

## Examining the Tissue Samples of Granulomatous Lesions on the Skin through Histopathological Analysis

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### Abstract

**Aim:** The objective of the present study is to evaluate the histopathological study of cutaneous granulomatous lesions.

**Methods:** This study was conducted at the Department of Pathology, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India, and 50 subjects with cutaneous granulomatous lesions were included. The duration of the study was one year. Local ideas and culture were incorporated. Confidentiality was assured. They were given thorough explanations in their native tongue about the purpose and aim of the survey.

**Results:** There were 50 subjects analysed, of which 29 (58%) had male predominance and 21 (42%) had female predominance, resulting in a M:F ratio of 1.3:1. 15 (30%) instances.

**Conclusion:** A procedure namely a biopsy should be carried out to confirm the detection, particularly in cases where the patient is presenting with more than one type of lesion. Treatment of cutaneous granulomatous lesions should be tailored to the individual patient and the particular type of lesion they have.

**Keywords:** Granuloma, Histopathology, Skin Lesions, Skin Biopsy.

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### Introduction

Histopathology is defined as the study of human tissue under a microscope to ascertain any demonstrations of disease, laceration, or another oddity. It is a specialist area of diagnostic medicine that makes it possible to diagnose and treat illnesses correctly [1]. Histopathologists look at tissue samples taken from organs and tissues to find anomalies, such as cancer cells, or to look at the structure of healthy tissue to see if a disease is present. Numerous illnesses, including cancer, viral disorders, and autoimmune diseases, are diagnosed using histopathology [2].

A range of impetus, like foreign objects, cancer, septicaemia, metabolites, and chemicals, can cause a skin inflammatory reaction, which is the hallmark of the heterogeneous group of illnesses known as cutaneous granulomatosis. They are separated into infected and non-infectious granulomas from a pathogenic standpoint. Granuloma is a specialized disposition of inflammation where the predominant cell types are M cells, T lymphocytes, and dendritic cells. Granuloma annular, rheumatic nodules, necrobiosis lipoidica, foreign body granulomas, cutaneous sarcoidosis, and interstitial granulomatous

dermatitis are examples of non-infectious granulomatous skin disorders. [3]

The occupancy of a granulomatous inflammatory infiltration in the hypodermis & dermis, which is mostly made up of phagocytes clustered with a nodular, interstitial architecture, or palisaded architecture, is the common denominator from a histological perspective. Inflammations with granulomas are a frequent and interesting issue. In order to administer the necessary treatment, a proper diagnosis must be reached. Histopathology is a technique that can be used to correctly diagnose diseases that affect the body's many organ systems, as well as many other ailments [4].

Histiocytes, also known as tissue phagocytes, are primarily responsible for phagocytosis, the removal of pathogens, and antigen presentation. Additionally, they influence the synthesis and production of chemotactic lipids, cytokines, and chemokines [5].

Recurrent skin infections, photosensitivity, excessive swelling at the drainage site, granulomatous lesions, and vasculitis are all signs of CGD. Fever, lymphadenopathy, leukocytosis, an augmented C-reactive protein, and an increased absolute number of eosinophils were among the additional prevalent symptoms identified in these lesions across 50 pediatric research participants [6].

According to some theories, each of two, a non-specific inflammation brought on by unknown objects or a specific delayed hypersensitivity reaction to an antigen is what causes granuloma formation. This inflammatory process involves either innate or adaptive immunity [7]. Major actors in innate immunity that function as microbial sensors include cell membrane receptors like TRA (Toll-like receptors) and cytoplasmic receptors like Nucleotide-binding oligomerization domain like receptors. A limited number of these receptors may detect a variety of human

diseases through a process known as pattern recognition. [8]

### Materials and Methods

This study was carried out at the Department of Pathology, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, and 50 subjects with cutaneous granulomatous lesions were included. The duration of the study was one year. Local ideas and culture were incorporated. Confidentiality was assured. They were given thorough explanations in their native tongue about the purpose and aim of the survey. After receiving informed consent in the patient's native language, all experiments were carried out.

The diagnosis of cutaneous granulomatous lesions is usually made by clinical examination, followed by a biopsy of the skin. This procedure involves the removal of a sample of affected skin tissue, which is then examined under a microscope for the presence of inflammatory cells and other features that are typical for granulomatous lesions [9]. Additional tests, such as blood work or imaging studies, are performed to rule out other conditions or to further investigate the underlying cause of the lesions.

Depending on the type of granuloma, different staining methods were used to better highlight the presence of the granulomatous cells and the surrounding tissue. In addition to providing a diagnosis, histopathological studies of cutaneous granulomatous lesions can help to inform treatment decisions. Cutaneous biopsies are crucial for identifying numerous diseases and disorders of the skin. These biopsies were meticulously processed and stained using various laboratory methods, including H&E, Ziehl Neelsen, Periodic Acid Schiff, Fite Faraco and Gomori Methenamine Silver, to achieve correct results (GMS). These stains are crucial for identifying particular skin cell types and identifying any anomalies in the biopsy specimen. In order to inform treatment

options, pathologists can use proper staining to identify the presence or absence of specific illnesses and diseases.

#### **Inclusion criteria/ case definition:**

1. The inclusion criteria for this clinical research of histopathological study of cutaneous granulomatous lesions were all skin biopsies coming during a one-year study period for revealing granulomatous skin lesions on histopathological examination.
2. Participants for the study were selected after taking into consideration age, sex, history of trauma, and laboratory tests.

#### **Exclusion criteria:**

In order to ensure that the results of a histopathological study of cutaneous granulomatous lesions are as accurate as possible, certain exclusion criteria must be applied before the study begins. This criterion helps to ensure that any results obtained are not skewed by factors that could lead to misinterpretation. The following are the most commonly used exclusion criteria for a histopathological study of cutaneous granulomatous lesions:

1. Lesions with an atypical clinical presentation.
2. Lesions with a mixed clinical presentation.
3. Lesions that have previously been treated with any form of therapy.
4. Lesions that came out in areas of the skin that may be difficult to biopsy.
5. Lesions that have an infectious etiology.
6. Lesions that have existed for less than three months.
7. Lesions that have been excised before biopsy.
8. Lesions that have been biopsied before the current histopathological study.
9. Lesions that are surrounded by known malignancy.
10. Lesions that are associated with other systemic diseases.

**Statistical Methods:** The information from the lesions must first be gathered and put into an easily-accessible format, like an Excel spreadsheet. The broad trends in the data can then be understood using descriptive statistics like mean, median, and mode. If there is a notable distinction among two or more groups of lesions, it can be determined using inferential statistics like t-test and chi-square test. Regression analysis is used to understand how one variable predicts another variable, correlation analysis can be used to analyze the relationships between several variables.

#### **Clinical data:**

The aim of this study is to investigate the clinical profile of cutaneous granulomatous among 50 subjects. The status of all subjects which are evaluated during the study is mentioned below:

- The histological analysis of cutaneous granulomatous lesions is a crucial step in the diagnosis and tracking of systemic illnesses. In various phases of this disorder, redness, swelling, itching, lumps or ulcers, discomfort, and skin discoloration are typical symptoms.
- Skin lesions that are present in the early stages of the illness may look like ulcers or tiny, red pimples. The lesions may enlarge, rise, and even develop a central drainage channel as the illness worsens.
- The skin lesions may develop into ulcerative and purulent stages. The patient also experiences systemic symptoms in these situations, including fever, malaise, and anemia. Antibiotics and topical steroids to lessen inflammation are frequently used in the treatment of the illness.

#### **Result**

The authorization forms for the samples that were received provided the clinical findings and other pertinent data. The

research comprised skin lesions with histological evidence of granuloma development. Based on their histological and clinical findings, cases with cutaneous granulomatous lesions were evaluated.

There were 50 subjects analyzed, of which 29 (58%) had male predominance and 21

(42%) had female predominance, resulting in a M:F ratio of 1.3:1. 15 (30%) instances, or the preponderance of the patients, were found to be among 21–30 years old, followed by 15 (30%) cases in the 31–40 age range. In our study, 80% of instances were observed in patients under 50.

**Table 1: No. of cases according to age distribution**

Age Distribution	Number of cases
1-10	1
11-20	3
21-30	15
31-40	15
41-50	5
51-60	2
61-70	3
71-80	5
81-90	1

**Table 2: No. of cases according to disease**

Disease	No. of cases	Percentage
Borderline tuberculoid	10	20
Intermediate and lepromatous leprosy	15	30
Tuberculoid leprosy	12	24
Orderline lepromatous	5	1

Only one incidence of sarcoidosis was discovered, and infectious granulomatous dermatoses were fairly common. There were 15 incidences of infectious dermatoses reported in people aged 21 to 30. Infectious granulomatous dermatoses still have leprosy as their predominant cause, followed by skin tuberculosis.

Indeterminate & lepromatous leprosy both had 15 (30%) numbers of cases, followed by borderline tuberculoid leprosy with 10 (20%) cases, tuberculoid leprosy with 12 (24%) cases, and borderline lepromatous with 5% of cases. Lepra bacilli were discovered by Fite Faraco stain to be positive in 2 cases of leprosy. Four (8%) instances of lupus vulgaris and just one (2%) case of sarcoidosis were discovered.

### Discussion

Clusters of inflammatory cells known as granulomas can be found in a diversity of skin conditions, like leprosy, tuberculosis,

and sarcoidosis [10]. As a result, an essential tool for accurately diagnosing and treating patients with these illnesses is the histological analysis of cutaneous granulomatous lesions. Studies on histopathology entail looking at tissue samples under a microscope. This enables us to see the nucleus, cytoplasm, and other organelles of the cell as well as other cellular structures, and to spot any abnormalities [11]. Histopathology is particularly useful for identifying the presence of foreign material, such as bacteria and fungi. Histopathology can assist identify the types of cells involved in cutaneous granulomatous lesions, help distinguish between benign and malignant tumors, and more [12].

The histopathological study can also help to identify the type of granuloma present in the lesion. Granulomas can be classified into tuberculous granulomas and non-tuberculous granulomas. Tuberculous

granulomas are caused by infection with *Mycobacterium tuberculosis*, while non-tuberculous granulomas can have many different causes, including fungal infection, drug-induced granulomas, and sarcoidosis [13].

Cutaneous granulomatous lesions are a particular kind of skin lesion brought on by an abnormal build-up of cells that produce inflammation on the skin. Although these lesions are uncommon in India, their prevalence is rising as a result of numerous genetic and environmental causes [14]. Proximity to industrial or environmental contaminants, such as heavy metals or chemicals, which can increase the number of inflammatory cells nearby the skin, is the most frequent cause of these lesions in India. The prevalence of granulomatous skin lesions can also be increased by specific hereditary diseases like sarcoidosis or tuberous sclerosis [15]. In India, cutaneous granulomatous lesions are thought to affect 0.5–1% of the population. Given the changing environment and genetics of the population, this number is probably going to rise over time. The source and severity of these lesions determine how they should be managed. Topical steroids are typically helpful in lowering the number of inflammatory cells in the majority of cases, but in more extreme situations, phototherapy or systemic drugs may be necessary. Surgery for excision may be required in rare circumstances [16].

Finally, the histopathological study can help to differentiate between benign and malignant granulomatous lesions. Benign granulomas are typically composed of epithelioid cells, while malignant granulomas are composed of cells with pleomorphic features. Furthermore, malignant granulomas can have features of necrosis, mitoses, and vascular invasion, which help to distinguish them from benign granulomas [17]. Overall, histopathology is an important tool for properly diagnosing and treating patients

with cutaneous granulomatous lesions. It can help to differentiate between benign and malignant tumors and to identify the type of granuloma present. Furthermore, histopathology can help to identify the cause of the lesion, allowing for appropriate treatment [18,19].

## Conclusion

Granulomatous dermatitis has a vast range of etiologies that depends on the sites they are found on. Leprosy is the most common etiology of infectious forms of granulomatous dermatoses and is one of their primary causes. Accompanied by the relevant history and pertinent clinical examination, histopathology is crucial in the diagnostic and comment thread of cutaneous granulomatous lesions. And we found that only one incidence of sarcoidosis was discovered, and infectious granulomatous dermatoses were fairly common.

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