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ORIGINAL ARTICLE

Pulmonary Tuberculosis in Dermatological Patients on High-Dose, Long-Term Steroid Therapy

KALSOOM ASLAM[1], FAROOQ AZAM KHAN[2], HAFSA USMAN[3], KAUSAR MASOOM[4], SYED EHSANULLAH[5], ABDUL QAYUM KHAN[6]
[1]*Assistant Professor, Dermatology department, Kuwait teaching hospital Peshawar*
[2]*FCPS Dermatology HOD Dermatology Naseer ullah Khan Babar memorial hospital, Peshawar*
[3]*Senior registrar, dermatology department, Kuwait teaching hospital Peshawar*
[4]*MBBS-FCPS-CHPE, Associate Professor, MCH centre, Gynae Department PIMS Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad*
[5]*Associate professor medicine department Bolan medical college Quetta*
[6]*Department of Dermatology lady reading hospital Peshawar*
Correspondence to: Abdul Qayum Khan, Email: qayum008@gmail.com

ABSTRACT

Background: Tuberculosis is a dangerous infection that can affect the vital organs of the body. Steroid is the cornerstone of immunosuppressive treatment disorders in dermatology.

Objective: The aim of the study was to find out the frequency of Pulmonary tuberculosis in dermatological patients on high-dose, long-term steroid therapy**.**

Methodology: The current study was conducted at the Dermatology department, Kuwait teaching hospital Peshawar from January 2022 to November 2022 after taking approval from the ethical committee of the institute. Individuals who presented to the dermatology department, met the inclusion criteria (patients of either sex, in the adult (≥12 years) age range, and needed high dosage, continuous systemic steroid treatment for their skin condition) were enrolled. To assess for pulmonary tuberculosis, patients were checked on every three months, six weeks, and six months following treatment. Sputum smears for acid-fast bacilli (AFB) were performed for three days straight at each appointment. In cases where more than one sputum smears tested positive for AFB, no further testing was done. An X-ray of the chest was taken to look for any anomalies that would be compatible with active pulmonary TB if just one sputum smear tested positive for AFB. The data was imported into the SPSS (Statistical Package for the Social Sciences) version 19 computer software application and examined as necessary. The quantitative variables were shown using the mean, median, and standard deviation. To determine the P value, the McNamara test was used.

Results: A total 54 individuals with skin diseases needing high-dose systemic steroid treatment over an extended period of time participated in this study. Out of which 26(48.1%) were male and 28 (51.85%) were females. The patients' ages ranged from 15 to 75. After a duration of three months, 4 individuals (7.4%) out of 54 receiving high dosage long-term systemic steroid treatment developed pulmonary TB (P=0.0001).

Conclusion: This study evaluated 7.4% pulmonary tuberculosis among individuals receiving large doses of systemic steroid treatment over an extended period of time.

Keywords: Pulmonary tuberculosis; Dermatological patients; High-dose, Steroid therapy

INTRODUCTION

Tuberculosis is a chronic and dangerous infection. It is caused by the acid-fast bacteria Mycobacterium tuberculosis. It can effect vital systems, such as the respiratory, digestive, genitourinary, skin, bones, joints, lymphoreticular, and central neurological systems.[1] Every year, someone with active TB infects 10 to 15 other people.[2] The immune system blocks off the underlying organism and keeps it dormant for years, so people with tubercle bacilli in their bodies do not always exhibit the hallmarks and signs of tuberculosis. The likelihood of tuberculosis becoming active increases in those with weakened immune systems. A new individual contracts the tubercle bacilli every second. Currently, this bacterium is present in one-third of the world's population.[2] Throughout their lives, five to ten percent of immunocompetent people worldwide contract tuberculosis.[2] Annually, there is a rise in the prevalence of both HIV and TB in Pakistan.[3] People with weak immunity such as AIDS patients and those on immunosuppressive therapy, are more susceptible to contracting Tubercle bacillus.[4] In an immunocompromised individual, tuberculosis may result from a preliminary infection, reactivation, or reinfection.[5] Hemoptysis, chest discomfort, and a productive cough lasting three weeks or more are signs of pulmonary TB. Fever, chills, sweats at night, hunger loss, weight loss, and easy fatigability are possible symptoms.[6]

Steroid are the cornerstone of immunosuppressive treatment for collagen vascular disorders and immunobullous disorders in dermatology. A high-dose, prolonged glucocorticoid medication regimen is frequently required to manage a number of disorders, including dermatomyositis, lupus erythematous, pemphigus, and bullous pemphigoid. These individuals run the risk of contracting primary tuberculosis as well as having their dormant tuberculosis reactivate. In addition to masking the disease symptoms and signs, which delays diagnosis, the immunosuppression brought on by glucocorticoids in these people predisposes them to more severe forms of the medical conditions, such as disseminated tuberculosis.[7] When a patient receiving high-dose, long-term systemic steroid treatment is found to have active tuberculosis, anti-TB treatment should be started without interrupting the steroid treatment; however, the dosage of the steroid should be reduced to the lowest level that is feasible while still reducing the activity of the underlying dermatitis. It is important to do quick drug susceptibility testing to determine drug resistance.[8] So this study was carried out to explore the Pulmonary tuberculosis in dermatological patients on high dose, long –term steroid therapy**.**

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METHODOLOGY

The current study was conducted at the Dermatology department, Kuwait teaching hospital Peshawar from January 2022 to November 2022 after taking approval from the ethical committee of the institute. Individuals who presented to the dermatology department, met the inclusion criteria (patients of either sex, in the adult (≥12 years) age range, and needed high dosage, continuous systemic steroid treatment for their skin condition) were selected while Individuals with uncontrolled diabetes, systemic steroid medication, antituberculous therapy (ATT), or any other immunosuppressive therapy were excluded. Following informed permission, demographic information was acquired. On the initial appointment, a clinical examination, screening tests, and a history were conducted. To assess for pulmonary tuberculosis, patients were checked on every three months, six weeks, and six months following treatment. Sputum smears for acidfast bacilli (AFB) were performed for three days straight at each appointment. In cases

where more than one sputum smears tested positive for AFB, no further testing was done. An X-ray of the chest was taken to look for any anomalies that would be compatible with active pulmonary TB if just one sputum smear tested positive for AFB. If the result was affirmative, no more testing was done. Sputum culture was performed if one sputum smear was positive for AFB when the results of the chest X-ray did not indicate the presence of pulmonary TB. In the event that the test was positive, the patient was identified as having pulmonary TB. Sputum culture was performed if the results of the AFB sputum smear were negative for three days in a row. A case of pulmonary tuberculosis was diagnosed in the individual if any of the sputum cultures were positive. The individual was diagnosed with pulmonary tuberculosis if the sputum smear for AFB had been negative over three consecutive days and the sputum culture was also negative. Additionally, the patient was classified as having persistent radiographic abnormalities consistent with active tuberculosis that did not improve with therapy employing universal antibiotics for at least one week. The history, physical examination, and screening test results were all recorded on a pro forma. The gathered data was imported into the SPSS (Statistical Package for the Social Sciences) version 19 computer software application and examined as necessary. The quantitative variables were shown using the mean, median, and standard deviation. To determine the P value, the McNamara test was used.

RESULTS

A total 54 individuals with skin diseases needing high-dose systemic steroid treatment over an extended period of time participated in this study. Out of which 26(48.1%) were male and 28 (51.85%) were females (figure i). The patients' ages ranged from 15 to 75 years with an average age of 39. The most dominant age group was 46-61 years (37.0%) followed by 31 t0 46 years age (29.62%). the demographic features of the study participants has been displayed in table 1. The majority of the individuals had pemphigus vulgaris 38(70%), flowed by Systemic lupus erythematous 6(11.1%), Pemphigus foliaceus 4(7.4%) respectively. (Table 2.)

Table 1: Demographic feature of the study participants (N %)

Gender	
Females	28 (51.85%)
Male	26(48.1%)
Age in years	
15 to 30	15(27.7%)
31-46	16(29.62%)
46-61	20(37.0%)
Above 61	3(5.5%)

According to the study's findings, 4 individuals (7.4%) with pemphigus vulgaris who were receiving high-dose, long-term systemic steroid treatment also acquired pulmonary TB after three months. Of these 4(7.4%) 3 cases were male and 1 were female. 2 individuals had abnormal chest X-ray results at the 6th-week assessment, but the AFB culture and sputum smear came out negative. Similarly with two of the patients already mentioned, two individuals experienced abnormal chest X-ray results at three months of therapy, and in both cases, the sputum smear and culture for AFB were negative. (Figure 2).Although these patients received high dosage systemic steroid treatment and wide spectrum antibiotics for two weeks, the results of their chest X-rays did not improve. Participants were placed on ATT after a sputum smear & culture at that time revealed positive results. After receiving antibiotics for two weeks, a person who had anomalies in his chest on X-ray at the six-month follow-up had a resolution of his radiological chest findings. Three male participants and one female were among the 4 individuals who got pulmonary tuberculosis. There were two unemployed sufferers and one laborer among the male patients. Every patient had a married life. The woman was a homemaker. Each of these four patients came from a low-income background. Two of the patients were men who smoked. Out of the patients, three were underweight and one had a normal BMI. Two of the patients had a family history of pulmonary TB. All four patients had a history of having had the BCG immunization. All of the patients had elevated ESRs as well.

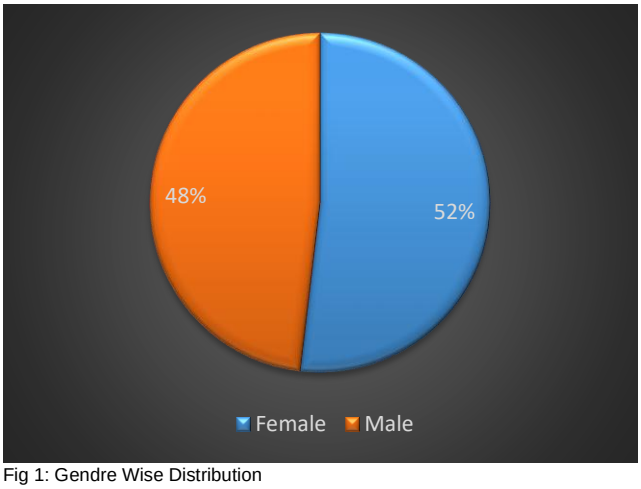

Fig 1: Gendre Wise Distribution

Table 2: The prevalence of certain skin disorders needing high-dose, long-term steroid treatment

Skin disorder	N (%)
Pemphigus vulgaris	38(70%)
Systemic lupus erythematous	6(11.1%)
Pemphigus foliaceus	4(7.4%)
Bullous pemphigoid	4(7.4%)
Lupus erythematous	2(3.7%)

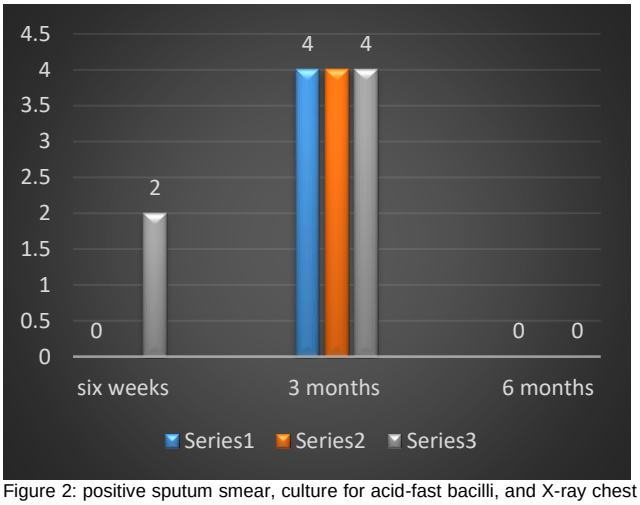

Figure 2: positive sputum smear, culture for acid-fast bacilli, and X-ray chest results [P=0.0001].

DISCUSSION

In the current study explored the incidence of pulmonary tuberculosis in individuals with skin disorders using steroid for long time as a therapeutic agents. We determined that 8% of the study participants had pulmonary tuberculosis. The findings of the current research are similar with the study conducted by Dr Ghazala et al.[15] There is little data on how steroid medication affects the progression of tuberculosis. Steroids have a recorded adverse effect of making infections severe.[9] Researchers argue that steroid medication may exacerbate active or seemingly dormant TB, while others come to the conclusion that steroid therapy has no effect on tuberculosis incidence.[8] In this study, we discovered a statistically significant (P<0.05) correlation between

the onset of pulmonary TB and steroid dose, defined as more than 1 mg/kg daily for six months. Research from around the globe also corroborate our results. A higher frequency of chronic TB was seen in 269 rheumatic disease participants receiving moderate to high dosages of corticosteroids.[10] The mean and cumulative daily steroid dosages given during the first year of treatment were the risk variables. Sasaki reported that in the majority of his patients with collagen vascular disease, the average period between the onset of TB and the commencement of corticosteroids, at a dosage ranging from 13.9 mg to 20 mg per day, was 4.1 years.[11] Out of 160 individuals (3.1%), Kobashi et al. Identified five who had pulmonary TB while receiving long-term corticosteroid treatment.[12] The total amount of corticosteroids taken throughout the two to nine & a half months leading up to the clinical diagnosis of pulmonary TB was 1.16 gm to 5.6 gm Dryga et al revealed 39 instances of progressing TB in patients receiving varying dosages of glucocorticoids.[13] Jick et al showed that individuals given Glucocorticoids raise the likelihood of TB development without regard to other risk factors[14]. When individuals using oral glucocorticoids were screened for TB, Chan and Yosipovitch discovered that lower or sporadic dosages of glucocorticoids are not linked to tuberculosis.[7]Sayarlioglu and associates found that high prednisolone dosages were a significant predictor of a higher incidence of TB in individuals with SLE.[9] Pal et al also came to the conclusion that prolonged systemic steroid medication significantly raises the incidence of TB.[8] The risk of tuberculosis can be raised by glucocorticoids through a variety of methods. Because of their immunosuppressive and anti-inflammatory properties, corticosteroids hinder the production of antibodies and cell-mediated immunity, which are essential for the treatment of tuberculosis.[14] Glucocorticoids block the binding and function of Fc receptors, as well as the lymphocyte impact and monocyte chemo taxis. Glucocorticoids block the binding and function of Fc receptors, as well as the lymphocyte impact and monocyte chemo taxis. Glucocorticoids reduce peripheral blood monocyte counts and their ability to perform various roles, such as producing interleukin-1 and TNF-α and having bactericidal action. Glucocorticoids also cause a shift of lymphocytes (mostly T-cells) out of the circulation, which results in peripheral lymphocytopenia. This process inhibits T cell activation, resulting in decreased proliferative responses and cytokine production.[14] The cellular immune system may be significantly impacted by the diverse actions of glucocorticoids, thereby increasing susceptibility to TB infection. When steroid dosages above 0.03 mg/kg/day of prednisolone or its equivalent, these effects become more noticeable. There is a noticeable increase in susceptibility to a wide range of illnesses at dosages more than 1 mg/kg/day. Treatment lasting fewer than five days seems to have less of an impact on infection susceptibility and immune system performance. Ongoing treatment provides more significant and prolonged immunosuppressive effects than intermittent treatment.[8] Each of the four patients in our research came from a low socioeconomic background. It has been observed that poverty and tuberculosis have a very significant relationship. It's possible that overcrowding in homes increases the risk of transmission, and inadequate nutrition lowers immunity.[15]

Given that tuberculosis is a widespread and transmissible disease in Pakistan, it is imperative to demonstrate a link between the development of pulmonary tuberculosis and high dosage, long-term systemic steroid treatment. Long-term high dosage systemic steroid medication suppresses the immune system and masks its symptoms and indications, delaying diagnosis and increasing the risk of primary infection, reinfection, and reactivation of dormant tuberculosis. Before or after starting high-dose, long-term systemic steroid therapy, patients with skin diseases can be screened for tuberculosis to help prevent infection spread, reactivation of dormant tuberculosis, complications, morbidity, and mortality from undiagnosed tuberculosis. Additionally, the patient will benefit from the prompt initiation of tuberculosis treatment.

CONCLUSION

This study evaluated 7.4% pulmonary tuberculosis among individuals receiving large doses of systemic steroid treatment over an extended period of time. People should undergo screening for pulmonary TB before to starting systemic steroids and every three months thereafter. If the disease is found, individuals should get the necessary therapy.

REFERENCES

1 Tuberculosis. In: Kasper DL, Braunwald E, Fauci AS, et al., eds. Harrison's Principles of Internal Medicine, 16th ed. New York: McGraw-Hill; 2005. P.953-66.

2 World Health Organization. Tuberculosis Fact sheet N 104 - Global and regional incidence. Revised November 2010. Cited online on 10.12.2010. URL:http://www.who.int/mediacentre/factsheets/fs104/en/index.html

3 Global tuberculosis control WHO report 2010. World Health Organization WHO/HTM/TB/2010.7.

4 Crompton GK, Haslett C, Chilvers ER. Immunological factors in disease. In: Haslett C, Chilvers ER, John A et al., eds. Davidson's Principles and Practice of Medicine, 20th ed. London: Churchill Livingstone; 2006. P. 75.

5 Kumar P, Clark M. Immunology. In: Kumar P, Clark M, Eds. Clinical Medicine, 6th ed, W.B. Saunders 2005: 177.

6 Crompton GK, Haslett C, Chilvers ER. Diseases of the respiratory system. In:Haslett C, Chilvers ER, John A et al., editors. Davidson's Principles and Practice of Medicine, 20th ed. Churchill Livingstone 2006: Page 695-703

7 Chan YC, Yosipovitch G. Suggested guidelines for screening and management of tuberculosis in patients taking oral glucocortoids -- an important but often neglected issue. J Am Acad Dermatol.2003; 49: 91-58.

8 Pal D, Behera D, Gupta D, A. Tuberculosis in patients receiving prolonged treatment with oral corticosteroids for respiratory disorders. Indian J Tub. 2002; 49:83

9 Sayarlioglu M, Inanc M, Kamali S et al. Tuberculosis in Turkish patients with systemic lupus erythematous: increased frequency of extrapulmonary localization. Lupus.2004; 13:274-8

10 Kim H, Yoo C, Baek J et al. Mycobacterium tuberculosis infection in a corticosteroid-treated rheumatic disease patient population. Clin Exp Rheumatol. 1998;16:9-13

11 Sasaki Y, Yamagishi F, Yagi T et al. A clinical study in the collagen disease patients developed pulmonary tuberculosis during corticosteroid administration. Kekkaku. 2000; 75:569-7

12 N et al. Clinical analysis of pulmonary tuberculosis in association with corticosteroid therapy. Kekkaku 1999; 74:789-9

13 Dryga P, NesterovskiĭI, Kovalenko L, Elovskikh P. Clinical-morphological characteristics and prevention of steroid tuberculosis. Probl Tuberk Bolezn Leg.1995;4:22-4

14 Jick SS, Lieberman ES, Rahman MU, Choi HK. Glucocorticoid use, other associated factors, and the risk of tuberculosis. Arthritis Rheum. 2006; 55:19-26

15 Butt, Ghazala, et al. "Frequency of pulmonary tuberculosis in patients with skin diseases requiring high dose long-term systemic steroid therapy." Journal of Pakistan Association of Dermatologists 23.2 (2013): 126-132.

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