. The pet recovered without any surgical complication.

Tissue micro photographic analysis

The excavated lumps sent for histological analysis in a 10% formalin preservative container (Fig.1d). The tissue processed as per standard histological techniques, eventually stained by Hematoxylin and Eosin stain. The H & E staining of tissue (Fig. 2a, 2b, 2c & 2d) depicted the characteristic of pilo sebaceous structure, presence of hair shaft, abundant keratin flakes within the cystic lumen along with focal area of mononuclear infiltrations in the muscle fibres. This histopathological analysis strongly evidenced that it's the case of dermoid sinus or cyst /pilonidal sinus or cyst neither invaded into the skull nor infected.

Discussion

Dermoid sinus has synonyms dermoid cyst/pilonidal sinus or cyst (Fleming *et al.*, 2011) [5]. It must be differentiated from germ cell tumour teratoma. Because ovarian teratoma also known as dermoid cyst. Unlike dermoid sinus it has all the three germinal layers and may differentiate into any tissue of the body (Oliveira *et al.*, 2004) [6]. Dermoid sinus reported in all domestic animals. In Rhodesian ridgeback breed it's inherited and predisposed via autosomal dominant trait (Newton, 2019 & Perazzi *et al.*, 2013) [7, 8]. It's reported most commonly in cervical and thoracic region, commonly in sacral, less frequently in nose region (Miller & Tobias, 2003) [9] and rarely in lumbosacral and head region (Perazzi *et al.*, 2013) [8]. Earlier it was thought that Dermoid sinuses occurs only at dorsal midline in sagittal plane. But the report of dermoid sinuses on head by Bornard *et al.* (2007) [10] and Further this case report supports that dermoid sinuses could occur wherever along the lines of embryological fusion. Interestingly intestinal dermoid cyst also been reported in German shepherd dog with histological features (Saber *et al.*, 2013) [11]. The clinical findings of dermoid sinus has often itching, head rubbing if lesion on head, lichenified thickened skin of protruding hair with or without discharge (Fleming *et al.*, 2011) [5]. Sometimes infected with bacteria's and depends on the connection with meninges and spinal cord it produces from mild inflammation to neurological signs (Rycke and Saunders, 2017) [12]. These dermoid sinuses also are associated with spinal, limb malformations (Barrios *et al.*, 2014) [13], spina bifida (Motta *et al.*, 2012) [14], tethered cord syndrome (Kopke *et al.*, 2019) [15] and meningomyelocele (Musso *et al.*, 2019) [16]. Dermoid sinuses classified into five types (degree of penetration) with three subtypes (anatomical location a to c) in dogs. It depends on the degree of

penetration in the subcutaneous tissues and whether or not a skin opening exists (type I to V) and on the anatomical location (subtypes a to c) (Bornard *et al.*, 2007) [10]. This case falls under the type Ib of four independent sinuses. The diagnosis and extend of dermoid sinuses can be made from fistulography (Corneigliani *et al.*, 2001) [17], CT (Jones *et al.*, 2019) [3] CT combined fistulography (Barrios *et al.*, 2014) [13] and MRI (Fleming *et al.*, 2011) [5]. Among the former MRI proved as useful tool for characterization of lesion and for meticulous surgical approach (Tong & Simpson, 2009) [18]. Confirmation of dermoid sinuses can be made by histopathology only. It's often confused others like folliculosebaceous hamartoma, trichofolliculoma and infundibular cyst. Unlike above stated, dermoid sinuses has randomly distributed sebaceous lobules, folliculosebaceous units radiating from cyst wall which oriented perpendicular to it and no signs of differentiation of isthmus or hair matrix ((Perazzi *et al.*, 2013) [8]. Dermoid sinuses shows dermal cystic structures squamous debris and hair shaft emerging from wall lined by squamous epithelium (Rochat *et al.*, 1996) [19]. Complete excision is the treatment of choice for dermoid sinus (Kiviranta *et al.*, 2011) [4]. Although conservative treatment reported in asymptomatic cases (Miller & Tobias, 2003 [9] and White, 2006) [20], long term outcome has been not reported.

Conclusion

The dermoid sinus which does not have contact with spinal cord or thecas of brain has good surgical outcome. To the authors knowledge this is the first fronto-parietal dermoid sinus report in young German shepherd and its diagnosis and surgical management.

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Author's contribution statement

Kalaiselvan Elangovan: Drafted the first manuscript and Second major surgeon; Swapan Kumar Maiti: Major surgeon; Shivaraju Shivaramu: Reviewed the manuscript & first assistant surgeon; Yumpi Kamdak: Second assistant surgeon; Amitha Banu: carried out Pre and postoperative care and management; Divya Mohan: Editing of manuscript and carried out Anaesthesiology and postoperative care; Manikandan Rajendran: Bacteriological culture analysis and infection assessment; Dinesh Murali & Monalisa Sahoo: Histopathological analysis; Naveen kumar: supervision

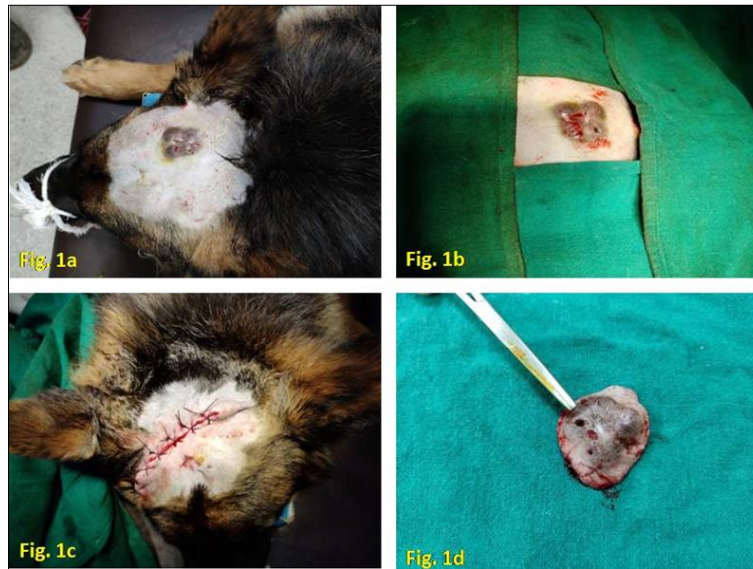


Fig 1: a) Presence of dermoid cyst right off center of fronto-parietal region b) quadric irregular dermoid cyst with pilo erective structure after aseptic surgical site preparation c) De-roofed site after placement of complete simple interrupted cross mattress suture. d) Gross appearance of radically excised tissue

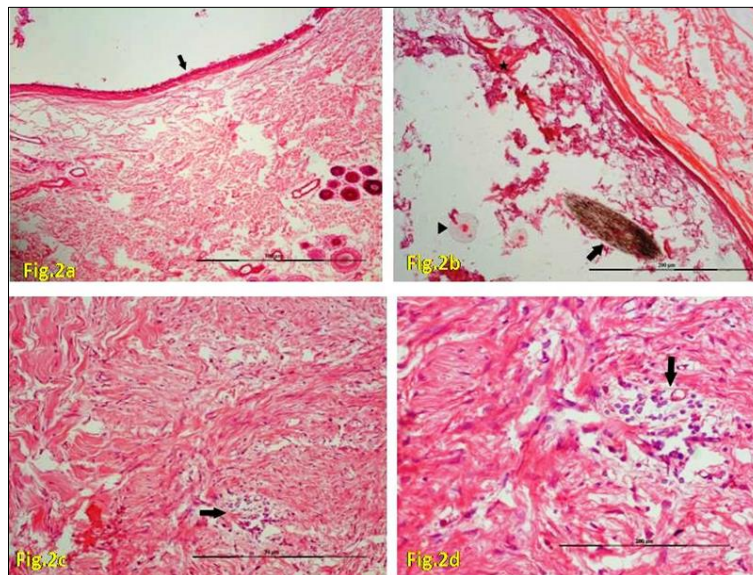


Fig 2: a) Dermoid cyst of dog showing the presence of cyst lined by stratified squamous epithelium with inner granular layer (arrow) b) lumen cyst containing abundant keratin flakes (star), with presence of pilo sebaceous structure (arrow head), note presence of hair shaft (arrow) within the cystic lumen c) focal area of mononuclear cells infiltration in the facial muscle fibers d) improvised view of focal area of mononuclear cell infiltration in the facial muscle fibers

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