

Gram Negative Folliculitis Due to *Klebsiella Pneumoniae*

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Abstract

Chronic non-scarring scalp folliculitis is common in younger age group, more so in men. The common causative agents are gram-positive organisms like *Pityrosporum acnes* and *Staphylococcus aureus*.

Gram-negative scalp folliculitis caused by *Klebsiella* is an uncommon entity. Skin and soft tissue infection by *Klebsiella* alone is rare. It could be caused by bacterial interference and replacement of the Gram-positive flora of the skin, where long-term antibacterial treatments are given. The uncommon occurrence of gram-negative folliculitis can lead to common diagnostic dilemma, and, it severely impairs the quality of life of the patient and worsens disease progression.

In this case, a 22 years man had recurrent scalp folliculitis for 2 years, for which multiple courses of antibiotics were taken. Hence, dermatologists require to be vigilant with high index of suspicion in the recalcitrant cases.

Keywords: Gram-negative folliculitis • *Klebsiella* folliculitis • Scalp folliculitis

Introduction

Klebsiella folliculitis is a gram-negative folliculitis, causing benign inflammation of hair follicles. *Klebsiella* colonization in sites other than the primary sites occurs only after protection of the bacteria against immunological challenges [1]. Skin and soft tissue infection by *Klebsiella* alone is a rare entity [2]. It could be caused by bacterial interference and replacement of the Gram-positive flora of the skin where long-term antibacterial treatments are given [3].

Chronic recurrent scalp folliculitis is a benign inflammation of hair follicles which is mostly caused by *Pityrosporum acnes* and *Staphylococcus aureus*. However, empirical treatment of folliculitis may not only lead to unresolved folliculitis, but it may also lead to gram-negative folliculitis owing to the empirical use and even leading to occurrence of resistant strains of *Klebsiella*. *Klebsiella* has been known to be sensitive to third generation cephalosporins but Extended Spectrum Beta-Lactamases (ESBL) producing *Klebsiella* have become a common prevalence with 14%-16% in Europe and 5% in the US. The ESBL producing *Klebsiella* have known to be associated with multi drug resistance which are sensitive to carbapenems, which have become the drug of choice in ESBL producing *Klebsiella* [4]. Resistance to even carbapenems has been noted in hospitals throughout Europe and US due to alteration in core genome of *Klebsiella* [5]. Therefore, it is very important that folliculitis not be considered a simple condition that would be treated simply by the empirical antibiotics; rather failure to

resolve the condition should direct the dermatologist to take more specific measure like a culture and sensitivity testing for administration of specific class of antibiotics.

Case Presentation

Our case is a 22 years male from Kathmandu, who presented with multiple painful pus-filled lesions present discretely over the scalp. The lesions were recurrent in nature, occurring for the past 4 years before the time of presentation. The lesions initially began as raised lesions and gradually turned to pus-containing elevations. Lesions containing pus, both pin point and larger in size, were present initially on the scalp and later spread up to the nape of neck. Patient complained of constant nagging pain; however, there was no sensation of itching, burning, active discharge or bleeding from the lesions. There were no similar lesions in other parts of the body as noticed by the patient. There is no history of exposure to any chemicals or use of cosmetic products deviating from the regular use.

The patient presented to various medical facilities where antibiotic regimens were prescribed; upon completion of the dosage, there was improvement of the lesions only to relapse within few weeks of treatment completion. In the course of four years, he had taken two courses of Isotretinoin (20 milligrams once daily for six months), Rifampicin (600 milligrams once daily for eight weeks) and regular Mupirocin ointment for seven days specifically directed for eradication of *Staphylococcus aureus*. Other oral medications included

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Received: 11-Aug-2020, Manuscript No. JCCR-22-006-PreQc-22; Editor assigned: 16-Aug-2020, PreQC No. JCCR-22-006-PreQc-22; Reviewed: 31-Aug-2020, QC No. JCCR-22-006-PreQc-22; Revised: 06-Aug-2022, Manuscript No. JCCR-22-006-PreQc-22; Published: 12-Aug-2022, DOI: 10.37421/2165-7920.2022.12.1524.

in the treatment regimen were Minocycline, Cyclosporine, Doxycycline, Amoxiclav, and Azithromycin. Topical medications included Ointment Tacrolimus and Lotion Salicylic Acid, prescribed by different doctors at different periods of time. However, there is no history of use of topical steroids or intake of oral steroids. The patient had no significant history of chronic illness such as Diabetes Mellitus, Hypertension, and Tuberculosis to name a few.

The patient chose motorbike as a primary mode of transportation and used helmet on a daily basis. He used to exercise in the local gymnasium on an irregular basis. On local examination of the lesions over the scalp, multiple papules and pustules were present over the occipital part of the scalp and over the nape of the neck, as shown in Figure 1. Pustules were varying in size, and position; some of the pustules were superficial whereas some were deep within the skin with the follicles presenting an erythematous base. Some of the lesions had healed to form residual scars, but in general, the lesions were recalcitrant in nature. However, no group or tufts of follicles and no active discharge were visible.



Figure 1: Multiple pin-point and larger pustules on the occipital region of the scalp.

Patient had a normal general physical status, with no similar lesions over other parts of the body.

Fungal culture of the lesion had been done in previous center and the report was brought by the patient, which showed absence of fungal growth. When the patient had presented to our facility, the previous treatment regimen had been completed without any improvement.

According to the patient, the lesions had worsened in severity hence; pus was withdrawn from the pustule over the nape of the neck in outpatient clinical examination room, under aseptic conditions and was sent for culture and sensitivity.

The pus culture showed isolation of *Klebsiella Pneumoniae*, sensitive to Ciprofloxacin, Amoxiclav, Ceftazidime, Ceftriaxone, Cefepime, Co-trimoxazole, Gentamicin, as shown in Figure 2.

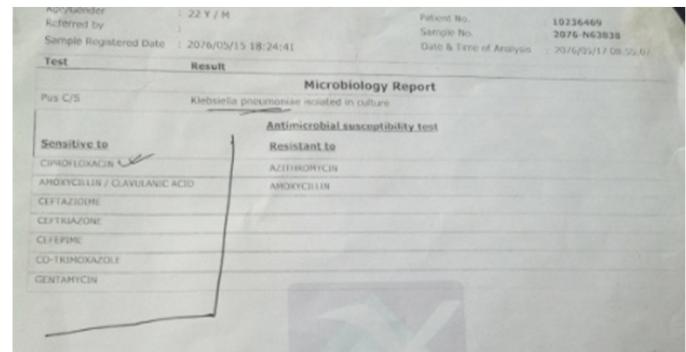


Figure 2: Pus Culture and sensitivity report showing isolation of *Klebsiella pneumoniae* sensitive to Ciprofloxacin, Amoxiclav, Ceftazidime, Ceftriaxone, Cefepime, Co-trimoxazole, Gentamicin.

The patient was treated with tablet Ciprofloxacin 500 milligrams twice daily for six weeks. Lesions subsided. Patient was kept under regular follow up. There was no recurrence of the lesions.

Results and Discussion

Gram negative folliculitis over the face is a fairly uncommon lesion; it is even less likely for gram negative folliculitis to occur over the scalp. Over enthusiastic use of antibiotics lead to gram negative folliculitis over face. In this case, the antibiotics initially alleviated the lesions; however, overuse of the antibiotics could have led to possible aggravation of the condition. Even though an initial transmission factor cannot be determined, the daily use of the helmet can be ascribed to the recurrence of the lesions. The inner spongy surface of the helmet is a possible harbor for different organisms, as helmets are not regularly washed or even cleaned. In addition to the sweat that favors the growth of different micro-organisms, the increasing burden of air pollution in Kathmandu makes it impossible to prevent our skin and appliances we use, from being a walking petri-dish. Kathmandu valley is one of the most polluted cities in the world with the Environment Performance Index ranking the air quality of Nepal in 177th position out of 180 countries. The maximum status of fine Particulate Matter (PM 2.5) was $140 \mu\text{g}/\text{m}^3$ in urban areas on Nepal which was ten times the desirable value set by WHO. The daily average of Particulate Matter measuring $10 \mu\text{m}$ in diameter (PM 10) was $2,928 \mu\text{g}/\text{m}^3$ whereas the finer Particulate Matter (PM 2.5) was $226 \mu\text{g}/\text{m}^3$ [6]. Air pollution has been responsible for seven million deaths annually, majority of the causes of morbidity being respiratory and cardiovascular conditions [7]. However, air pollution can be equally responsible for various skin conditions. When antibiotic use is reckless, personal hygiene is overlooked, and air pollution aggravates skin lesions, it can give rise to an alarming condition leading to chronicity of various dermatological conditions.

Conclusion

Gram Negative folliculitis due to *Klebsiella Pneumoniae* is an uncommon condition. Attribution of the lesion to the more common

agent, *Staphylococcus aureus*, can be a possible misdiagnosis which can be averted by proper culture and sensitivity of the lesion. Empirical use of antibiotics can aggravate the lesions; however, pus culture and sensitivity can direct towards a more appropriate treatment of *Klebsiella* and prevention of relapse. Sanitation of personal use items such as helmets and maintenance of hygiene is important for the prevention at an individual level. At a professional stance, curbing of antibiotics' overuse can alleviate the worsening of gram-negative folliculitis. Mitigation of air pollution can unquestionably diminish incidence and exacerbation of diverse skin conditions.

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How to cite this article: Smriti, Shresta, Shrestha Riyaz, and Shrestha Prastuti. "Gram Negative Folliculitis Due to *Klebsiella Pneumoniae.*" *Clin Case Rep* 12 (2022) : 1524.