SHORT COMMUNICATION

Feline Notoedric Mange: Therapeutic Management and Zoonotic Implications

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Abstract

Three month old, five kittens were brought to the Emergency Critical Care Unit of Madras Veterinary College, Chennai, with the history of intense pruritus in the animals. On physical examination, alopecia and hyperkeratotic crusts were seen on the animal body, particularly on the pinna, head and legs. Pinna pedal reflex was also observed to be positive for animal. Skin scrapings were collected from the tip of the ear of affected kittens. The collected material examined by using liquid paraffin under the low power microscope revealed the presence of *Notoedrus cati* mites, indicating that cats were affected with notoedric mange. The owner also reported instances of itching among family members in the recent past. Upon examination, lesions were observed even on the owner's hands, suggesting a potential mange infestation. There were earlier reports about zoonotic risk of notoedric mange from India.

Key words: Excoriation, Microscopy, Notoedric mange, Pinna-pedal reflex, Pruritus, Zoonoses.

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Introduction

Notoedric mange is attributed to obligate parasitic mites of the genus *Notoedres*, belonging to the family Sarcoptidae (Gross *et al.,* 2005). The *Notoedres* genus comprises over 41 recognized species, with *Notoedres cati* being the initial species described by Hering in 1838 and later recognized as a separate genus and species by Railliet in 1893 (Gyorke *et al.,* 2022). It is a rare yet highly contagious disease of cats and kittens, distributed worldwide. The transmission of *Notoedres cati* occurs among diverse species through direct contact with infested animals, with a higher prevalence observed in cats, rats, and rabbits (Foley *et al.,* 2016; Little and Cortinas, 2021). Major clinical signs include intense pruritus, alopecia, and hyperkeratotic crusts commonly manifested on the pinnae, face, neck, head, and feet. Scratching in an attempt to relieve the itching exacerbates the condition by causing skin excoriation and inflammation. Humans, occasionally contact *Notoedres cati*, leading to human notoedric mange or human notoedric scabies. Those with frequent exposure to infested cats in communal living environments or within animal care groups, exhibit increased susceptibility to *N. cati* infestation (Mullen and OConnor, 2019; Little and Cortinas, 2021).

Diagnosis primarily involves assessing the clinical pattern of lesions and identifying mites in skin scrapings, typically examined under a microscope for confirmation. Scrapings should be taken from the periphery of the lesions, deep enough to observe minor bleeding, and subsequently examining the mites in mineral oil or saline solution on a slide (Foley *et al.,* 2016). *N. cati* may sometimes be detected in fecal flotation tests of infested cats likely due to ingestion during grooming. Treatment for notoedric mange in domestic animals is relatively simple involving usage of modern acaricides like eprinomectin, ivermectin, selamectin or moxidectin (macrocyclic lactones), which are safe, rapid-acting, offering protection for weeks, and highly effective (Foley *et al.,* 2016). While combination products with dual efficacy such as eprinomectin/fipronil, selamectin/sarolaner, moxidectin/fluralaner, are expected more effective. Isoxazolines approved for cats, such as fluralaner, lotilaner, and sarolaner, are also deemed effective. Cats with notoedric mange typically respond well to treatment, when all cats in the household are treated, re-exposure is avoided, and treatment can be repeated if needed until the infestations are completely resolved (Knaus *et al.,* 2021; Little and Cortinas, 2021). However, there are currently no scientific reports available from Chennai regarding the zoonotic transmission of notoedric mange from cats to humans. This

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communication reports feline notoedric mange in kittens, its therapeutic management and zoonotic implications.

Materials and Methods

A group of five domestic three month old short-haired kittens, was brought to the Emergency Critical Care Unit of Madras Veterinary College, Chennai, India. They were presented with a history of hair loss and intense itching for the past few days. On clinical examination all the kittens were active, food intake was normal, but vital parameter like rectal temperature was 103.5 °F, indicating a mild elevation. Heart rate, respiration rate, pulse rate were within the normal limit. On gross examination of the kittens, thick scabs, scaly crusts and erythema were noticed on the body of the animal, especially on the pinnae, head and ears (Fig. 1). Pinna-pedal test was also turned out to be positive. Blood samples were collected from them for Complete Blood Count (CBC) and serum biochemical parameters. Deep skin scrapings were collected from the affected area until minor capillary bleeding was observed. The collected material was kept on the slide containing liquid paraffin and examined under the low power microscope.

The owner also mentioned that family members had experienced itching recently. Upon closer examination, it was noted that lesions were present on the owner's hands as well (Fig. 2). This finding raised concerns about the possibility of a mange infestation, attributable to parasitic mites known to afflict both animals and humans. The presence of lesions on the owner's hands underscores the potential for zoonotic transmission from the kittens to humans.

Results and Discussion

The clinical diagnosis of the disease as feline scabies was based on the characteristic clinical signs observed like intense pruritis, alopaecia, scaly crusts especially on face, ears, thick scabs as well as confirmation by skin scraping examination,

Fig.1: Scaly crusts, thick scabs, hyperkeratinisation, erythema on cats

Fig. 2: Skin lesions observed on hands of owner

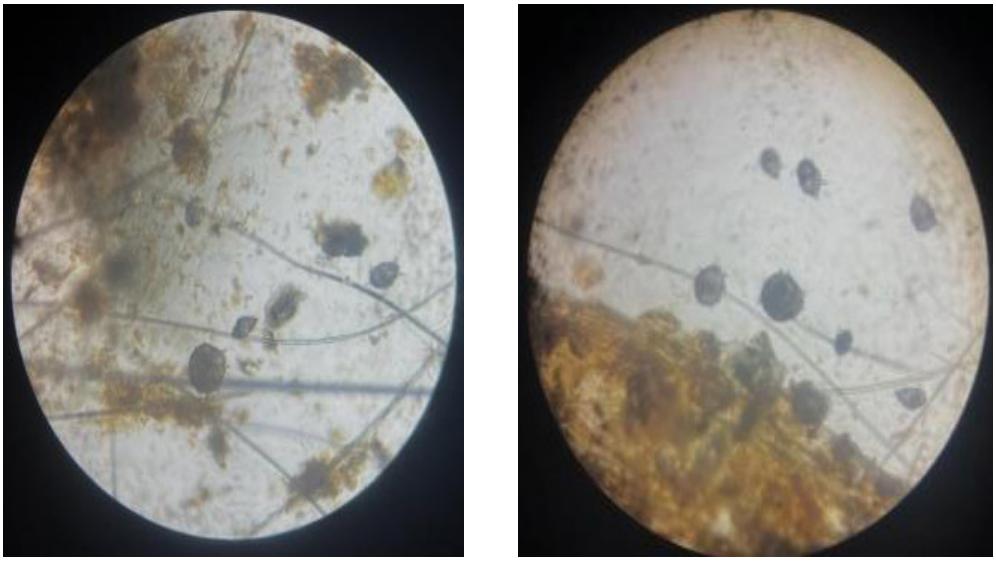

Fig. 3: Microscopic examination of skin scrapings- *Notoedres cati* mites under low power microscope

which were in consonance with previous reports (Györke *et al.,* 2022; Kumar *et al.,* 2023; Dangi *et al.,* 2023; Patel *et al.,* 2024). On microscopic examination it revealed the presence of *Notoedres cati* mites, indicating that the cats were suffering with notoedric mange (Fig. 3). The common mite species infesting cats can be readily distinguished by examining their morphological disparities that serve as pivotal diagnostic criteria for taxonomic differentiation. Upon comparison of *Notoedres* and *Sarcoptes* mites, it is evident that *Notoedres* are characterized by their smaller size, distinct dorsal striations resembling 'thumb-prints', shorter limb stalks, and a dorsal anus, contrasting with the larger body size, presence of dorsal pegs and spines, and terminal anus observed in *Sarcoptes* species (Scott *et al.,* 2001; Sofyan *et al.,* 2018). The blood parameters were observed to be normal, but there was a mild elevation of WBC count. Serum biochemical parameters were within the normal limit, revealing the kidney and liver function was normal (Table 1).

Cats infected with notoedric mange were successfully treated with selamectin (Itoh *et al.,* 2004; Hardy *et al.,* 2013; Georgiana and Dumitrache, 2021; Luca and Garedaghi, 2021). So, the affected kittens were treated with topical application of selamectin on the skin behind the neck region, along with the administration of glossy coat fatty acid-containing syrup as supportive therapy. Periodic evaluation of skin scraping was done to rule out the presence of mite infestation. The cats were completely recovered from mange and the skin scrapings were negative after a period of 1 month. This suggests that selamectin can be a best way to treat feline notoedric mange along with supportive therapy to boost the immunity. It's crucial to emphasize the significant role of immunosuppression in the development of notoedric mange. Therefore, it is advisable to explore supportive medications that aid in modulating the immune response (Foley *et al.,* 2026). Patel *et al.* (2024) also successfully treated notoedric mange infestation with inj. Ivermectin and supportive therapy in two rabbits.

Table 1: Hematological and serum biochemical parameters of cats infested with *Notoedres cati*

Parameter	Mean ± SE	Reference range*
Hematological Parameters		
Hb (g dL^{-1})	11.06±0.48	9.8-15.4
RBC ($\times 10^6$ µ L^{-1})	1.3±0.58	5-10
PCV (%)	35.08±1.06	30-45
WBC ($\times 10^3$ µ L^{-1})	19.15±0.79	5-19.5
Neutrophils (%)	59.4±0.81	45-64
Lymphocytes (%)	32.6±0.81	27-36
Monocytes (%)	1.81±0.2	0-5
Eosinophils (%)	2.6±0.24	0-4
Platelets ($\times 10^3$ µ L^{-1})	441±31	300-800
Serum Biochemical Parameters		
Creatinine (mg dL^{-1})	1.038±0.14	0.9-2.2
Total protein (g dL^{-1})	6.5±0.22	6-7.9
Albumin (g dL^{-1})	3.02±0.14	2.8-3.9
Bilirubin (mg dL^{-1})	0.7± 0.07	0-1.7
ALT	38.2±3.69	25-97
ALP	8.8±0.86	0-45

*Reference values were taken from MSD Veterinary Manual

Moreover, the suspicion of human scabies arose due to the presence of characteristic lesions, including scaly crusts and hyperpigmentation, observed on the hands of owner, as reported during the anamnesis (Fig. 2). It is reported that individuals regularly exposed to infested cats in communal living environments, show a higher susceptibility to *N. cati* infestation. After extended period of exposure, individuals

may become sensitized to the mite and develop itching and manifest papulovesicular erythematous dermatitis localized to areas of direct contact with infested animals, particularly hands, legs or abdomen during handling (Mullen and OConnor, 2019; Little and Cortinas, 2021). The owners were recommended to consult a dermatologist for specialized treatment, and they ultimately recovered from mange over a period of time. The zoonotic transmission of feline scabies, has been extensively documented in India (Sivajothi *et al.,* 2015; Galdhar *et al.,* 2020; Sinha *et al.,* 2023). However, there are currently no scientific reports available regarding feline scabies and its zoonotic transmission specifically in the Chennai area.

In general, the cats were diagnosed with feline notoedric mange, posing a potential risk of transmission to humans in close contact with them. The prevention of notoedric mange in cats involves keeping healthy cats away from stray or diseased cats, avoiding unsanitary boarding or grooming environments and educating pet owners about signs, symptoms, risk factors, and preventive measures. This could pave the way for future therapeutic advancements and formulation of mitigation strategies to curb disease spread.

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