Research Article

The histopathological study of granulomatous diseases in various organ to find the exact etiology of granulomas

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Abstract

This study was conducted to find out the etiology of all granulomatous lesions on Histo-pathology and Cytological studies. Our study was done at SBKS MI & RC, Piparia from January 2011 to July 2012. All the cases which were clinically diagnosed and suspected of granulomas, on haematoxylin and eosin stained sections were studied. Special stains like Ziehl Neelsen stain, PAS stain and Fite Faraco stain were done whenever required. The morphological features and special staining helped us to find the specific etiology of Granulomas in 123 cases whereas it could not be determined in 7 cases even after special stains. Thus we conclude that Cytological study of granulomatous lesions helped us to find the exact etiology of Granulomas in 81% of cases whereas Histopathological examination of granulomatous lesions helped us to find the exact etiology of Granulomas in 95 % of cases. The correlation of histo-pathology with PCR, serological tests and culture correlation would have helped to find the specific etiology in the remaining cases.

Keywords: Granuloma, histopathology, special stains, etiology

1. Introduction

The granulomatous inflammatory response is ubiquitous in pathology, being a manifestation of many infections, toxic, allergic, autoimmune and neoplastic diseases, vasculitis, immunological aberration, leukocyte oxidase deficiency, hypersensitivity, chemicals, and also conditions of unknown etiology. Schistosomiasis, tuberculosis and leprosy, all infective granulomatous diseases, together affect more than 200 million people worldwide, and granulomatous reactions to other irritants are a regular occurrence in everyday clinical histopathology.¹

Granulomatous inflammation is best defined as a special variety of chronic inflammation in which cells of the mononuclear phagocyte system are predominant and take the form of macrophages, epithelioid cells and multinucleated giant cells. In most instances, these cells are aggregated into well demarcated focal lesions called granulomas, although a loose, more diffuse arrangement may be found. In addition there is usually an admixture of other cells, especially lymphocytes, plasma cells and fibroblasts.¹

Granulomatous inflammation is a distinctive pattern of chronic inflammation and adaptive immunity and the granuloma is the hallmark of many human diseases of great significance, the most important of which is tuberculosis.²,³ Its formation is firmly linked to the type IV(delayed type) hypersensitivity reaction which is a form of adaptive cell-mediated immunity that is mediated by activated T lymphocytes and their products, called cytokines. Recognition of granulomatous
inflammation on histology is very important because of the fairly limited number of conditions that give rise to granulomas and the clinical significance of these diagnoses.

2. Materials and Method

The present study was undertaken from January 2011 to July 2012 in the Department of Pathology, SBKS MI & RC, Piparia, Vadodara. For the cytological study, FNAC was done in clinically diagnosed and suspected cases of granuloma. All the cases which were clinically diagnosed and suspected of granulomas, on haematoxylin and eosin stained sections were studied. Special stains like Ziehl Neelsen stain, PAS stain and Fite Faraco stain were done whenever required.

Total 130 cases of clinically diagnosed and suspected cases of Granulomatous lesions were studied. Out of total 130 cases, the 98 cases were studied with Histopathological and cytological examination, 25 cases with the histopathological examination only, 7 cases only with cytological examination. The most common site of the granulomatous diseases was in lymph nodes(72 cases), followed by skin and subcutaneous tissue (10 cases), neck (12 cases), respiratory system (7 cases), spine (7 cases), bones and joints (5 cases), gastrointestinal tract(6 cases), female reproductive system(5 cases), male reproductive system (2 cases) and 1 case each in ear, umbilicus, CNS and muscle.

3. Result

The present study of 130 cases (Male=58 cases and Female=72cases) was carried out to detect the incidence of various types of granulomatous diseases in various organs with help of cytological and histo-pathological examinations. Out of total 130 cases, 98 cases were studied with both histo-pathological and cytological examination, 25 cases with histo-pathological examination only, 7 cases only with cytological examination.

So, Total 123(98+25) cases were studied with histo-pathological examination and Total 105(98+7) cases were studied with cytological examination.
Age of the patients varied from 2 years to 80 years. Maximum numbers of patients were in the age group of 21-30 years. The ratio of male to female patients was 1:1.24. So, Granulomatous lesions were seen predominantly in 3rd decade of life and in females.
Most common cause of granuloma was tuberculosis (81%) followed by leprosy (7%), fungal infections (4%), foreign body granulomas (2%), parasitic infection (1%), and granulomas of unknown etiology (5%).

Table 1. Incidence of various types of granulomatous diseases in present study (130 cases)

| Type Of Granulomatous Diseases  | Cases | Percentage (%) |
|---------------------------------|-------|----------------|
| Tuberculosis                    | 106   | 81%            |
| Leprosy                         | 9     | 7%             |
| Fungal Granuloma                | 5     | 4%             |
| Foreign Body                    | 2     | 2%             |
| Parasitic Granuloma             | 1     | 1%             |
| Granuloma Of Unknown Etiology   | 7     | 5%             |
| Total                           | 130   | 100%           |
Table-2. Incidence of granulomatous diseases in various organs in the present study (130 cases)

| Various organs | Tuberculosis | Leprosy | Fungal | Foreign body | Parasitic granuloma | Granulomas of unknown etiology |
|----------------|--------------|---------|--------|--------------|---------------------|-------------------------------|
| Lymph node     | 69           |         |        |              |                     | 3                             |
| Resp tract     | 4            |         | 3      |              |                     |                               |
| Skin           |              | 9       | 1      |              |                     |                               |
| GIT            | 5            |         |        |              |                     |                               |
| Spine          | 7            |         |        |              |                     |                               |
| Breast         |              |         |        |              |                     | 1                             |
| FGT            | 4            |         |        |              |                     |                               |
| MGT            | 1            |         |        | 1            |                     |                               |
| Neck           | 9            |         | 1      |              |                     | 2                             |
| Bone & joint   | 4            |         | 1      |              |                     |                               |
| Ear            | 1            |         |        |              |                     |                               |
| Umbilicus      |              |         |        |              |                     | 1                             |
| CNS            | 1            |         |        |              |                     |                               |
| Muscle         | 1            |         |        |              |                     |                               |
| Total          | 106(81%)     | 9(7%)   | 5(4%)  | 2(2%)        | 1(1%)               | 7(5%)                         |

Table-3. Incidence of various types of leprosy in the present study (9 cases)

| Sr. No. | Types of Leprosy | Incidence | Percentage |
|---------|------------------|-----------|------------|
| 1.      | Indeterminate Leprosy | 2         | 22%        |
| 2.      | Borderline Lepromatous Leprosy | 2         | 22%        |
| 3.      | Lepromatous Leprosy     | 4         | 44%        |
| 4.      | Erythema Nodosum Leprosum | 1         | 11%        |
| Total   |                   | 9         | 100%       |

4. Discussion

Below table revealed that incidence of tuberculosis (82%) in our study is slightly higher than other two Karnataka studies, Jayashree pawal et al study (49%) and Harish permi et al study (47%). Even though leprosy is common in Gujarat but may be due to less samples size.

Table-4. Comparison of incidence of various types of granulomatous diseases on histo- pathological study with other studies

| Type Of Granulomatous Diseases | Jayashree pawal et al\textsuperscript{a} Bagalkot & Hubli, Karnataka (170 Cases) | Harish S. Permi et al\textsuperscript{b} Mangalore, Karnataka (253 Cases) | Present Study, Piparia, Vadodara, Gujarat (130 Cases) |
|-------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------|
| Tuberculosis                  | 49%                                                                         | 47%                                                                     | 82%                                                 |
| Leprosy                       | 18%                                                                         | 13%                                                                     | 7%                                                  |
| Fungal Granuloma              | 6%                                                                          | 9%                                                                      | 4%                                                  |
| Foreign Body                  | 8%                                                                          | 8%                                                                      | 2%                                                  |
| Parasitic Granuloma           | -                                                                           | 4%                                                                      | 1%                                                  |
| Actinomycosis                 | 1%                                                                          | 1%                                                                      | -                                                   |
| Tumour Associated Granuloma   | -                                                                           | 6%                                                                      | -                                                   |
| Rhinoscleroma                 | 12%                                                                         | 5%                                                                      | -                                                   |
| Granuloma Of Unknown Etiology | 6%                                                                          | 8%                                                                      | 5%                                                  |
Table-5. Comparison of incidence of granulomatous diseases in various organs with the other studies

| Various organs     | Jayashree pawal et al$^a$ Bagalkot & Hubli, Karnataka (170 cases) | Harish S. Permi et al$^b$ Mangalore, Karnataka (253 cases) | Present study, Piparia, Vadodara, Gujarat (130 cases) |
|-------------------|---------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------|
| Lymph node        | 18%                                                          | 21%                                                        | 55%                                                    |
| Resp tract        | 17%                                                          | 9%                                                         | 5%                                                     |
| Skin              | 31%                                                          | 25%                                                        | 8%                                                     |
| GIT               | 7%                                                           | 8%                                                         | 5%                                                     |
| Spine             | -                                                            | -                                                          | 5%                                                     |
| Breast            | 6%                                                           | 6%                                                         | 0.7%                                                   |
| FGT               | 4%                                                           | 3%                                                         | 4%                                                     |
| MGT               | 3%                                                           | 4%                                                         | 2%                                                     |
| Neck mass         | -                                                            | -                                                          | 9%                                                     |
| Oral cavity       | 1%                                                           | 2%                                                         | -                                                      |
| Thyroid           | -                                                            | 1%                                                         | -                                                      |
| Gall bladder      | 1%                                                           | 2%                                                         | -                                                      |
| Bone & joint      | 8%                                                           | 18%                                                        | 4%                                                     |
| Ear               | 2%                                                           | -                                                          | 1%                                                     |
| Umbilical mass    | -                                                            | -                                                          | 1%                                                     |
| CNS               | 1%                                                           | 1%                                                         | 1%                                                     |
| Liver             | 1%                                                           | -                                                          | -                                                      |
| Urinary tract     | 1%                                                           | -                                                          | -                                                      |
| Muscle            | -                                                            | -                                                          | 1%                                                     |

5. Conclusion

In our study, granulomatous lesions were seen predominantly in the 3rd decade of life and in females. Most common cause of granuloma was tuberculosis (81%) followed by leprosy (7%), fungal infections (4%), foreign body granulomas (2%), parasitic infection (1%), and granulomas of unknown etiology (5%).

Out of total 130 cases, a definite aetiological diagnosis could be made only in 123 cases. Even after relevant special stains, the aetiological diagnosis could be confirmed only in 95% cases. Cooperation between the clinician and the pathologist is more important to derive the greatest benefit from the biopsy.

All these analytical results highlight the various pitfalls of cytological study so that it cannot be relied upon as a sole diagnostic criterion. Other reasons can be inadequate aspiration, poor quality of staining and mounting.

However, 78.57% of cases were correctly diagnosed on cytological study, hence its advantages as a simple, non-invasive procedure for earliest diagnosis of various granulomatous diseases cannot be overlooked. Additional tests like culture, serological investigations and PCR may be necessary to confirm the results. Cytological study has its limitations which cannot be overcome; however diagnostic rate of granulomatous diseases can be increased by combining it with other confirmatory tests.

References
1. Williams G T and Williams W J, Granulomatous inflammation—a review J Clin Pathol 1983; 36: 723-733.
2. Thurlbeck W, Churg A. Pathology of the Lung 2nd edition, 1995. Thieme Medical Publishers. Chapter 13, p234.
3. Algood HM, Chan J, Flynn JL. Chemokines and tuberculosis. Cytokine Growth Factor Rev. 2003;14 (6): 467-77.
4. Jayashree Pawal, et al, A Histopathological Study Of Granulomatous Inflammations with an attempt to find the aetiology. Journal of Clinical and Diagnostic Research. 2011; 5(2):301-306.
5. Harish S. Permi, et al, A Histopathological Study of Granulomatous Inflammation. Nitte University Journal of Health Science, 2012;2 (1): 2249-7110.