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Clinicopathological Correlation of Leprosy in Jharkhand

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Abstract:
Background: *Leprosy or Henson's disease is one of the major public health problem of the developing countries. Leprosy is a chronic granulomatous disease caused by mycobacterium laprae. It mainly affects skin, peripheral nervous system, upper respiratory tract, eye and testis. Material and methods- The present study - "Clinicopathological Correlation of Leprosy gn Jharkhand" has been carried out March 2008 to October 2009 on the patients attending indoor and outdoor departments of RIMS and leprosy centres around RIMS, Ranchi. Sample size were 50. Results- Out of 50 cases, 72% were male and 28% were female. Of the total 50 Leprosy cases 76% were tribal and 24% were non-tribal. Out of 50 Leprosy cases majority (62%) were present in age group 20 to 50 years. Persons were more affected by paucibacillary (54%) than multibacillary (46%). Nerve damage was more in case of paucibacillary (70%) than multibacillary (30%).*
Conclusion-The clincopathological picture is determined by the equilibrium between the agent and the host resistance. Skin has different pathophysiological subunit where in there is some local modulation of the central host response as a result of which there are different grade of resistance and hence different clinicopathological response in different areas
Keywords: *Leprosy, Paucibacillary, Multibacillary.*

I. Introduction

Leprosy is one of the major public health problems of the developing countries, (ex. INDIA) It is occasionally known as Hansen's disease, named after Armover Hansen, the Norwegion physician who first identified the microorganism which causes the disease; known and dreaded since Biblical times because of the severe deformities that can occur. It was considered incurable until as recently as the 1940s; but now a days it is totally curable if proper diagnosis and adequate treatment is done. The seventh WHO expert committee on leprosy defined a case of leprosy as a person having one or more of the following features and who has yet to complete a full course of treatment:

- Hypopigmented or reddish skin lesion (s) with definite loss of sensation.
- Involvement of peripheral nerve as demonstrated by definite thickening with loss of sensation and
- Skin smear positive for acid fast bacilli.(WHO expert committee 1998)

There is also a simpler field grouping determined by the number of skin patches whmh is used for public health programme purposes. Paucibacillary (PB) (up to five patches) and multibacillary (MB) (More than five patches). For an affected person, leprosy would mean deformities and disabilities.

Leprosy endemicity is not restricted to rural areas but also affects urban population; this is well reflected by the fact that at the end of 1979 there were 430 urban leprosy centres in India. (MoHFW 1982). The epidemiology of leprosy is varied in different states of India. This was evident from NLEP data from Andhra Pradesh, Bihar and Tamil Nadu.(Gupte et al 2005) Leprosy is a chronic disease and hence the temporal changes within endemic regions are rarely appreciated over shorter time spans. During its chronic course it may affects different parts of the body like, skin, eye, joints, palate, nose, nerves, muscles and other part of humans body causing depigmentation of skin, madarosis or less of eyebrows, dactylitis, pathological fracture bizarre deformities in joint and bone, perforation of the palate and nasal septum, claw hand, atrophy of testes, muscles and many other disabilities and deformities.

These above disabilities and deformities may be due to the disease is relegated to neglect, leprosy still needs the attention it deserves. The principle of reducing the load of infection in society is to break the chain of infection and this is the mainstay of leprosy control work today. To reduce the load of infection, it is very necessary to recognize the disease clinically and pathologically. Keeping in view of above considerations, the present study has be undertaken to establish a correlation between different types of leprosy with respect to its clinical features and histopathology so that.

1. Early and doubtful cases will be diagnosed without any doubt and treated adequately
2. Adequate treatment will reduce the lead of infection in the society.

II. Material And Methods

The present study - "Clinicopathological Correlation of Leprosy in Jharkhand" has been carried out between March 2008 to October 2009 on the patients attending indoor and outdoor departments of RIMS and leprosy centres around RIMS, Ranchi. Sample size were 50.

Material - Clinically suspected leprosy cases were selected from skin indoor and outdoor of RIMS and other leprosy centres around Ranchi.

Method - Leprosy in the majority of instances, is diagnosable on the basis of a proper clinical examination alone. Therefore, a set pattern was followed in the clinical examination of a patient of suspected leprosy which comprised of:

(a) Interrogation

1. Collection of bio-data of the patient such as name, age, sex, occupation and place of residence.
2. Family history of leprosy
3. History of contact with Leprosy cases.
4. Details of previous history of treatment for leprosy, if any and
5. Presenting complaint or symptoms.

(b) Physical examination

1. A thorough inspection of the body surface (skin) to the extent permissible in good natural light for the presence of suggestive or tell talk evidence of leprosy.

Materials and Methods

2. Palpation of the commonly involved peripheral and cutaneous nerve for the presence of thickening and/or tenderness. They were the ulnar nerve near the median epicondyle, greater auricular nerve as it turn over sternomastoid muscles, lateral popliteal and the dorsal branch of the radial nerve.
3. Testing for
(a) loss of sensation for heat, cold, pain and light touch in the skin patches, keeping in mind that some hypopigmented patches may not show sensory impairment.
(b) Paresis or paralysis of the muscles of the hand and feet, leading to the disabilities or deformities.

Above examinations were done sequentially and then lesions were selected for punch biopsy. For punch biopsy, the lesions was cleaned with spirit, then 2% xylocaine was drawn up into a syringe and mixed with hyalase (spreading factor).

After injecting a small quantity intradermally the needle was inserted into the centre of the anaesthetized area of skin and driven downward in|stages, injecting local anaesthetic at each stage until the needle can go no further. A biopsy in leprosy must include the full depth of the dermis together with a portion of subcutaneous fat.

A punch with cutting edge of 5mm diameter was used to take a biopsy which include the full-depth of'dermis together with a portion of subcutaneous fat. The punch biopsy wound was closed with only one stitch.

A dressing strip was applied and the patient was advised to keep it dry; and remove it after a week. Greatest care was taken not to damage the biopsy material when it was picked up with dissecting forceps and Toothed forceps were never used.

After having punch biopsy; biopsy material were kept in container containing 10% formalin to transfer it from dermatology department of RIMS and other centers to pathology department of RIMS Ranchi, Jharkhand. The biopsies were then subjected for histopathological examination. Histopathological examination were done by examining thin section of tissue which were coloured differently by different dye & stains. Total or selected representative part of tissue not more than 4 mm thick were selected & were subjected to the

Following Sequential Processing (Tissue Processing) :-

1. Fixation - Was Done In 10% Formalin
2. Dehydration - Was Done In Ascending Grade Of Isopropyl Alcohol.
3. Clearing - Was Done With Xylene
4. Imprgegnation - Was Carried Out With The Help Of Wax.
5. Embedding And Blocking - Embedding Was Done With The Help Of Wax And Blocking Was Done In L Blocks (Leukhart's Block).
6. Section Cutting - 4-5 Um Thick Section Were Taken With The Help Of Rotatory Microtome.
7. Routine Staining - The Processed Tissue Section Were Then Subjected To Routine Stain By Haematoxylin and eosin stain and special for Leprae bacilli by Wade fite technique or modified Ziehl Neelsen stains method.

Procedure For Staining Of Haematqxylin & Eosin

1. Section were brought to water after deparafinization of the section with xylene and subjected to descending grades of isopropyl alcohol & then water.
2. Section were placed in haematoxyline stain for 8-10 minutes.
3. Rinsing in water.
4. Differentiation was carried out with 1% acid alcohol (10 seconds)
5. Rinsing in water.
6. Blueing of the section was done (3 minutes).
7. Counter staining was carried out with 1% aqueous solution of eosin (1-3 minutes).
8. Rinsing in water.
9. Dehydration of the section was done with ascending grade of alcohol.
10. Coverslip mooting with DPX was down after putting the section in xylene (3 dips).

Results-

Nuclei - Blue
Cytoplasm - Pink
Muscle collagen - Pink
RBC, keratin - Pink
Colloid protein - Pink

Methods Of Wade Fite Technique

Sections
Formalin fixed paraffin
Solutions

1. commercially available carbol fuchsin.
2. commercially available Methylene blue.

Method-

1. Sections were warmed and deparaffinized using 1 part of clove oil and 2 part xylene to remove paraffin - 10 minute.
2. Repeated blotting and washing was done in water until section was uniformly wet.
3. Staining in filtered carbol-fuchsin was carried out at room temperature, 30 minute.
4. Section were washed in tap water and blot dried.
5. Decolorization was down in 5% sulfuric acid.
6. Section was washed in tap water.
7. Counter staining in 0.2% methylene blue, was down 5-10 seconds.
8. Section was blot dried completely in an oven at 60°C.
9. Cover slip mounting was down with DPX.

Results-

Leprosy and other mycobacteria, Nocardia – Red
Background : Blue
Nuclei - blue - black (if hematoxylin is used)

III. Results

The present study clinicopathological correlation of leprosy in Jharkhand was conducted on 50 patients. They were selected from patient suspicious of being leprosy from indoor and outdoor of dermatology department of RIMS and other center around RIMS.

The data pertaining to age, sex, religion, socio-economic status, clinical and histopathological classification of the type of leprosy (According to Ridley Jopling) were collected and analyzed for analysis, indeterminate and histoid type of leprosy were also included.

In analyzing the histopathology of lesion, special attention was given to the following features, viz., invasion of the epidermis with or without erosion, involvement of the subepidermal zone, character and extent of granuloma, density of lymphocyte infiltrate, epitheliod cells and other cellular element, nerve involvement and the presence of M. Leprae.

Clinical & histopathological correlation

Table - 1

Clinical type	no of cases	Histological diagnosis							
		Histoid	TT	BT	BB	BL	LL	IL	% Parity
TT	3	-	2	-	-	-	-	1	66.7%
BT	15	-	1	8	1	-	-	6	53.3%
BB	2	-	-	-	-	1	-	1	0
BL	11	-	-	2	1	4	4	-	36.3%
LL	6	-	-	-	-	1	5	-	83.3%
IL	8	-	-	1	-	-	-	7	87.5%
HISTOID	5	3	-	-	1	-	1	-	60%
TOTAL	50	3	2	11	3	6	10	15	58%

TT-Tuberculoid leprosy, BT-Borderline tuberculoid,BB-Boderline borderline,LL-Lepromatous leprosy,IL-Indeterminate leprosy.

Distribution of leprosy among male, female, tribal, non-tribal, socioeconomic status, literally, different age groups religion & are follows.
Number of leprosy cases in different sex.

Table - 2

Sex	No. of cases	Percentage
Male	36	72%
Female	14	28%
Total	50	100%

Of the total 50 leprosy cases, most of the cases were in male{72%} and only 28% were in female.
Distribution of Leprosy according to Tribal and non-tribal

Table - 3

Race	No. of cases	Percentage
Tribal	38	76%
Non-tribal	12	24%
Total	50	100%

Of the total 50 Leprosy cases 76% were tribal than 24% non-tribal
Distribution of Leprosy according to Socioeconomic status

Table - 4

Socioeconomic status	No. of cases	Percentage
Low	36	72%
Middle	12	24%
High	02	4%
Total	50	100%

Out of 50 Leprosy cases majority of cases were from loss Socioeconomics status 70%.
Observation
Distribution of Leprosy cases according to religion

Table - 5

Religion	No. of cases	Percentage
Hindu	16	32%
Muslim	16	32%
Christian	18	36%
Total	50	100%

Out of 50 Leprosy cases more were from Christian (Tribal) 36% than Hindu and Muslim.
Distribution of Leprosy according to Literacy

Table - 6

Literacy	No. of cases	Percentage
Nil	33	66%
Literate	16	32%
Qualified	01	02%
Total	50	100%

Out of 50 Leprosy cases 66% were present in illiterate person.

Distribution of Leprosy according to Age

Table - 7

Age	No. of cases	Percentage
<20 yr.	10	20%
20-50 yr.	31	62%
> 50 yr.	9	18%
Total	50	100%

Out of 50 Leprosy cases majority (62%) were present in age group 20 to 50 years.
Distribution of Leprosy according to bacillary load

Table - 8

Disease	No. of cases	Percentage
Paucibacillary	27	54%
Multibacillary	23	46%
Total	50	100%

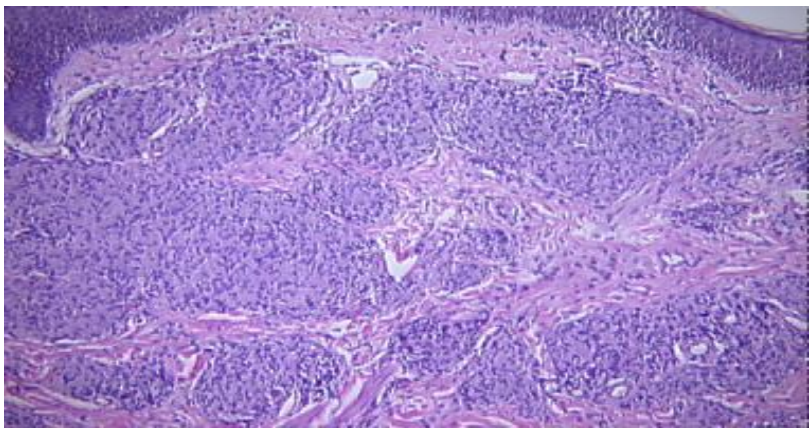
Persons were more affected by paucibacillary (54%) than multibacillary (46%).

Distribution of Leprosy according to Nerve damage

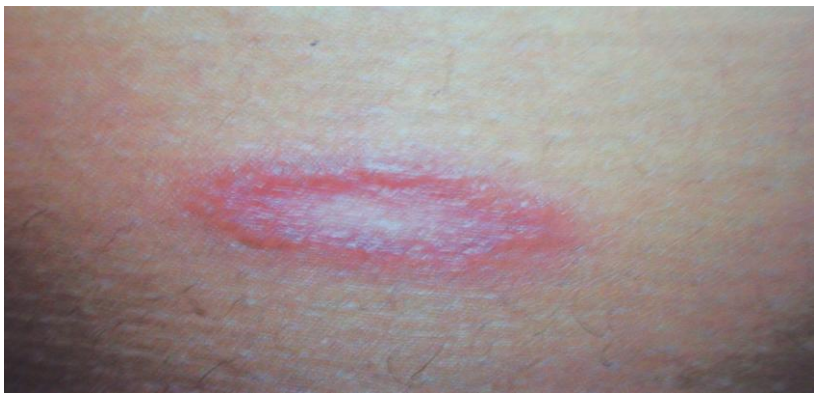
Table - 9

Disease	No. of nerve damage cases	Percentage
Paucibacillary	35	70%
Multibacillary	15	30%
Total	50	100%

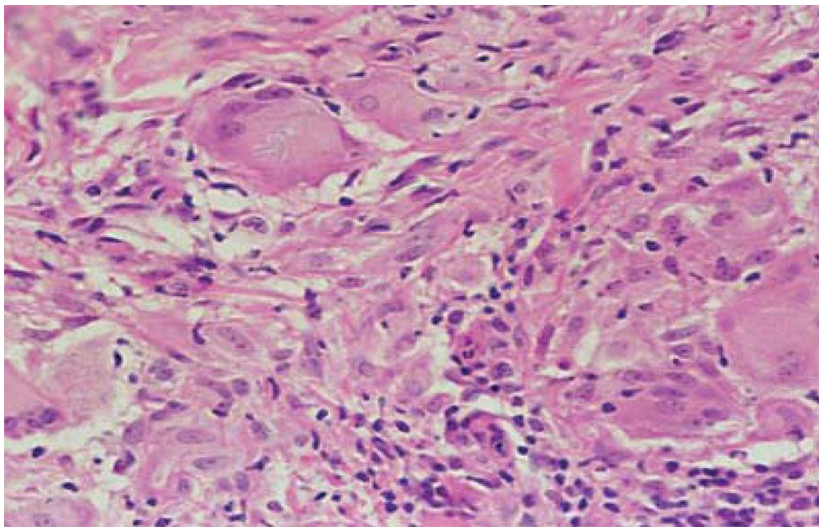
Nerve damage was more in case of paucibacillary (70%) than multibacillary (30%).



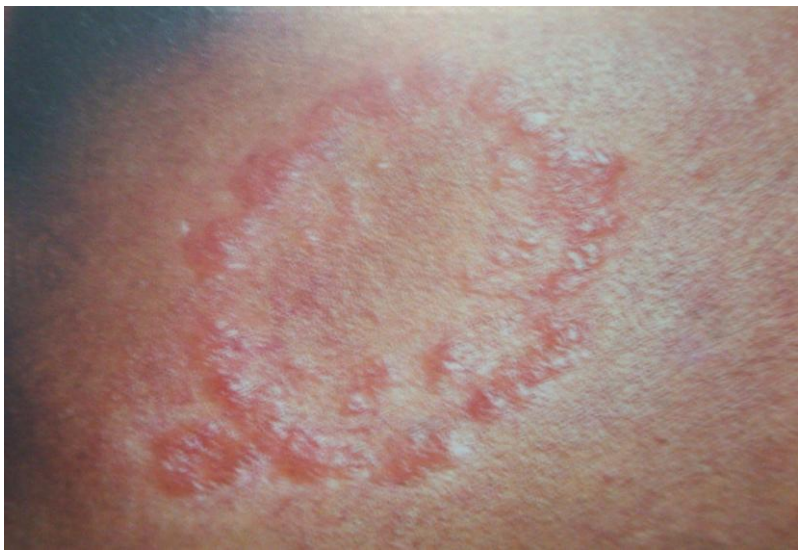
Tuberculoid Leprosy: There are lymphocyte and giant cell within dermal granuloma



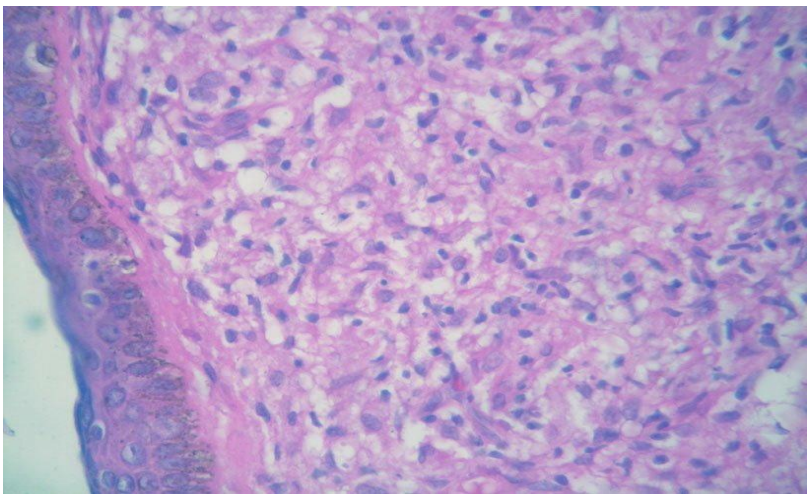
Tuberculoid Leprosy:- Annular Plaque



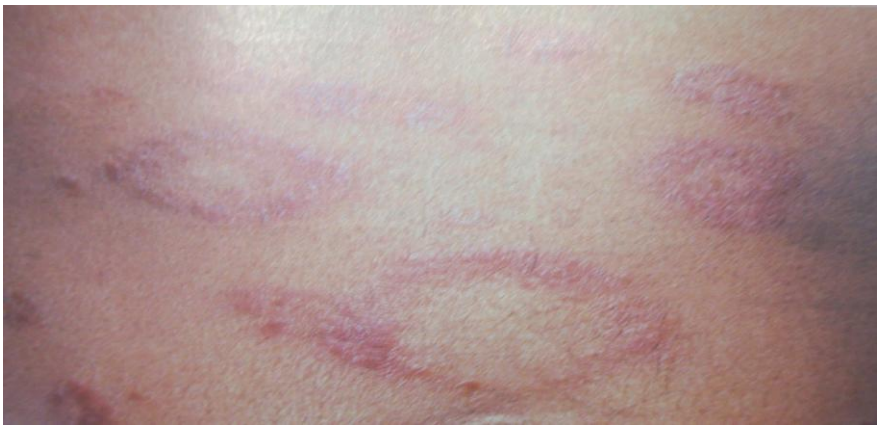
Borderline tuberculoid leprosy: Confluent and poorly delimited granuloma,interstitial oedema and multinucleated giant cell



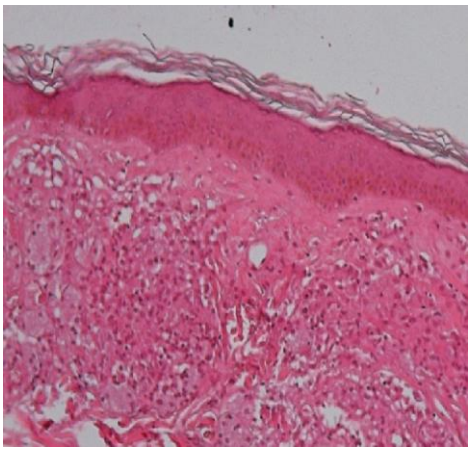
Boderline Tuberculoid Leprosy:- Annular plaque with satellite lesions



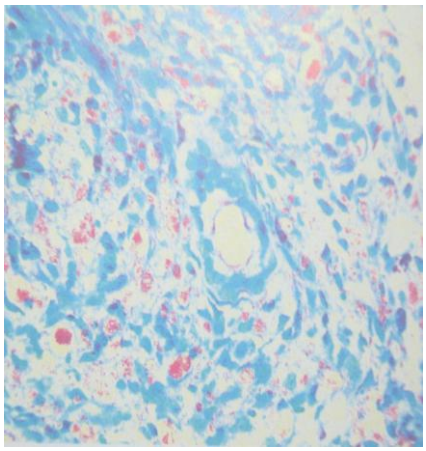
Borderline lepromatous leprosy: Atrophy of epidermis with subepidermal cell free zone{grenz zone}, dermis shows cellular infiltrate composed of foamy macrophage admixed with lymphocyte.



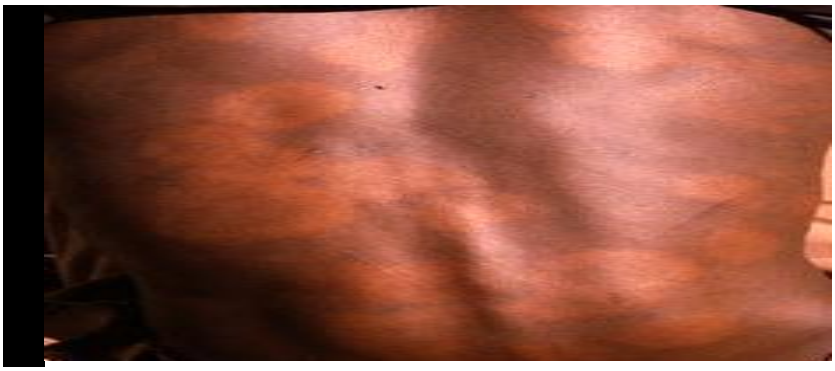
Borderline Lepromatous annular plaque in a patient downgrading from borderline tuberculoid leprosy.



Lepromatous Leprosy: Epidermal Atrophy With Numerous grenz zone,macrophage & foamy areas around blood vessels.



Lepromatous Leprosy:- Pink Stained Globi Of acid fast bacilli within acrophages.



Lepromatous leprosy

IV. Discussion

In the present study, Ridley-Jopling classification was used to classify leprosy both clinically and histopathologicaly. Ridley Jopling classification is based on clinical, histopathological and immunological features, which is widely accepted by histopathologist and dermatologists. The discordance between clinical and histopathological diagnosis was noticed because the clinical diagnosis was made on the lines of Ridley-Jopling classification even when a histopathological examination had not been done.

Table shows comparative study of clinicopathological correlation by different workers in percentage. It is clear from table that the correlation was better at lepromatous pole (LL & BL) than the tuberculoid pole (TT & BT). The correlation was least in IL except in study conducted Jerath and Desai in 1982.

Comparative study of clinico-Pathological corr^{n} by diff. workers

Type of leprosy	Jerath & Desai #.	Bhatia, et al.	Nadakarni & Rage	Present study
TT	74.5	50.00	97.2	66.7
BT	64.7	77.00	95.0	53.3
BB	53.8	25.00	89.0	0
BL	28.5	43.00	87.0	36.3
LL	61.5	91.00	98.2	83.3
IL	88.8	35.00	19.0	87.5

There is no independent gold standard for diagnosis of leprosy. Taking any of the clinical sign, clinical type, histopathological parameters or histological type as a gold standard is not ideal. The variation in different studies may be due to different criteria used to select the cases and difference in number of cases of each type. Various factors also influence the histopathological diagnosis such as differences in sample size, choosing the biopsy site, age of the lesion, immunological and treatment status of the patient at the time of biopsy. Indeterminate leprosy is an early and transitory stage of leprosy found in persons, whose immunological status is yet to be determined and it may progress to one of the other determinate forms of the disease. The Indeterminate leprosy type appears to be problematic due to the non-specific histology of their lesions. The diagnosis of IL also depends on many factors such as nature and depth of the biopsy, the quality of the section and number of section examined both H & E stained and acid fast stained.

Clinical diagnosis of early leprosy lesions offer difficulties even to experienced dermatologists and leprologists. Although a definitive diagnosis may be possible by histopathological examination, the other important point to be considered is inter-observer variation, both clinically & histopathologically. As there can be some degree of overlap between different type of leprosy, both clinically & histopathologicaly correlation of clinical & histopathological features along with bacteriological index appears to be more useful for accurate typing of leprosy than considering any of the single parameters alone.

Ridley and Jopling (Ridley DS Jopling, 1966) in their study of 82 cases found complete agreement between clinical and histological type in 56 patients (68.3%). Kar et al (Kar et al, 1994) in their study observed total parity in 70%. They also observed highest parity in stable pole i.e. TT (87.5%) and LL (71.4%) followed by IL (81.2%), BT (60.9%), BB (54.5%) and BL (53.8%). Kalla et al. (Kalla et al 2000) in a study of 736 patients observed highest parity in LL & TT group (76.7% & 75.6%) respectively followed by BT (44.2%), BL (43.7%) and BB (37.0%). Jerath and Desai (Jerath et al, 1982) in a study of 130 cases found complete agreement in 89 cases (68.5%). The figures for individual groups were TT (74.5%), BT (64.7%), BB (53.8%) and BL (28.5%), LL (61.5%) and IL (88.8%).

Considering the data of present study and other comparative studies we can say that maximum disparity is seen in borderline cases. Parity in the polar group were maximum because they were stable and showed a fixed histopathology, while borderline and indeterminate groups may have different histopathology in different site and lesion. In present study it was also seen-that the incidence of leprosy was higher in low socioeconomic status, and those who were illiterate and leprosy commonly affects male sex more than female.

V. Conclusion

The clincopathological picture is determined by the equilibrium between the agent and the host resistance. Skin has different pathophysiological subunit where in there is some local modulation of the central host response as a result of which there are different grade of resistance and hence different clinicopathological response in different areas. From the present study it was concluded that histopathological examination should be carried out in all cases of leprosy to arrive at a definite diagnosis of leprosy and to classify the type of the disease.

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