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Research article

HISTOPATHOLOGIC AND CYTOMORPHOLOGIC CORRELATION IN LEPROSY

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ABSTRACT

This study was conducted in Dr. Panjabrao Deshmukh Medical College we tried to evaluate and compare the histological and cytological procedure for classifying leprosy lesion. **Method**: Total sample size was 60.Skin punch biopsy was done and sample was evaluated for histology after H & E and Fite Faraco staining. In some cases where histological diagnosis was confirmed we also took sample for cytology which were stained by MGG and modified ZN technique. **Results** Our study group consists of total 60 leprosy patients, out of which 34 (56.66%) were males and 26 (43.44%) were female between 10 years to 68 years of age. Complete cytohistological correlation was seen in 36 (60%) cases. Correlation was fairly strong in polar group of leprosy like in TT i.e. (62.5%) and LL (60%). **Conclusion** In cases of polar leprosy cytological diagnosis parallels histological diagnosis, within the constraint of cytological interpretation the cases in borderline unstable spectrum of leprosy can be classified broadly. Histopathological correlation is required to determine appropriate position in RJ spectrum. Similarly in cases where aspirate was inadequate histology is required to confirm or rule out type of leprosy.

Keywords: Tuberculoid Leprosy, Borderline Tuberculoid, Borderline Lepromatous, Lepromatous Leprosy.

INTRODUCTION

Leprosy is one of the oldest disease known to mankind. Currently The Ridley-Jopling (RJ) classification currently in use for classifying leprosy is based on widely acknowledged clinical, bacteriological, immunological, and histological parameters. [1] Application of the RJ scale in the classification of leprosy helps in understanding the immunology of the patient to predict prognosis and possible complications. Histopathology is considered to be a gold standard for diagnosing leprosy but it is an invasive procedure and leads to a biopsy scar, which may not be cosmetically acceptable. Slit skin smear technique stained with Ziehl-Neelsen (ZN) is considered as a simple field procedure for the diagnosis of leprosy but many practical problems affect the reliability of skin-smears.[2, 3, 4, 5,6,7]This present study was undertaken to evaluate and compare the histological and cytological procedure for classifying leprosy lesion.

MATERIAL AND METHODS

Present study was undertaken in department of pathology, Dr Panjabrao Deshmukh Memorial Medical college after receiving clearance from institutional ethical committee. Study done over a period of 2.5 years from June 2011 to Oct. 2013. All the new clinically suspected cases of leprosy attending Dermatology OPD in Dr PDMM College were enrolled. Informed consent was taken from patients. Histologically confirmed cases of leprosy were enrolled into the study.

Skin punch biopsy was performed by dermatologist. Biopsy material was immediately fixed into 10% formalin. After adequate fixation for 10 – 12 hours

sample was submitted for routine processing, following which paraffin embedded section of 5 µm thickness were stained with H and E for histopathological analysis and fite faraco staining for identifying bacilli. After studying histopathological feature & noting bacteriological index the diagnosis of leprosy was confirmed & classified as per Ridley jopling classification.

For cytology sampling procedure depend on type of lesion. Slit skin smear was done in cases of flat lesion & FNA or Cytopuncture was done in case of nodular lesion, slides were air dried and stain with May Grunwald Giemsa stain & modified Ziehl-Neleson stain for acid fast bacilli. Cytological procedure were consider adequate if the cellular yield of inflammatory cells was heavy or when eccrine sweat glands were seen in presence of low inflammatory cells. Cytological criteria for classifying the cases is shown in table 1

Table 1: Cytomorphological features in leprosy [5]

Types of leprosy	Morphological features			
	Cellularity	Granuloma	lymphocytes	AFB
Tuberculoid leprosy (TT)	Cellular smear	Cohesive granuloma consists of epitheloid cell & lymphocytes	Numerous lymphocytes not infiltrating granuloma	AFB 0
Borderline tuberculoid(BT)	Fairly cellular	Poorly cohesive granuloma composed mixture of epitheloid cell and macrophages	Few lymphocytes	AFB 1+,2+
Borderline lepromatous (BL)	Moderate cellularity	Singly dispersed macrophages no epitheloid cell	Numerous lymphocytes	AFB 3+,4+
Lepromatous leprosy (LL)	Heavy cellularity	Numerous foamy macrophages	Few lymphocytes	AFB 5+,6+

RESULTS

Our study group consists of total 60 leprosy patients, out of which 34 (56.66%) were males and 26 (43.44%) were female between 10 years to 68 years of age. majority of patients 18 (30%) were between age group of 20 to 29 years.12 patients (20%) were involved in farm related activity either they were labour or farmer.

Majority of female patients 20 (33.33%) were housewife. 6 patients (10%) in our study were baggers they were detached from family because of leprosy stigma.

Out of 60 cases of leprosy, on histology majority 25/60 (41.66%) were of borderline tuberculoid leprosy followed by tuberculoid leprosy 16/60 (26.66%). Borderline lepromatous leprosy was seen in 3 (5.0%) cases.

There were 10/60 (16.66%) cases of lepromatous leprosy. We also found 1 case of indeterminate leprosy, 2 cases of histoid leprosy and 3 cases of ENL.

All cases (16/16) of histologically confirmed tuberculoid leprosy were paucibacillary whereas 24/25 (96.0%) cases of borderline tuberculoid leprosy were paucibacillary. All the cases of BL and LL were multibacillary leprosy.

There were 2 cases of histoid leprosy all were multibacillary. Out of 3 cases of ENL 2 were paucibacillary and 1 case was multibacillary whose bacillary index was more than 1+.

Complete cytohistological correlation was seen in 36 (60%) cases. Correlation was fairly strong in TT leprosy i.e. (62.5%), borderline (50%), LL (60%). 2 cases of TT on cytology showed feature suggestive of BT. 1 case of Histologically confirmed LL showed feature suggestive of BL on cytology.

Two smears one each of TT and BT showed chronic inflammatory cells on cytology. Remaining 24 smears for cytology were inadequate for interpretation (table 2)

Table 2: cytohistological correlation along RJ spectrum

Histological classification		Cytological classification						
classification	No. of cases	TT	Borderline (BT,BL)	LL	Histoid	ENL	Indeterminate	Chronic inflammatory cells
TT	16	10	2	--	--	--	--	1
BT	25	01	14	--	--	--	--	1
BL	3	--	--	--	--	--	--	--
LL	10	--	1	6	--	--	--	--
Histoid	2	--	--	--	--	--	--	--
ENL	3	--	--	--	--	--	--	--
Indeterminate	1	--	--	--	--	--	--	--
Total	60	11	17	6	0	0	0	2

DISCUSSION

In present series of 60 cases we found more no of cases in age group of 20 – 29 years around 30%. We could not found single case below 10 years of age similarly in other studies also incidence of leprosy below 10 years of age was very low [2,3,4,5,6]. Probable cause for this finding may be long incubation period of leprosy [7, 8]. Histology is considered to be a gold standard for diagnosis of leprosy. In present series of 60 cases we did biopsy from lesion site from every case.

The most commonly encountered type of leprosy was BT 41.66% (25/60). Second common type was TT 26.66% (16/60), BL was seen in 5% of cases. Borderline group constituted the major spectrum 46.66% 28 biopsies, which include BT, BB, BL. A sizeable portion of leprosy patient will be in a continuous changing immunological spectrum i.e. BT, BB, BL so majority of cases belong to borderline group[8]. According to many observer features of both tuberculoid and lepromatous leprosy can occur in same section or in serial sections or in different lesion of same borderline cases immunological instability in this borderline cases make them move in either direction along the borderline spectrum. With treatment they move toward tuberculoid pole or without treatment they tend to move towards lepromatous pole. If the disease is recognized at an earlier stage and biopsy is taken, it will be in BT stage or if disease is recognized at latter stage and biopsy is taken, it may be in BL stage [9].

In our study overall cytohistological correlation was seen in total 60% (36/60) cases, Cytohistological correlation was more prominent in polar group of leprosy. In TT leprosy 62.5% (10/16) cases were diagnosed on cytology whereas 60% (6/10) cytology showed feature suggestive of LL type. Cytohistological correlation was around 50% (14/28) borderline group of leprosy.

Slit skin smear for AFB have conventionally been used in assessing bacteriological index in leprosy. Marine Ridley examined cellular exudates in slit skin smear by ZN technique for AFB this generate more information about leprosy lesion than only BI and MI alone. She suggest that by studying nature of exudates it was possible to place lesion in its approximate position of RJ scale however she failed to differentiate epithelioid cells from macrophages or comment on cohesiveness of granuloma. This is a limitation of ZN stain which does not provide morphological detail comparable to that with MGG. In present study cytological sub classification of Histologically diagnosed leprosy was done on RJ spectrum as per the criteria led down by ridley and also the one adapted by N singh et al. Cytological TT is characterized by cohesive epithelioid granuloma with lymphocytes not infiltrating the granuloma as the disease progress toward the lepromatous pole cohesion between the cells of granuloma diminishes, concurrent with increasing infiltration of lymphocytes within them thus epitheloid granuloma of TT transform to macrophage granuloma of LL with heavy bacterial load. This is similar to feature described in histology. The largest no of lymphocytes are seen in BL leprosy where these predominate cell type [7].

Histological criteria for diagnosis of leprosy is applicable to cytological smear even though nerve damage could not be detected on cytology the overall cytodiagnostic accuracy of skin lesion has been 60%

in present study this is lower than 76.6% as reported by Singh et al[10]. We observed uniform cytohistological correlation in leprosy skin lesion. However cytologic feature in cellular exudates may be similar across Borderline tuberculoid (BT), borderline borderline (BB), Borderline lepromatous (BL) area.

Out of 10 cases of LL on MGG stain foamy macrophages were seen in 6 cases i.e. 60%. 1 case of LL was diagnosed as borderline on cytology and remaining three smears were inadequate. Thus complete cytohistological correlation was achieved in 60% cases of LL.

A 14 (50%) out of 28 (25 BT + 3 BL) cases were diagnosed as borderline group mostly BT because it shows inflammatory cell with few epithelioid cell. Out of remaining 14 cases 7 showed nonspecific inflammatory cells, 6 were inadequate and 1 case was diagnosed as TT.

10 cases 62.5% out of 16 cases were diagnosed as TT on cytology, 2 cases were diagnosed as BT, 1 showed nonspecific inflammatory cells and remaining 3 inadequate smears.

It thus become evident that cytological examination of cellular exudates from leprosy skin lesion provides information similar to one obtained on histological preparation of skin biopsy in cases of polar leprosy of either type. In borderline cases however keeping in view the recommendation on cytological interpretation of a leprosy skin lesion made by Marine Ridley [10] can be placed broadly in BT, BB, BL area of spectrum. It seems, in such a cases, histologic confirmation to place the cases in appropriate borderline group is required.

CONCLUSION

In conclusion cytomorphology study of leprosy using MGG and Z-N Stain for AFB can act as a useful adjuvant to histopathology. In cases of polar leprosy cytological diagnosis parallels histological diagnosis within the constraint of cytological interpretation the cases in borderline unstable spectrum of leprosy can be classified broadly. Histopathologic correlation is required to determine appropriate position in RJ spectrum. Similarly in cases where aspirate was inadequate histology is required to confirm or rule out type of leprosy.

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Conflict of Interest: Nil

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