DOI: https://doi.org/10.3126/njdvl.v24i1.85895

Milker's Nodule: A Case Report from South India

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Abstract

Milker's nodule is an acute viral infection caused by the bovine strain of the paravaccinia virus transmitted to humans through direct contact with infected cattle. Parapoxvirus infection is usually endemic among livestock herds. It is an occupational dermatosis, and populations at risk include shepherds, butchers, farmers, wool shearers, and veterinarians. We report a 36-year-old female cattle rearer who presented with a few nodular lesions on the hand, along with histopathology and Dermoscopy features. Although it is well documented in endemic livestock regions, reports from South India are limited. Prompt diagnosis of the disease is important for facilitating the implementation of control measures to minimize the losses suffered by farmers.

Key words: Milker's nodule, Parapox virus, Zoonotic infections

Introduction

Milker's nodule is a highly contagious zoonotic, self-limiting infection. Milker's nodule, also called pseudo-cowpox virus infection, is caused by a DNA virus of the *Parapoxvirus* genus of the *Poxviridae* family, which is an epitheliotropic virus.[1] Other parapoxviruses include grey sealpox virus, bovine papular stomatitis virus, pseudo-cowpox virus, and red deer pox virus.[2,3] These viruses reside in nasal secretions, saliva, and lesions over the mouth, udder, trunk, and legs of infected bovine cattle.[3] Human transmission occurs through inoculation of broken skin during milking of cows, contact with infected carcasses, and rarely through fomites.[4] In humans, lesions occur mostly on exposed parts such as the hands, fingers, and forearms. Shedding of virus-rich scabs contributes to environmental contamination.[5] Milker's nodule are usually self-limiting and heal without scarring.[6] There are very few reports from South India on this zoonotic infection, as most individuals affected are from rural backgrounds with limited awareness of the disease. We aim to describe a case of milker's nodule in a cattle rearer from South India and to highlight its varied clinical, dermoscopic, histopathological, and preventive aspects.

Case Report

A 36-year-old female, who is a cattle rearer and home maker, residing in a village near Puducherry, presented to the dermatology outpatient department with complaints of raised, painless lesions on the dorsum of her right hand. She reported that the lesions had started 15 days earlier as tiny fluid-filled lesions over the dorsum of the hand, which gradually increased in size within 3 days to attain the present size. The patient denied any history of associated fever or lymph node enlargement. On further questioning, she mentioned that she had noticed similar lesions on the udder of the cow while milking 1 week prior to the onset of her lesions.

On examination, four skin-colored nodules with central hyperpigmentation were noted over the dorsum of the right hand. (Fig. 1, 2) To confirm the clinical diagnosis, a Tzanck smear was performed, which showed multiple

Date of Submission: 2025-11-13
Date of Acceptance: 2026-03-19
Date of Publication: 2026-05-01

How to cite this article
How to cite the article: BS, Padavai N, Vaisali TV. Milker's Nodule: A Case Report from South India. Nepal Journal of Dermatology, Venereology & Leprology. NJDVL 2026;24(1):66-69

https://doi.org/10.3126/njdvl.v24i1.85895

Funding: None
Conflict of Interest: None

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neutrophils and a few eosinophils. Periodic Acid–Schiff staining was negative for fungal elements. Dermoscopic examination revealed central orangish-brown pigmentation, peripheral greyish-white structureless areas, and a few dotted vessels. (Fig. 3)

Figure 1, 2: Four discrete skin-colored indurated nodules over the dorsum of the hand.

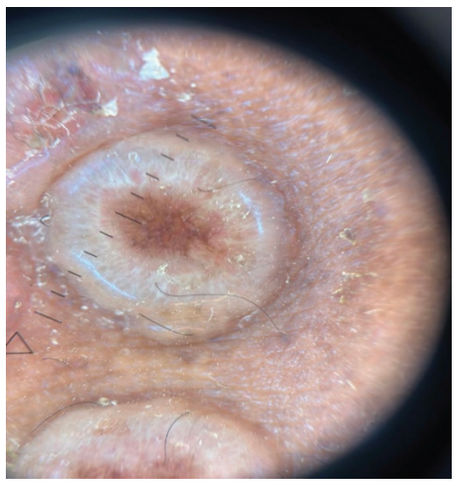

Figure 3: Dermoscopy (non-polarized, 10 X) showing orangish brown central pigmentation and peripheral structureless areas.

In skin biopsy, Hematoxylin & Eosin stain showed multilocular intraepidermal vesicles filled with neutrophilic infiltrates with epidermolysis, spongiosis, and eosinophilic inclusions in the epidermis. Dense inflammatory infiltrates comprising lymphocytes, neutrophils, and a few eosinophils were seen in the dermis and peri-adnexal structures. (Fig. 4, 5)

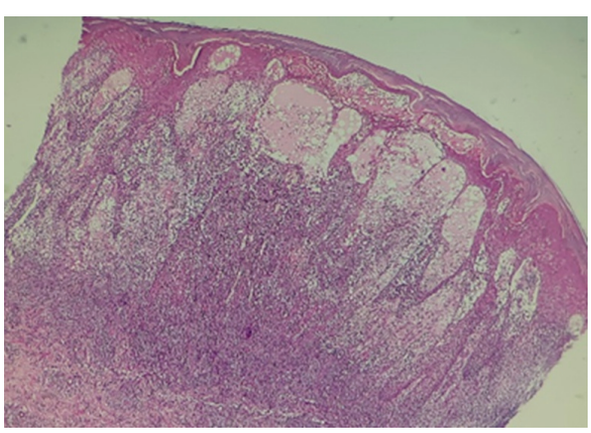

Figure 4: H &E stain, under 10X magnification, showing multilocular intraepidermal vesicles with spongiosis.

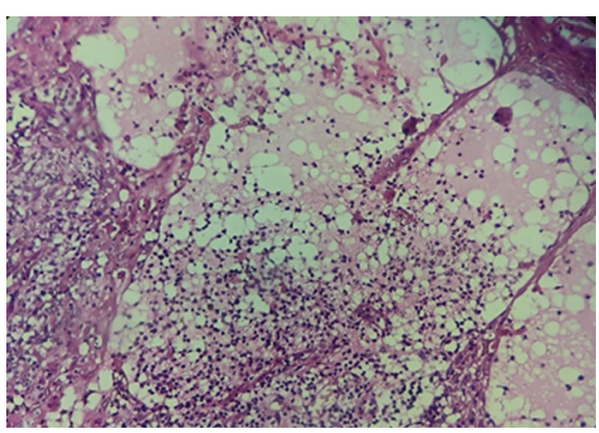

Figure 5: H &E stain, under 40X magnification, dermis showing inflammatory infiltrates comprising lymphocytes, neutrophils, and eosinophils.

The patient was managed with a combination of a mid-potent topical steroid (betamethasone valerate 0.1% cream) and a topical antibiotic (Fusidic acid 2% cream) for 2 weeks. After a two-week follow-up, the lesions were resolving without scarring and with mild hyperpigmentation. The patient was educated regarding hygiene measures in cattle rearing for the prevention of recurrence.

Discussion

Milker's nodule belongs to the family *Poxviridae*, a group of relatively large animal viruses. It is a double-stranded DNA virus with characteristic ovoid or cylindrical morphology (~310 nm × 140–160 nm).[1] This infection occurs in individuals who manage dairy cattle through direct contact with infected udders or noses of cows or by handling contaminated objects. Usually, the incubation period is between 5–15 days.[1,7]

The cutaneous nodule evolves through six phases, with each phase lasting approximately six days: The 1st stage is the maculopapular stage, in which a single erythematous nodule occurs. The 2nd stage, which is the targetoid stage, is characterised by a central papule surrounded by an erythematous outer ring with a pale inner ring. The 3rd is the acute stage, in which nodules

ulcerate and begin to drain. In the 4th stage, that is the Regenerative stage, nodules become firm and crusts. The 5th stage is the papillomatosis stage, where papillomas begin to appear in the nodules. The last, 6th stage is the regression stage, in which nodules begin to regress without any scars.[5] Lesions may be associated with lymphadenopathy, fever, urticaria, malaise, or occasionally erythema multiforme-like or bullous pemphigoid-like presentation and secondary bacterial overgrowth.[1,8]

In Dermoscopy, lesions are classified into four types:

1. Yellowish white area in the centre with a surrounding erythematous ring
2. Orangish yellow streaks centrally with violaceous erythematous base and greyish white streaks
3. Central ulceration with a yellowish-white ring and surrounding erythema
4. Central erythema or ulcer-crusted area with a yellowish-white ring

Vascular structures such as dotted, comma, polymorphic, glomerular, and hairpin vessels may be observed.[9,10]

Histopathological features include epidermal proliferation, mild to moderate acanthosis, nuclear vacuolations, and cytopathic changes in the upper epidermis. Deeply eosinophilic homogeneous intracytoplasmic inclusion bodies measuring 3–5 µm with a surrounding pale halo are characteristic. Phloxine-tartrazine stain demonstrates inclusion bodies in addition to routine hematoxylin–eosin staining. Dense dermal inflammatory infiltrate and dermal edema contribute to papillomatosis.[9,10]

Other diagnostic tools include polymerase chain reaction, serology, tissue culture, and electron microscopy.[3] Three-dimensional organotypic cultures have also been studied for detecting cytopathic effects and genomic alterations.[11]

Differential diagnoses include Orf, brown spider bite, cutaneous anthrax, sporotrichosis, pyoderma, and atypical mycobacterial infections.[1] Milker's nodule and Orf have nearly identical clinical and histological presentations. Milker's nodule occurs following exposure to cattle, whereas Orf occurs after contact with sheep and goats.[12] Animal Orf infection presents with scabby lesions around the mouth and nostrils, anorexia, oozing lesions on hooves, peeling skin, oral vesicles, glossitis, and respiratory distress.[13] Because of their similarities, both infections are sometimes referred to as "farmyard pox."[5]

Milker's nodule is benign and self-limiting; watchful waiting is usually sufficient. Treatment is mainly supportive. Topical antiseptics and antibiotics may be used to prevent secondary bacterial infection. Topical imiquimod, idoxuridine, and cryotherapy have been reported to hasten recovery in some cases.[10] In immunocompromised individuals or persistent lesions, curettage, electrodessication, or shave excision may be required. Brincidofovir has been tried in ecthyma contagiosum and other orthopoxviruses and has been found to be effective.[2,10] Systemic therapy is rarely necessary.

Preventive measures include wearing protective gloves during milking, maintaining proper hand hygiene after handling cattle, avoiding direct contact with infected lesions, and vaccination of infected animals where available.[2]

Conclusion:

Milker's nodule, a zoonotic infection, should be considered in patients presenting with nodulo-ulcerative or pustular lesions following contact with cattle. Although it is self-limiting, misdiagnosis and unwarranted interventions are common. Early recognition allows for accurate diagnosis and appropriate patient reassurance. Our case report highlights the need for preventive education among individuals with occupational exposure to livestock. As most of the affected people are from rural areas, campaigns regarding occupational exposure, animal handling, and preventive interventions by health care workers will reduce the incidence of disease burden in the future. Further detailed studies are required to delineate the molecular details for understanding the epidemiological strains circulating in the country and for designing effective treatment modalities.

Conflicts of Interest: Nil

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