Miliaria pustulosa in post craniotomy patient

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Abstract. Miliaria is a skin disorder due to blockage/interruption of the eccrine sweat glands that often caused by increased heat, humidity, and resident skin organism. Types of miliaria are miliaria crystalline, miliaria rubra, and miliaria profunda. Miliaria pustulosa is rare variant of miliaria rubra in which vesicles develop into pustules. Miliaria pustulosa is often misdiagnosed because it has a similar appearance like other skin disorder with pustules as their main lesion. A 16-year-old female was consulted from Neurosurgeon Department H. Adam Malik General Hospital with reddish papules and pustules accompanied with pain and itchy at the back and chest since 12 days of hospitalization. They firstly rose in the back region then spread to chest, neck and became pustules. Dermatology status showed in interscapular, thoracic and collie region, miliary pustules and erythematous papules were found. Differential diagnoses were miliaria pustulosa, steroid acne and drug allergic eruption with miliaria pustulosa as working diagnosis. Lotiofaberi combined with gentamycin sulfate cream 0.1%, and cetirizine 10 mg tablet once daily were given as treatments. The patient was advised to wear lightweight clothing and avoid exposure to conditions of high heat and humidity. After seven days of treatment, the patient showed good clinical improvement.

1. Introduction

Miliaria or heat rash is the retention of sweat caused by the disruption and blockage of the eccrine sweat gland. Several factors contribute to this condition which is exposed to ultraviolet, resident skin organisms, and recurrent sweat episodes. The role of resident organisms, especially Staphylococcus epidermidis has been a major factor in miliaria. Study shows that these organisms produced extracellular polysaccharide substance which obstructed the sweat gland duct that prevents sweating. This blockage inhibited the normal secretion of the sweat glands and caused rupture of the sweat glands or duct at various depths of the skin. However, in microscopic examination of miliaria lesions, we rarely found the evidence of sweat duct obstruction, such as the keratin ring, a positive Periodic Acid Schiff (PAS) protein or microorganisms. Holzle and Kligman conclude that the keratin rings and PAS-positive proteins are the results of the sweat gland duct destruction. Nevertheless, there still no conclusion on the mechanism of the cause of obstruction and how sweat can escape from the ducts at different depths.

Miliaria is usually in a patient undergoing treatment in hospital. Diagnosis is on clinical findings. Based on its clinical and histopathological findings, miliaria can be into three groups, which are miliaria crystalline, miliaria rubra, and miliaria profunda.

Miliaria Rubra is the most common form of miliaria with pruritic erythematous papules and vesicles, accompanied by burning and pricking sensation. Papules can be found around the pores.
and caused by seat leakage in the epidermis and upper dermis. The most common area that is affected is antecubital, fossa popliteal, trunk especially back area, inframammary, abdomen, and inguinal area. This disorder is often seen in children and adults after recurrent sweat episode in the hot and humid environment. Eruption usually improves within a few days after the patient moved to cool area. However, anhidrosis that associated with miliaria takes two weeks until complete recovery because there is time needed to repair the affected sweat duct unit.

Some of the miliaria rubra eruptions can transform into pustular, called miliaria pustulosa. Miliaria pustulosa is caused by previous miliaria that resulted in injury, damage or blockage on sweat duct. Pruritic pustules are located superficially and not on the hair follicle; it is usually in the intertriginous part of body, scrotum, and back. Recurrence is often with type 1 pseudohypoaldosteronism. Miliaria pustulosa is often misdiagnosed with other skin disorder with pustules as their main lesions such as acne vulgaris and folliculitis due to their similar appearance. Bukhari et al. in 2016 reported a case of miliaria pustulosa misdiagnosed as acne vulgaris. Therefore, here we report a case of miliaria pustulosa in a post-craniotomy patient with a prolonged hospital stay.

2. Case report
Female, 16 years old, student, single, was referred from Department of Neurosurgery, Haji Adam Malik General Hospital on April 6th, 2017 with chief complaints of reddish rash with pus, accompanied with itching on the neck, chest, and back, 12 days since the patient was hospitalized. At first, the patient confessed that the rash was initially small in number, which then increases and spread to her neck, chest, and back when the patient sweats. The patient feels so itchy that she often scratches it.

2.1. Investigation
From physical examination, the patient was fine. There are lesions of erythematous papules and extrafollicular pustule, in miliary size, discreet on interscapular, thorax, and collar region.

2.2. Differential diagnosis
The differential diagnosis of this patient is miliaria pustulosa, acne vulgaris, and folliculitis. We diagnose the patient with miliaria pustulosa. We give information about patient’s condition, which possibly caused by lying down for too long, sweat and heat.

2.3. Treatment
The therapy given to the patient was lotiofaberi combined with 0.1% gentamycin sulfate cream which was applied in the morning and evening after the patient was wiped clean or after abath. Afterwards, cetirizine 10mg once daily was applied to reduce itchiness.

2.4. Outcome and follow-up
The first control of the patient on the 3rd day, we found that the rash was reduced, with no itchiness or other complaints. After three days of medication and use of lotiofaberi, the patient said that lesion has started reducing. On dermatology examination, we found hyperpigmented macules, papules, and extrafollicular pustules were in the interscapular, thorax, and collar region.

On the next control after five days of medication, the patient was found to have less skin rash, with no itchiness or other complaints. On dermatology examination, we found multiple hyperpigmented macules, papules and extrafollicular pustules on the interscapular, thorax, and collar region.
Figure 1. Primarily patient was referred to our department with multiple erythematous papules with extrafollicular pustules on interscapular, thoracic, and neck region.

Figure 2. First control (third day): there are hyperpigmentation spots, multiple papules, and extrafollicular pustules on interscapular, thoracic, and neck region.
3. Discussion
Miliaria is an inflammation reaction caused by sweat extravasation into the surrounding tissues.\textsuperscript{1-3} It may be caused by the presence of disruption and blockage of the eccrine sweat gland.\textsuperscript{1-3} Such situation is more often found on inpatient, or on hot and humid weather.\textsuperscript{1-3} Factors of resident organisms of \textit{Staphylococcus epidermidis} is thought to be the main factor in miliaria pathogenesis.\textsuperscript{1} Miliaria can then be classified again into three groups, namely: miliariacrystalline, miliariarubra, and miliariaprophunda.\textsuperscript{1-3}

Miliariacrystalline appears as small vesicles, superficial, clear, placed in the subcorneum.\textsuperscript{1-3} Lesions are usually asymptomatic, without inflammation and easily ruptured when rubbed.\textsuperscript{1-3} This condition often found in babies, including in ICU where sweat stimulating drugs are often used.\textsuperscript{1} Drugs such as isotretinoin, bethanecol, and doxorubicin may cause this disease.\textsuperscript{2} Miliariacrystalline does not require treatment and may recover on their own.\textsuperscript{1,2}

Miliariarubra is the most common type of miliaria.\textsuperscript{1-3} Blockage of sweat gland, causes sweat leakage in deeper epidermic layers, provoking local inflammation reaction, thus giving unique appearance in the form of erythematous papulovesicle, accompanied by pruritic.\textsuperscript{1,4}

Miliariapustulosa is a rare case of miliariarubra caused by inflammation and bacterial infection, which was preceded by miliaria rubra.\textsuperscript{1,4} The clinical appearance is in the form of extrafollicular pustules with predilection on the intertriginous area, extremities, and the back of patients who are lying down.\textsuperscript{2}

Miliariaprophunda occurs when sweat leakage is in deeper dermis layers.\textsuperscript{1} Lesions may not be pruritic appears as papules placing in multiple discreet, with colors similar to the flesh, especially on trunk and extremities.\textsuperscript{2} Hyperhydrosis compensation may occur on the face, axilla, hands, and feet, while other sweat glands do not function.\textsuperscript{1,2}

According to Fitzpatrick, diagnosis of miliariapustulosa are on history and dermatologic examination.\textsuperscript{1} In this case, the patient underwent craniotomy which made her stayed in bed for 12 days. This immobilization situation considers as a risk factor for miliaria. On dermatologic examination, clinical characteristics of the lesion appeared uniquely as erythematous papules and extrafollicular pustule, in miliary size, multiple, discreet, interscapular, thorax, and collar region.

Miliariapustulosa on the lesion starts from miliariarubra.\textsuperscript{1,4} Lesion starts with erythematous papulovesicles which causes pruritus near the sweat duct opening.\textsuperscript{1,2} Along with the disease, pustule may form on the intertriginous area or back of the patient.\textsuperscript{2} This patient is with miliariapustulosa, based on the presence of unique skin lesion in the form of extrafollicular papules in miliary size.\textsuperscript{3} It has a similar clinical appearance with other skin disorder, such as acne vulgaris and folliculitis.
The patient was differentially diagnosed with acne vulgaris and folliculitis. Acne vulgaris is a chronic inflammatory disease of the pilosebaceous follicles with a unique lesion in the form of someone, papule, pustule, nodule scars. In this patient’s case, the disease history started 16 days ago, meaning acute disease history, with no comedone found, causing differential diagnosis with acne vulgaris to be removable. Differential diagnosis with folliculitis is also removable since, in miliaria lesion, pustule is usually small in size, in large numbers, and at the center, there should be no hair follicles.

The patient would require education about the disease being caused by hot and humid environment, sweating, and lie down for too long. Therefore, one of the most effective treatment is to move the patient to a cool place. Moreover, the patient should be educated about the importance of hygiene and is advised to wear sweat-absorbing clothes. The therapy applied to the patient was lotiofaber 2 x 1 day combined with 0.1% gentamicin sulfate cream, and then cetirizine 1 x 10 mg to reduce itchiness. Lotiofaber is a type of powder which active substance consists of 1% salicylic acid, zinc oxide, talcum venetum, and glycerin adhesive. This powder is indicated for dry, superficial, wide dermatosis similar to miliaria. Gentamycin is an aminoglycoside antibiotic type, effective against gram-positive bacteria such as *Staphylococcus* and another gram-negative bacteria. Salicylic acid in 1% concentration is antiseptic. Zinc oxide functions in liquid absorption.

The prognosis of this patient is good, as long as the patient avoids oversweating and receives better ventilation.

Milliriapustulosa is a rare variant of miliaria rubra that often misdiagnosis with other diseases, and as a consequence get inadequate therapy. This condition could be avoided with complete history taking and careful dermatology examination. Management therapy is simple, affordable and increases patient’s comfort.

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