

Case Report

Milker's nodule: viral zoonosis among agricultural workers in a tertiary care hospital from rural Tamilnadu

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ABSTRACT

Milker's nodule caused by pox virus is not so uncommon among animal handlers in rural Tamilnadu. It is an occupational hazard. Diagnosis by clinical acumen. No special laboratory test needed, managed symptomatically. It leaves behind no major sequelae.

Keywords: Milker's nodule, Agricultural workers, Rural Tamilnadu

INTRODUCTION

Milker's Nodule

Synonyms: Milker's Pox, Noduli mulgentium, Farmyard pox, Pseudo cowpox, Paravaccina, Paravaccinal Nodule.

DNA - ds Poxviruses, largest animal virus, can be identified with light microscope. Human is host for 4 genera (Table 1).

Orf and Pseudo cowpox viruses infections manifest mainly as localized benign cutaneous tumours in the skin. Milker's Nodule is caused by either cowpox virus (an orthopoxvirus) or pseudo cowpox virus (a parapoxvirus, PCPV-pseudo cowpox virus). The worldwide appearance as bovine popular stomatitis & ring sores in the cows. This infection is spread by direct - contact inoculation and sporadic, transmitted from the teats of infected cow and cattle. The contaminated fomites to the veterinarians and milkers can produce similar type of lesions. It can be transmitted by contaminated fomites in burns and scalds. Human to human spread does not occur. No cross immunity with cowpox, vaccinia, variola.¹⁻⁴

Table 1: Poxviruses.

Orthopoxvirus	300x250nm;Ovoid	Variola, Vaccinia, Monkey pox & cowpox
Parapoxvirus	260x160nm; Cylindrical	Orf & milker's nodule
Molluscipoxvirus	275x200nm; Intermediate	Molluscum contagiosum
Yatapoxvirus		Tanapox

Its incubation period varies from 4 days to one week. It will present as an asymptomatic flat red macule or papule. After a week it will become a nodule with erythematous zone with or without central depression, after that crust stage. At the end of 4th to 6th weeks this lesion will resolve without scarring. Cue for the clinical diagnosis is all most all the patients will be agricultural workers with history of contact with the infected cow.^{5,6} Clinical diagnosis can be supported by serological and immunological tests for human parapox virus infection include virus identification by electron microscopy, cell

culture and animal experiments, assays for agglutinating, complement fixing, neutralizing and flocculating antibodies in patient's serum may be confirmed even after resolution of skin lesions. Immunofluorescence and enzyme assays (ELISA) are the most sensitive methods for latest laboratory methods. DNA-hybridization techniques / surface structure analysis with immune electron microscopy are useful in differentiating the three species of the genus of parapox virus.^{7,8} Cattle infections by parapox virus species are identical in humans. These factors justified the name Farmyard Pox to this clinical entity by several authors. Orf differentiation is possible by the history of contact with sheep and goats and the presence of hemorrhagic bulla and not on morphological grounds.

CASE REPORT

We present outpatient cases from Dermatology outpatient department in IRT Perundurai Medical College, Tamilnadu. 45-year-old male farm worker, who milked cows on his farm and developed non itchy erythematous nodules in his hands with web space between the thumb and index finger, After 5 days he noticed similar types of papules in the face. One papule resolved and presented as scar. One another papule near the left nasal labial fold present as non-itchy, erythematous nodule with central crusting. No history of constitutional symptoms, occasional itching present, after repeated picking and scratching of papule now presented as erythematous nodule. No regional lymph node enlargements in neck, axilla, elbow.



Figure 1: Erythematous papulo nodule with erosions and crusting near left nasal cavity & left lower chin.

35 years old agricultural laborer, presented to us with erythematous ulcers, macules & papules in the fingers of hands and mono morphic macules & papules arms, involving flexor and extensor compartments for 3 days. He is not having prodromal symptoms. His cow suffered with ring sore in the teats for more than a month.

Both are non-diabetic. No other immunosuppressive illness at present. Culture was not done. Both the patients were managed symptomatically with antibiotics topical and systemic; supportive and analgesics. Reviewed after two weeks, lesions resolved with hyper pigmented scar.



Figure 2: Greyish papules with crusting over right hand.



Figure 3: Sterile papulo pustular lesions over the fingers.

DISCUSSION

Milker's nodules are solitary with or without itching or pain. Six stages of clinical evolution, each staging will last for one week each. Different stages can be presented in one person.

1. Erythematous maculopapular.
2. Target (a papulovesicular lesion with a red centre, white ring, and red periphery).
3. Acute weeping nodule (characterized by loss of epidermis over the centre).
4. Dry, crusted nodular.
5. Papillomatous.
6. Regressive.

Milker's nodules are usually benign in nature and often under reported. Based on the history of sores in the mouth and teats of cattle, with increased saliva and nasal secretions & papule, nodule in the agricultural workers hand, rural health care providers should ensure the treatment and supportive care with clinical diagnosis itself. Viral particles are dormant in the fomites for decades, indirect infections from knives, barber wire, contaminated equipment and infected animal's environments reported. So far no reports of human to human transmission is documented.^{5,7,8,9}

Table 2: Differential diagnosis.

Differential Diagnosis	Spread & key findings	Treatment
Anthrax	<ol style="list-style-type: none"> <i>Bacillus anthracis</i>; Gram Positive spore forming rod Infection from direct contact with spores originating on hooved animals, their hides, or surrounding soil Malignant pustule - Rapidly enlarging, no pain, red papule that ulcerates and forms a black eschar; extensive local edema. Extensive cases with pyrexia, tachycardia, hypotension, regional lymphadenopathy without lymphadenitis High index of suspicion needed in the cases with history, rapid course, absence of pain in ulcer & lack of lymphangitis 	<ol style="list-style-type: none"> Penicillin or Tetracycline in heavy doses for more than 2 weeks Other choices: Erythromycin & Co trimoxazole Supportive corticosteroids
Pyogenic granuloma Syn: Lobular Capillary Haemangioma	<ol style="list-style-type: none"> Non-infectious capillary proliferation secondary to minor skin insult Nitric oxide synthase dependent angiogenesis; viral, hormonal and angiogenic factors Solitary, well circumscribed, dome shaped 1-10 mm sessile or pedunculated, bright or dusky red, smooth firm papule or nodule Rapidly enlarging, soft, red papule that bleeds easily 	<ol style="list-style-type: none"> Shave removal surgical excision curettage Cauterization - chemical or electro PDL Pulsed dye laser
Tularaemia	<ol style="list-style-type: none"> <i>Francisella tularensis</i> Wild rodents are reservoir, infection from rabbits and rodents via arthropod bites vectors Single rapidly enlarging, painful, red papule – nodules at the site of entry; ulcerates and forms a black eschar; fever and regional lymphadenopathy, toxaemia usually present 	<ol style="list-style-type: none"> Streptomycin Gentamicin
Orf	<ol style="list-style-type: none"> <i>Parapoxvirus</i> infection from direct contact with sheep or goats Self-limited, painless, red or reddish blue papule to flat topped hemorrhagic pustule or bulla up to 5cm in diameter, central crusting, zone of erythema Evolves through six stages With or without regional adenitis & lymphangitis Spontaneous recovery without scar. Second attacks quiet common Rare : <ul style="list-style-type: none"> Fungating large lesions Erythema multiforme Toxic erythemas 	<ol style="list-style-type: none"> Symptomatic treatment for secondary infection Spontaneous recovery Topical 40% idoxuridine in dimethylsulfoxide to shorten the duration of infection Large exophytic lesions - Surgical excision Cryotherapy Cidofovir
Milker's nodule	<ol style="list-style-type: none"> <i>Parapoxvirus</i> infection from direct contact with cattle Self-limited, painless, red papule that evolves through six stages; Presentation and course essentially identical to orf. Contact history is helpful to differentiate from orf 	<ol style="list-style-type: none"> Self limited No active intervention needed.



Figure 4: Papulo erosive lesion over the dorsum of the hand.



Figure 5: Healing pox lesion with hypo pigmented halo over the hand.

Gianotti-Crosti syndrome (GCS),¹⁰ or papular acrodermatitis of childhood, is a distinctive self-limiting rash with symmetrically distributed papules on the face, buttocks, and extremities that has been related to several underlying viral diseases. Acute, nodular, eroded lesions on the fingers (milkers' nodules) and monomorphic papular lesions on dorsum of the hand especially in children with the contacts of contaminated fomites. Gianotti-Crosti syndrome for all similar acraly located eruptions is considered as distinctive but nonspecific, cutaneous, eruptive pattern with valid and reproducible diagnostic criteria.

A tentative diagnosis of the specific pox infection is often made on the basis of the host species. Definitive diagnosis may be made by isolating the virus in tissue culture or by electron microscopic identification. Histopathological examinations show epidermal hyperkeratosis with intra epidermal separation. Upper dermis granulomatous, dermal edema and infiltrations with mononuclear cells, lymphocytes and histocytes, along thin walled vessels, with congestion. Vesicles multi locular epidermal acantholysis, Parakeratosis, cytoplasmic inclusion bodies (Guanieri bodies).^{6,7,8} According to the study by Groves et al. Histopathology features of orf and milkers' nodules, there were features typical of virus infection, with inclusion bodies and cytoplasmic and

nuclear vacuolation. However, the characteristic features were unique and unlike anything seen in other cutaneous viral lesions (herpes simplex, herpes zoster, molluscum contagiosum, coxsackievirus infection, or human papillomavirus infection).

Following differential diagnosis (Table 2) has to be ruled out before coming to the clinical diagnosis for milkers' nodule.^{1, 2,11}

CONCLUSIONS

Milker's nodule is diagnosed with clinical acumen without the necessity of elaborate and costly laboratory methods. Supportive treatment and reassurance with domestic animal pet treatment by vets will ensure complete management for the agricultural workers.

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