



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; SP-10(6): 149-152  
© 2021 TPI  
[www.thepharmajournal.com](http://www.thepharmajournal.com)

Received: 14-03-2021  
Accepted: 27-04-2021

**Prerona Patowary**  
MVSc. Scholar, Department of  
Clinical Medicine and Jurisprudence,  
College of Veterinary Science, AAU,  
Khanapara, Assam, India

**Gautam Bordoloi**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Manoj Kumar Kalita**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Sanjib Khargharia**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Mridu Pavan Baishya**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**L Sanathoi Khuman**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Dwipjyoti Mahanta**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Kandarpa Boruah**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Aditya Baruah**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Karuna Saikia**  
Assistant Professor, Faculty of  
Lakhimpur College of Veterinary  
Science, AAU, Joyhing, North  
Lakhimpur, Assam, India

**Corresponding Author:**  
**Prerona Patowary**  
MVSc. Scholar, Department of  
Clinical Medicine and Jurisprudence,  
College of Veterinary Science, AAU,  
Khanapara, Assam, India

## A successful therapeutic management of *Demodex canis* infestation in dog: A case report

**Prerona Patowary, Gautam Bordoloi, Manoj Kumar Kalita, Sanjib Khargharia, Mridu Pavan Baishya, L Sanathoi Khuman, Dwipjyoti Mahanta, Kandarpa Boruah, Aditya Baruah and Karuna Saikia**

### Abstract

A ten month old local male dog was presented with a history of inappetence, severe itching alopecia, erythema, dullness, papular and pustular lesions on face, fore limbs, hind limbs, ventral abdomen, inner thigh, loin region and tail. On the basis of history, clinical findings, hematological parameters and skin scraping confirm the case of generalized demodicosis. The dog was treated with acaricide, Anthelmintic, Keratolytic agent, Antibiotic, Antihistaminic and immunostimulant. Treatment was continued until complete recovery of the animal. Two consecutive negative skin scrapings after treatment were considered as recovery from *Demodex canis*.

**Keywords:** Demodicosis, skin lesions, mange, moxidectin

### Introduction

In canine clinical practice, one of the most commonly encountered pathological conditions of skin is demodicosis. Demodicosis, also known as demodectic mange, follicular mange or red mange can be defined as an inflammatory, non-contagious parasitic dermatosis caused by overpopulation of the host-specific follicular mites of various *Demodex* species (Shrestha *et al.*, 2015) [23]. The life cycle stages of *Demodex* includes an egg that develops into a 6 legged larvae which then develops into an 8 legged nymph (Mueller, 2008) [14], the later can be differentiated from an adult by the lack of an "armor-like" breastplate in it. Demodicosis can be classified into localized and generalized forms (Shipstone, 2000) [22] with juvenile or adult onset. In localised form, 4 or fewer areas of the body are involved, most often the face and the forelegs, with lesions smaller than 2.5 cm in diameter. On the other hand, generalized demodicosis is characterized by lesions in more than 4 areas of the body, with 2 or more feet affected or where an entire body region is involved (Mueller, 2012) [13]. Treatment of Canine demodicosis remained a challenge to treat due to several factors such as age of the animal, body condition, breed, prevailing climatic conditions of the area (Rodriguez-Vivas *et al.*, 2003, and Abdel-Ghaffar *et al.*, 2008) [18,1], recurrence of disease after treatment (Morita *et al.*, 2018) [11], progression to generalized form (Ferrer *et al.*, 2014) [5], localized immunosuppression (Kumari *et al.*, 2017, Tarallo *et al.*, 2009 and Janus *et al.*, 2014) [9,28,6] and the duration of the treatment (Paradis, 1999) [15]. Demodicosis is characterized by excessive proliferation of mite, with in the hair follicles and sebaceous glands of the animal (Scott *et al.*, 2001) [20]. The clinical signs include alopecia, erythema, crusts, hyperkeratosis, scaling, hair casting, pustules and pruritus with secondary pyoderma as a frequent complication, which ultimately leads to concomitant bacterial and fungal infections (Pradhan *et al.*, 2012 and Koch, 2017) [17, 8]. The easiest and quicker mean for diagnosis of canine demodicosis is microscopic examination of skin scraping as it is both simple and a confirmatory method (Mederle, *et al.*, 2010 and Paterson *et al.*, 2017) [10, 16]. Generalized demodicosis may be a severe and potentially life-threatening disease in comparison to localized demodicosis as it is being observed by many veterinarians that most of the (90%) localized demodicosis cases will resolve spontaneously over 6-8 weeks period (Mueller *et al.*, 2012 and Singh *et al.*, 2011a) [13, 24]. The most common treatments recommended by veterinarians are a combination of systemic antibiotics and/or antiseptic shampoo, with spot-on application of acaricides, subcutaneous ivermectin injection and/or amitraz bath. As an adjunct or supportive therapy, omega-3 fatty acids in the form of capsules or fish oil and/or vitamin E are considered (Arsenovic *et al.*, 2015) [2].

Thus, the present case report shows the successful therapeutic management of a generalized demodicosis with a combination therapy of acaricides and macrocyclic lactones along with supportive treatment.

### Case History and Observations

A ten month old local male dog weighing 10.5 kg was presented to the State Veterinary Hospital, Eidgah Field, Civil Chariali Tezpur with a history of inappetence, severe itching, foul body odour, alopecia, erythema, dullness, papular and pustular lesions, skin rashes, & formation of scabs in the face, fore limbs, hind limbs, ventral abdomen, inner thigh, loin region and tail (Fig-1). There was no previous history of skin infections nor was ectoparasite reported. The animal was regularly vaccinated and deworming schedule was also followed as advised by veterinarian. On clinical examinations, the body temperature of the affected dog was found to be 101.8 °F and the mucous membrane was slightly pale. Other parameters like Heart rate, respiration rate, pulse rate, urination and defecation were normal.



Fig 1: The dog was presented in this condition i.e. 0 day



Fig 2: After the treatment of 45 days



Fig 3: Elongated, cigar shaped mite (*Demodex canis*)

### Result

For the confirmatory diagnosis of the condition, deep skin scrapings were taken and digested in warm 10% KOH solution and centrifuged at 1500rpm for 5 minutes. A smear was prepared with the sediment and examined under microscope for detection of mites, if any. The skin scraping examination revealed the presence of elongated, cigar shaped mite, *Demodex canis* with body divisible into head, thorax bearing four pairs of short and stumpy legs and abdomen bearing transverse striations (Soulsby, 1982) [27] (Fig-2). For hematological study two mililitre of blood from cephalic vein was collected in EDTA vial & different parameters were studied by using fully automated haematological analyser. The hematological parameters haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC), total leucocyte count (TLC), Neutrophil, Eosinophil and Lymphocytes were estimated on 0<sup>th</sup> and 45<sup>th</sup> days after treatment (Table-1). On the basis of history, clinical signs and skin scraping examination the case was diagnosed as a generalized canine demodicosis.

Table 1: Hematological parameter of the animal during 0<sup>th</sup> day and 45<sup>th</sup> day post treatment

| Haematological values                           | 0 <sup>th</sup> day treatment | After 45 <sup>th</sup> days post-treatment |
|---|-------------------------------|--|
| Hb (g/dl)                                       | 9.45                          | 12.84                                      |
| TEC (10 <sup>6</sup> /mm <sup>3</sup> )         | 3.95                          | 6.27                                       |
| PCV (%)   | 29.80                         | 38.35                                      |
| TLC(10 <sup>3</sup> /mm <sup>3</sup> )          | 17.51                         | 10.73                                      |
| Neutrophils (10 <sup>3</sup> /mm <sup>3</sup> ) | 14.06                         | 7.15                                       |
| Eosinophils (10 <sup>3</sup> /mm <sup>3</sup> ) | 2.04                          | 1.05                                       |
| Lymphocytes (10 <sup>3</sup> /mm <sup>3</sup> ) | 1.48                          | 2.16                                       |

### Treatment

The dog was treated with Amitraz dip (acaricide) @ 250ppm, for four occasions at weekly interval along with Moxidectin (a macrocyclic lactone of milbemycin class) @ 0.3mg /kg body weight, subcutaneously injected for four occasions at seven days interval. To counteract secondary bacterial infection Cephalexin antibiotic @ 25mg/kg body weight, was administered orally daily for 10 days. Chlorpheniramine maleate @ 0.5mg /kg body weight as antihistaminic was injected intramuscularly for 5 days to inhibit severe itching. Benzoyl peroxide shampoo as keratolytic agent was applied during bath on weekly basis. As immunosuppression in puppies is an important cause of canine demodicosis, immunostimulator syrup (immunol) was administered @ 5ml orally two times daily after food. For hair re-growth and glossy coat, oral nutritional supplement containing natural egg protein, biotin (Samfur power) @ 1.5 tsf twice daily along with feed was administered. Treatment was continued until complete recovery of the animal (Fig-3). Two consecutive negative skin scrapings after treatment were considered as recovery from *Demodex canis*.

### Discussion

The present case was considered as a generalised demodicosis due to presence of more numbers of lesions throughout the body (Satheesha, *et al.* 2016) [19] and (Kaplaywar *et al.*, 2017) [7]. The lesions found in the present case were similar to those described by Kaplaywar *et al.*, 2017 [7]. Treatment of canine generalized demodicosis is multimodal which include a number of medications for demodicosis treatment (Mueller, 2008) [14]. The clinical signs and lesions of canine demodicosis might be due to various predisposing factors like

poor condition, malnutrition and abnormal environment that favours mite proliferation and development of skin disease which is supported by previous reports of (Mueller *et al.* 2012 and Shrestha *et al.*, 2015) <sup>[13, 23]</sup>. The use of broad spectrum antibiotic in the present study is primarily due to the fact that most cases of canine generalized demodicosis involve a secondary bacterial skin infection, which needs administration of systemic antibiotics for several weeks along with acaricidal treatment i.e., Amitraz (Verde, 2005 and Mueller, 2011) <sup>[29, 12]</sup>. Amitraz associated with the antibiotic therapy is highly effective for treating generalized demodectic mange (Horne, 2010) <sup>[4]</sup>. In the present case study the haematological parameters (Table-1) revealed decreased level of haemoglobin concentration, total erythrocyte count, leukocytosis, neutrophilia and eosinophilia. These findings were in accordance with the findings of Pradhan *et al.*, 2012 <sup>[17]</sup>. Benzyl peroxide-based shampoo are often recommended because of their keratolytic and supposed follicular flushing activity Scott, 2001 <sup>[21]</sup>. Benzoyl peroxide shampoo showed a good success in the treatment of generalised demodocosis. These findings were in accordance with the findings of Kaplaywar *et al.*, 2017 <sup>[7]</sup>. Most commonly, corticosteroids cause immune suppression in case of demodicosis (Barriga *et al.* 1992) <sup>[3]</sup>. In the present case study animal was provided with adequate nutritional supplements showed good response in managing canine demodicosis by its antioxidant properties (Singh *et al.*, 2011, Yattoo *et al.*, 2014 and Arsenovic *et al.*, 2015) <sup>[25, 30, 2]</sup> and also to overcome side effects of specific acaricidal treatment (Singla *et al.*, 2013) <sup>[26]</sup> as well.

### Conclusion

Thus, it can be concluded from present case study that moxidectin and amitraz may be considered as a drug of choice for canine demodicosis. Benzoyl peroxide containing shampoo and immunostimulant should be used as a supportive therapy against generalized canine demodicosis.

### References

1. Abdel-Ghaffar F, Al-Quraishy S, Sobhy H, Semmler M. Neem seed extract shampoo, Wash Away Louse®, an effective plant agent against *Sarcoptes scabiei* mites infesting dogs in Egypt. *Parasitology Research* 2008;104:145-148.
2. Arsenovic M, Pezo L, Vasic N, Ciric R, Stefanovic M. The main factors influencing canine demodicosis treatment outcome and determination of optimal therapy. *Parasitology Research* 2015;114:2415-2426.
3. Barriga OO, Al-Khalidi NW, Martin S, Wyman M. Evidence of immunosuppression by *Demodex canis*. *Vet Immunol Immunopathol* 1992;32(1-2):37-46.
4. Horne KL. Canine demodicosis. *Veterinary Technician*, 2010, 31(3).
5. Ferrer L, Ravera I, Silbermayr K. Immunology and pathogenesis of canine demodicosis. *Veterinary Dermatology* 2014;25:427-465.
6. Janus A, Tresamol PV, Mercy KA, Habeeb Biju P, Sheameen H. A study on clinical and hematobiochemical parameters in canine demodocosis. *Indian Journal of Canine Practice* 2014;6(2):92-94.
7. Kaplaywar S, Jyothi J, Sreenivasa GS, Murthy. Clinical management of generalized and pododemodocosis in German shepherd dog. *The Pharma Innovation Journal* 2017;6(11):829-831.
8. Koch S. Updates on the management of canine

- demodicosis. *Today's Veterinary Practice. TVP Journal*, 2017, 77-85.
9. Kumari P, Nigam R, Singh A, Nakade UP, Sharma A, Garg SK *et al.* Demodex canis regulates cholinergic system mediated immunosuppressive pathways in canine demodicosis. *Parasitology* 2017;144(10):1412-1416.
10. Mederle N, Darabuş G, Oprescu I, Morariu S, Ilie M, Indre D *et al.* Diagnosis of canine demodicosis. *Science Parasitology* 2010;11(1):20-23.
11. Morita T, Ohmi A, Kiwaki A, Ike K, Nagata K. A new stubby species of demodectic mite (Acari: Demodicidae) from the domestic dog (Canidae). *Journal of medical entomology* 2018;55(2):323-8.
12. Mueller Ralf S, Bensignor E, Ferrer Holm B, Lemarie S, Paradis M *et al.* Treatment of demodicosis in dogs: 2011 clinical practice guidelines. *Veterinary Dermatology* 2011;23:86-96.
13. Mueller RS. An Update on the Therapy of Canine Demodicosis, applied dermatology – vetlearn.com-compendium: continuing education for veterinarians, 2012.
14. Mueller RS. Demodicosis - a frequent problem in the dog. *Proceedings of the 33rd World Small Animal Veterinary Congress Dublin, Ireland, 2008.*
15. Paradis M. New approaches to the treatment of canine demodicosis. *Veterinary Clinics: Small Animal Practice* 1999;29(6):1425-36.
16. Paterson TE, Halliwell RE, Fields PJ, Louw ML, Louw JP, Ball GS *et al.* Treatment of canine-generalized demodicosis: A blind, randomized clinical trial comparing the efficacy of Advocate® (Bayer animal health) with ivermectin. *Veterinary Deramtolgy* 2009;20(5-6):447-455.
17. Pradhan NR, Chatterjee S, Lodh C. Demodicosis IN Dogs and its Therapeutic Management. *Indian Journal of Canine Practice* 2012;4(1):17-20.
18. Rodriguez-Vivas RI, Ortega-Pacheco A, Rosado-Aguilar JA, Bolio GME. Factors affecting the prevalence of mange-mite infestations in stray dogs of Yucatán, Mexico. *Veterinary Parasitology* 2003;115:61-65.
19. Satheesha SP, Chandrashekhar G, Nagaraj L, Malatesh DS, Patel Suresh R, Kottadamane MR. Therapeutic Management of Generalized Demodicosis in a Beagle puppy. *International Journal of Science Environment and Technology* 2016;5(5):3177-3181.
20. Scott DW, Miller WH Jr, Griffin CE. Canine demodicosis. *Muller & Kirk's Small Animal Dermatology*. Philadelphia, W. B. Saunders, 2001, 457-474.
21. Scott DW, Miller WM, Griffin CE. Parasitic skin diseases. In: Di Berardino, C., editors. *Muller and Kirk's Small Animal Dermatology*. 6th ed. W.B. Saunders Company, Philadelphia, PA, 2001a, 423-516.
22. Shipstone M. Generalised demodicosis in dogs, clinical perspective. *Australian Veterinary Journal*. 2000; 78(4).
23. Shrestha D, Thapa B, Rawal G, Dhaka S, Sharma B. Prevalence of demodectic mange in canines of Kathmandu valley having skin disorder and its associated risk factors *International Journal Applied Science Biotechnology* 2015;3(3):459-463.
24. Singh SK, Dimri U, Sharma MC, Swarup D, Sharma B, Pandey HO *et al.* The role of apoptosis in immunosuppression of dogs with demodicosis. *Veterinary Immunology and Immunopathology*

- 2011a;144:487-492.
25. Singh SK, Kumar M, Jadhav RK, Saxena SK. An Update on Therapeutic Management of Canine Demodicosis. *Veterinary World* 2011a;4(1):41-44.
  26. Singla LD, Eljadar MSM, Bal Mandeep Singh, Deshmukh S, Uppal SK, Juyal PD. Parasitic Dermatitis Due To Canine Demodicosis In Dogs. *Indian Journal of Canine Practice* 2013;5:85-87.
  27. Soulsby E JL. *Helminths, Arthropods and Protozoa of Domesticated Animals*. 7th ed., Bailliere Tindall, a division of Cassell Ltd., London, 1982, 476-479.
  28. Tarallo VD, Lia RP, Sasanelli M, Cafarchia C, Otranto D. Efficacy of Amitraz plus Metaflumizone for the treatment of canine demodicosis associated with *Malasseziapachydermatis*. *Parasites and Vectors* 2009;2:13.
  29. Verde M. Canine demodicosis: treatment protocol. *Proceeding of the NAVC North American Veterinary Conference, 2005*, 8-12.
  30. Yattoo M, Iqbal Jhambh R, Malepad DP, Kumar P, Dimri U. Advances in Therapeutic Management of Complicated Demodicosis in Canines. *The Journal of Advances in Parasitology* 2014;1(1):6-8.