

Atypical dermoid sinus in a chow chow dog

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ABSTRACT

A case of multiple dermoid sinuses in the dorsal cervical and craniothoracic regions in an adult chow chow dog is described. One sinus did not open on the skin surface. This is the first reported case of the condition in this breed and the first time absence of the sinus opening on the skin is described. The use of the term pilonidal sinus to describe this condition is challenged.

Key words: chow chow, cutaneous opening, dermoid sinus, pilonidal sinus.

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INTRODUCTION

The term dermoid sinus was first used in 1939 to describe a skin defect seen in 2 Rhodesian ridgeback puppies²⁷, and later in Rhodesian ridgeback crosses¹⁰. Cases have also been reported in a Yorkshire terrier⁵, shih tzu²⁵, boxer²⁵, English bulldog²⁴, boerboel²¹ and Great Pyrenees dog⁴. In the Rhodesian ridgeback the condition is hereditary^{10,17,18}.

Dermoid sinus is a congenital abnormality caused by incomplete separation of the ectodermal neural tube from the skin during embryological development^{1,3,15,18,21,25}. The result is a blind-ending tube of varying thickness and lined by epidermal appendages, extending from a small dorsal midline skin opening into the deeper tissues.

The condition is usually detected in Rhodesian ridgebacks and their crosses^{1,24} when they are young since they are actively screened for the condition by breeders and veterinarians^{18,23}. Breeds in which the dermoid sinus is rarely suspected may only be presented with clinical signs as adults^{5,21,25}. The sinus can be single or multiple^{1,10,22}, opening on the dorsal midline in the cervical, cranial thoracic and sacrococcygeal regions where the characteristic dorsal ridge of the Rhodesian ridgeback and their crosses is absent^{1,10,18,21}. They do not occur within the areas of the ridge^{10,15,16,18,21,23}, as has been incorrectly stated by some authors^{7,19}. Swelling due to continued production of sebum within the sinus tract^{5,18} and

draining tracts are common presenting complaints. In uncomplicated cases a hard cord can be palpated in the subcutaneous tissues¹⁰. Pain on palpation may occur if secondary inflammation or infection is present¹⁵, which can progress into an abscess that ruptures into the surrounding tissues¹⁰. Neurological signs may be present if the sinus communicates with the dura mater and causes inflammation of the spinal cord^{10,15,25}.

CASE HISTORY

A 20-month-old male, neutered, pure-bred chow chow dog was referred to the Onderstepoort Veterinary Academic Hospital (OVAH) with a history of dermoid sinuses. A year before referral, the dog was presented with a swollen, infected, discharging tract in the dorsal midline of the mid-cervical region that the referring veterinarian treated by surgical excision of a mass. Four to 5 months later the subcutaneous mass reappeared caudal to the previous surgical site. Intermittent infection of the mass was controlled with antibiotics, but it reappeared when the antibiotics were discontinued.

On clinical examination at OVAH a firm cord, about 7 mm in diameter, was palpated in the subcutis of the mid-cervical region underlying the previous surgical scar and extending in a cranioventral direction (sinus 1). Five centimetres caudal to this scar, a firm, non-painful, well-defined subcutaneous structure 15 mm in diameter was palpated in the midline connected to the skin *via* a small opening (sinus 2). Two similar, discrete, round subcutaneous structures were present in the midline of

the cranial interscapular region. The cranial structure (sinus 3) did not have a skin opening, while the caudal one (sinus 4) had a 1 mm skin opening with a protruding tuft of hair. No neurological abnormalities were present.

Survey radiographs of the cervical and thoracic vertebral column revealed an irregular area of lysis on the caudodorsal aspect of the dorsal spinous process of T₁. Based on the history, clinical signs and suspected involvement of bone, a tentative diagnosis of multiple dermoid sinus was made. Fine-needle aspirates of the masses were not performed.

After routine anaesthetic induction, prophylactic amoxycillin (Amoxil, Smith Kline Beecham) was administered intravenously at a dose of 15 mg/kg. Preparation of the patient and surgical procedure were as previously described^{10,14,16,19,23}. The firm cord of sinus 1 started blindly below the skin and was surrounded by scar tissue dorsal to the neck muscles, with many smaller fibrous cords branching off from it. These were dissected out *in toto* with the surrounding scar tissue, the main tract ending abruptly as a thin fibrous band extending towards the nuchal ligament. The opening of sinus 2 communicated with a round cystic structure that ended abruptly in the subcutis. Sinus 3 was 15 mm in diameter, started about 5 mm below the skin, ended blindly in the subcutis and did not communicate with the surface of the skin. The 4th sinus communicated with the external skin opening by means of a short, thickened cord, dilated to 20 × 15 × 20 mm and then continued as a fibrous cord of approximately 4 mm diameter. This cord ended on the cartilage covering the caudodorsal aspect of the dorsal spinous process of T₁ without extending into the underlying bone. Although it was suspected radiographically that the sinus tract may have continued into the bone, no continuation was seen ventral to the supraspinous ligament. No connections were present between the sinuses. All the resected tissues were submitted in 10 % buffered formalin for histological examination.

A fenestrated tube drain connected to a closed active drainage system (Porto-Vac, Sabax) and a well-padded neck bandage

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were applied to obliterate dead space and prevent the formation of a seroma. Prophylactic amoxycillin-clavulanic acid (Synulox, Pfizer A.H.) was given orally at a dose of 20 mg/kg, 4 and 12 h post-operatively. The drain was removed after 2 days, when drainage had become negligible and the bandage removed on the 3rd post-operative day.

Histologically the sinuses had the appearance of dilated hair follicles, with large amounts of keratin occupying the lumens. The surrounding squamous epithelium was thin and atrophied, and surrounded by mature connective tissue. Sinus 1 had several tracts branching off from the main tract. These tracts had the appearance of hair follicles with adnexal structures and were present in the connective tissue surrounding the main tract. Multifocal areas of pyogranulomatous inflammation were evident around keratin and hair fragments. All sinuses were considered to have been removed *in toto* and no communication could be demonstrated between the sinuses.

No recurrence of any of the sinuses occurred during the 5 months following surgery.

DISCUSSION

Four types of dermoid sinuses have been described depending on the depth to which the sinus extends: type I ending on the supraspinous ligament directly, type II ending indirectly on the supraspinous ligament *via* a fibrous band, type III ending in the subcutaneous tissues and type IV ending on the dura mater¹⁸. Sinus 1 did not open on the skin surface due to suspected previous incomplete resection with resultant recurrence. This would explain the presence of the fibrous scar tissue below the skin, in which the sinus abruptly started. The 3rd sinus had no external opening on the skin surface, but a thin band of fibrous tissue extended proximally from this cystic structure towards the skin. Absence of a skin opening has not previously been reported. In two cases found in the literature, no mention was made of observing an external opening after clipping the surrounding hair. In both these cases the initial diagnosis was that of an abscess. It is unlikely that this common feature would be overlooked or not reported. A Rhodesian ridgeback puppy was affected in 1 case²⁷, and the author does comment on the presence of the openings in the 2nd case. No mention of a discharging tract is made, so it is unlikely that the skin opening was obscured by a ruptured abscess. The other case involved a boerboel²¹, in which no

opening was observed either (S van Schouwenberg, Waterkloof Veterinary Hospital, pers. comm., 1997). Although it cannot be certain that a skin opening was absent in these 2 cases, but simply not reported, it is possible that they were similar to sinus 3 in this report. If failure of separation of the neural tube can give rise to a fibrous band connecting a dermoid sinus distally to the supraspinous ligament, it should also be possible for such a connection to exist proximally between the sinus and the skin. This would result in the absence of an external skin opening. It is proposed that this appearance be classified as a type V lesion.

The treatment of choice for dermoid sinuses is complete surgical excision^{1,3,10,15,16,23,25}. Entry into the sinus tract, which can make removal of the entire sinus difficult and increase the chance of postoperative infection, should be avoided¹⁰. Conservative management of dermoid sinuses has been advocated by certain authors^{7,19,24}, delaying treatment until clinical signs become evident. This approach is questionable for the following reasons: a) clinical signs can develop later in life, requiring surgery^{4,10,17,19,21,25}, b) a sinus that communicates directly with the dura mater can cause meningoencephalitis and neurological signs^{10,15,25}, c) long-standing dermoid sinuses get infected and inflamed, making surgery more extensive and increasing the risk of incomplete removal and subsequent recurrence^{6,10,14,15,21,27}. Surgery on early, elective cases is uncomplicated except for the formation of a seroma^{10,14,19}. If surgery is to be attempted, facilities and expertise should be available to perform a dorsal laminectomy, should the sinus communicate directly with the dura mater^{1,3,14,25}.

The histological appearance of all 4 specimens examined in this case was typical of a dermoid sinus^{3,6,15,17-19,21,25,27}. They consisted of thin, stratified, squamous epithelium lining the sinus, with the presence of adnexal structures, especially hair follicles, but also sebaceous and sweat glands. The term pilonidal sinus is used in standard veterinary textbooks to describe the dermoid sinus^{3,15}. All the case reports of this condition, however, refer to it as a dermoid sinus^{2,4-6,8-11,13,18,19,21-23,25,27,28}. Reference to pilonidal sinus is made in another 3 case reports, but only as a synonym^{14,16,17}. A search of the current veterinary literature failed to find any articles containing the term pilonidal sinus. The term is derived from human medical literature, and describes an inflammatory condition seen in the sacrococcygeal region of mainly obese post-pubertal male patients. It has

also been reported in the umbilicus, axilla, clitoris, hands and feet²⁰. Initially the cause was thought to be congenital, but the currently accepted hypothesis is that it is predominantly an acquired disease, although congenital forms are described on rare occasions¹². Based on histological findings it has been proposed that friction in the natal cleft causes keratin plugs to penetrate the dermis, resulting in a foreign-body reaction. Deep infection causes the development of lateral sinus openings lined by granulation tissue. The result is a granulation tissue-lined sinus containing hair and debris, with limited amounts of epithelialisation from the skin surface, inflammation and fibrosis²⁶. Continuing friction causes hair shafts to be forced down into the cyst, maintaining the foreign-body type reaction¹². Giant cells have been described as a common feature²⁰, supporting the hypothesis of a foreign-body reaction. Granulation tissue is not a characteristic of the dermoid, and the sinus is lined by squamous epithelium with hair follicles and adnexal structures. The only common feature between the 2 conditions is that a tuft of hair is involved. Pilonidal sinus has a distinctly different signalment, pathophysiology, histological appearance and treatment compared with the dermoid sinus^{10,17,20}. It is suggested that the term pilonidal sinus should not be used in reference to dermoid sinus in the dog.

It is important for clinicians to be aware that a dermoid sinus may be diagnosed in adult animals and in breeds other than the Rhodesian ridgeback and its crosses in which it has classically been described.

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REFERENCES

1. Angarano D W, Swaim S F 1993 Congenital skin diseases. In Bojrab M J (ed.) *Disease mechanisms in small animal surgery* (2nd edn). Lea & Febiger, Philadelphia: 178-183
2. Antin I P 1970 Dermoid sinus in a Rhodesian ridgeback dog. *Journal of the American Veterinary Medical Association* 157: 961-962
3. Bellah J R 1993 Surgical management of specific skin disorders. In Slatter D (ed.) *Textbook of small animal surgery* (2nd edn). W B Saunders, Philadelphia: 341-354
4. Camacho A A, Laus J L, Valeri V, Valeri F V, Nunes N 1995 Dermoid sinus in a Great Pyrenees dog. *Brazilian Journal of Veterinary Research and Animal Science* 32: 170-172
5. Fatone G, Brunetti A, Lamagna F, Potena A 1995 Dermoid sinus and spinal malformations in a Yorkshire terrier: diagnosis and follow up. *Journal of Small Animal Practice* 36: 178-180
6. Gammie J S 1986 Dermoid sinus removal in a Rhodesian ridgeback dog. *Canadian*

- Veterinary Journal* 27: 250–251
7. Grant D I 1991 Congenital skin disease. In Grant D I (ed.) *Skin diseases in the dog and cat* (2nd edn). Blackwell Scientific Publications, Oxford: 152–165
 8. Harmelin A, Tzur I, Perl S, Yakobson B, Orgad U 1991 Dermoid sinus in a Rhodesian ridgeback dog – a case report. *Israel Journal of Veterinary Medicine* 46: 32–33
 9. Hatchcock J T, Clampett E G, Broadstone R V 1979 Dermoid sinus in a Rhodesian ridgeback. *Veterinary Medicine and Small Animal Clinician* 74: 53–56
 10. Hofmeyer C F B 1963 Dermoid sinus in the ridgeback dog. *Journal of Small Animal Practice* 4: 5–8
 11. Hyman S D 1974 Dermoid sinus in dogs. *Canadian Veterinary Journal* 15: 230
 12. Jones D J 1992 ABC of colorectal disease. Pilonidal sinus. *British Medical Journal* 305: 410–412
 13. Kása F, Kása G, Kussinger S 1992 Dermoid-sinus beim Rhodesian Ridgeback. *Tierärztliche Praxis* 20: 628–631
 14. Lambrechts N 1996 Dermoid sinus in a crossbred Rhodesian ridgeback dog involving the second cervical vertebra. *Journal of the South African Veterinary Association* 67: 155–157
 15. LeCouteur R A, Child G 1995 Diseases of the spinal cord. In Ettinger (ed.) *Textbook of veterinary internal medicine* (4th edn): 629–683
 16. Leyh R, Carithers R W 1979 Dermoid sinus in a Rhodesian ridgeback. *Iowa State University Veterinarian* 41: 36–39
 17. Lord L H, Cawley A J, Gilray J 1957 Mid-dorsal dermoid sinuses in Rhodesian ridgeback dogs – a case report. *Journal of the American Veterinary Medical Association* 131: 515–518
 18. Mann G E, Stratton J 1966 Dermoid sinus in the Rhodesian ridgeback. *Journal of Small Animal Practice* 7: 631–642
 19. Marks S L, Harari J, Dernell W S 1993 Dermoid sinus in a Rhodesian ridgeback. *Journal of Small Animal Practice* 34: 356–358
 20. Onye E A 1981 Pilonidal cysts and sinuses. In Sabiston D C (ed.) *Textbook of surgery: the biological basis of modern surgical practice* (12th edn). W B Saunders, Philadelphia: 1683–1686
 21. Penrith M L, Van Schouwenberg S 1994 Dermoid sinus in a boerboel bitch. *Journal of the South African Veterinary Association* 65: 38–39
 22. Petrick S W 1981 Kort medelings oor gevalle van die oog, larinks, tragea en vel. *Journal of the South African Veterinary Association* 52: 69–70
 23. Ross G R, Howlett C R 1974 Dermoid sinus in the Rhodesian ridgeback in Australia. *Australian Veterinary Practitioner* 4: 173–181
 24. Scott D W, Miller W H, Griffin G E 1995 Congenital and hereditary defects. In Scott D W, Miller W H, Griffin G E (eds) *Small animal dermatology* (5th edn). W B Saunders, Philadelphia: 736–805
 25. Selcer E A, Helman R G, Selcer R R 1984 Dermoid sinus in a shih tzu and a boxer. *Journal of the American Animal Hospital Association* 20: 634–636
 26. Søndena K, Pollard M L 1995 Histology of chronic pilonidal sinus. *Acta pathologica, microbiologica et immunologica Scandinavica* 103: 267–272
 27. Steyn H P, Quinlan J, Jackson C 1939 A skin condition seen in Rhodesian ridgeback dogs: report on two cases. *Journal of the South African Veterinary Medical Association* 4: 170–174
 28. Stratton J 1964 Dermoid sinus in the Rhodesian ridgeback. *The Veterinary Record* 76: 846