Section: Pathology

Original Research Article

A RETROSPECTIVE STUDY OF TUBERCULOUS LESIONS IN HIV AND NON-HIV PATIENTS

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ABSTRACT

Background: Tuberculosis is an infectious bacterial disease caused by Mycobacterium Tuberculosis . It is a disease of antiquity that has long been a major health problem in the world. HIV-AIDS is a slowly progressive disease in which the virus weakens the immune system. In HIV infected individuals Tuberculosis is the most common opportunistic infection. The aim is to study 1.The age and sex incidence of Tuberculosis 2.To study the incidence of Tuberculosis in HIV patients,3.To study the morphological pattern of Tuberculosis in HIV and non HIV patients4.To study the common sites of involvement in the body by Tuberculosis and Tuberculosis in HIV patients. **Materials and Methods:** The present study is a retrospective study conducted in the Department of Pathology, at a Tertiary care center, Andhra Pradesh, India. The present study is based on histopathological examination of biopsy specimens received from June 2010 to May 2013. The samples include lymphnodes, lung, bone, intestine, CNS and others which were fixed in 10% formalin, followed by paraffin embedding and microscopy of H&E stained sections. Stains for AFB & Fite- Ferraco were applied when ever required. **Result:** Tuberculosis is the most common opportunistic infection in HIV infected Individuals. Among the HIV- Tuberculosis co-infected patients, extrapulmonary Tuberculosis mainly lymphnode involvement was the most common manifestation. Tuberculosis and HIV infections were mostly seen in low socioeconomic group people (labourers) and young, adolescent age groups Mortality and morbidity increased in dual infection (HIV- Tuberculosis) than single disease alone. Early diagnosis and prompt institution of anti Tuberculosis treatment reduced the mortality and morbidity in HIV and non HIV patient. **Conclusion:** Among the HIV- Tuberculosis co-infected patients, extrapulmonary Tuberculosis mainly lymphnode involvement was the most common manifestation.

INTRODUCTION

Tuberculosis is an infectious bacterial disease caused by Mycobacterium Tuberculosis. The word Tuberculosis is a derivative of latin word “tubercula” which means small lump. L.Schonlein named the disease as Tuberculosis.

It is a disease of antiquity that has long been a major public health problem in the world.[1] One third of the world population is infected with Mycobacterium Tuberculosis and 75% infected are in developing countries. In 2023, an estimated 10.8 million people fell ill with TB worldwide, including 6.0 million men, 3.6 million women and 1.3 million children. A total of 1.25 million people died from Tuberculosis (TB) in 2023 (including 161 000 people with HIV) Worldwide.[2] India accounts for 28 per cent of the global TB burden.[3] Tuberculosis (TB) remains the leading cause of death among people living with HIV (PLHIV). In 2019, TB accounted for an estimated 30% of the 690 000 AIDS-related deaths in the world. These 208 000 deaths represented approximately 15% of the 1.4 million TB deaths that year.[4]

Human immunodeficiency virus infection is generally a slowly progressive disease in which the virus weakens the immune system. In HIV infected individuals Tuberculosis is the most common opportunistic infection.

On 24th March, 1882 Robert Koch announced the discovery of tubercle bacilli in Berlin physiological

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society meeting. Bacteria in the genus mycobacteria are slender, aerobic rods that grow in straight or branching chains. Mycobacteria have a unique waxy cell wall composed of mycolic acid which make them acid fast, meaning they will retain stains even on treatment with a mixture of acid and alcohol. Mycobacteria are weakly gram positive.[6]

Aims and Objectives

1. To study the age and sex incidence of Tuberculosis.
2. To study the risk factors for Tuberculosis.
3. To study the incidence of Tuberculosis in HIV patients.
4. To study the morphological pattern of Tuberculosis in HIV and non HIV patients.
5. To study the common sites of involvement in the body

MATERIALS AND METHODS

Study design: A retrospective study was conducted in the Department of Pathology, at Tertiary care center.

The present study is based on histopathological examination of biopsy specimens received from June 2010 to May 2013. The samples include lymphnodes, lung, bone, intestine, CNS and others which were fixed in 10% formalin, followed by paraffin embedding and microscopy of H&E stained sections. Stains for AFB & Fite- Ferraco were applied when ever required.

Inclusion criteria

Cases of Tuberculosis and co-infection with HIV are included in the study.

Exclusion criteria

Cases with other coexistent opportunistic infections are excluded in the study.

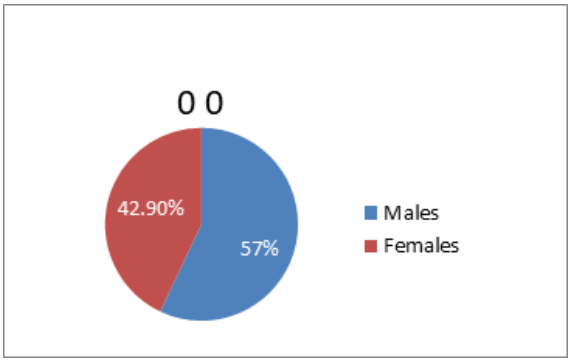
RESULTS

During the study a total of 296 cases of Tuberculosis were diagnosed. The age and sex incidence, organ wise distribution and HIV-Tuberculosis co-infection were analysed.

Total number of cases in the study: 296

Males: 169 (57%)

Females:127 (42.9%)



Gender distribution of total tuberculosis cases

In our present study male preponderance was observed in Tuberculosis with sex ratio of M:F 1.3:1

Table 1: Organ wise distribution of total number of Tuberculosis cases.

Organ	Number of cases	Percentage(%)
Lymphnode	88	29.7
Lung and pleura	79	26.6
Bone	38	12.8
Intestine	29	9.7
CNS	12	4
FGT	6	2
Skin biospsy (ulcer)	24	8.1
Genitourinary	6	2.02
Ear biopsy	5	1.6
Pericardial biopsy	3	1.01
Vocal cord biopsy	3	1.01
Breast biopsy	2	0.6
Oral cavity (gingiva)	1	0.33
Total	296	100

In our present study, Lymphnode was the most common organ involved by Tuberculosis, accounting for29.7% 0f cases, followed by lung& pleura 26.6%.

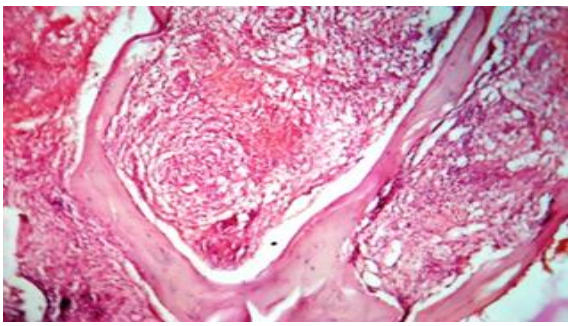


Figure 1: Bony trabeculae with granulomas in HIV patient. H&E x 100

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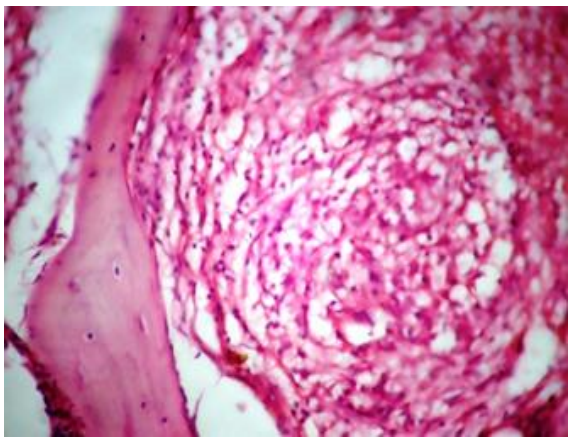

Figure 2: Bony trabeculae with granulomas in HIV positive patient. H&E x 200

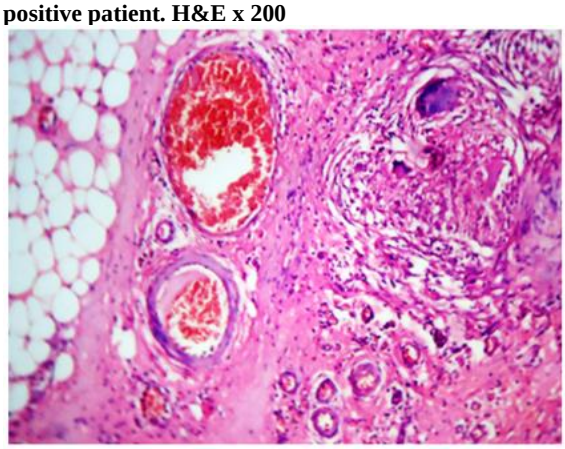

Figure 3: Omental tissue with congested blood vessels and granulomas H&E x 200

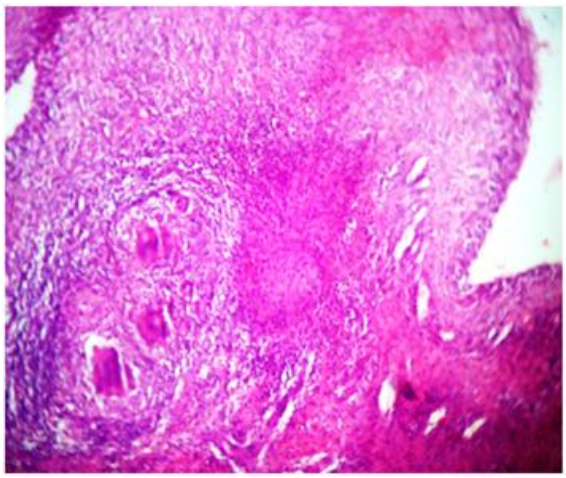

Figure 5: Ileal tuberculosis showing granulomas H&E x100

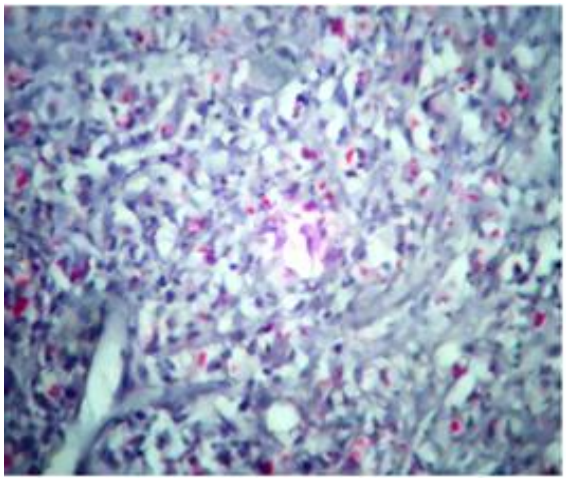

Figure 6: Fite-ferraco staining showing tuberculous bacilli H&E x 100

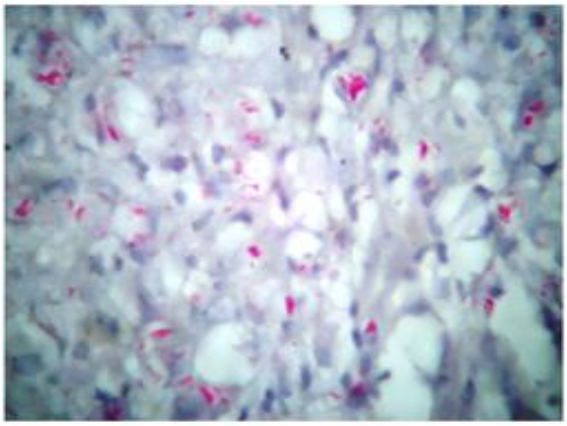

Figure 7: Fite-ferraco staining showing tuberculous bacilli H&E x 200

Table 2: Organ wise distribution of Tuberculosis in males

Organ	Number of cases	Percentage(%)
lymphnode	48	28.4%
Lung & pleura	48	28.4%
Bone	23	13.6%
Intestine	17	10%
CNS	7	4.1%
Skin biopsy	14	8.2%
Genitourinary	6	3.5%
Vocal cord	2	1.1
Pericardial effusion	2	1.1
Ear biopsy	2	1.1

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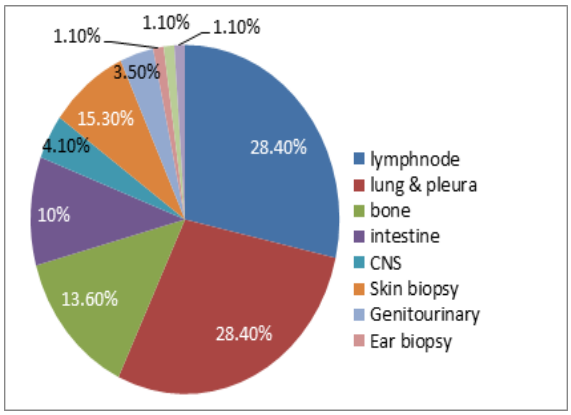
Total	169	100%



Organ wise distribution of tuberculosis in males

In our present study there was equal distribution of Tuberculosis lesions in lymphnode and lung corressponding to 28.4%

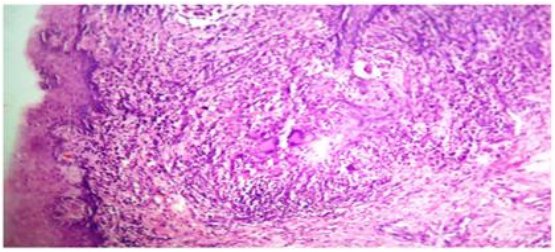
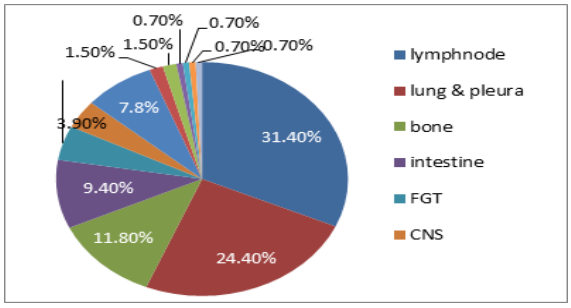


Figure 8: Penile tissue with granulomatous inflammation H&Ex100

Table 3: Organ wise distribution of Tuberculosis cases in females

Organ	Number of cases	Percentage(%)
Lymphnode	40	31.4%
Lung & pleura	31	24.4%
bone	15	11.8%
intestine	12	9.4%
FGT	6	4.7%
CNS	5	3.9%
Skin biopsy	10	7.8%
Breast	2	1,5%
Ear biopsy	2	1.5%
Genitourinary	1	0.7%
Vocal cord	1	0.7%
Pericardial biopsy	1	0.7%
Oral cavity (gingival)	1	0.7%
Total	127	100%

In our present study most common involved organ by Tuberculosis in females was lymphnode (31.4%), followed by lung (24.4%).



Organ wise distribution of Tuberculosis casea in Females

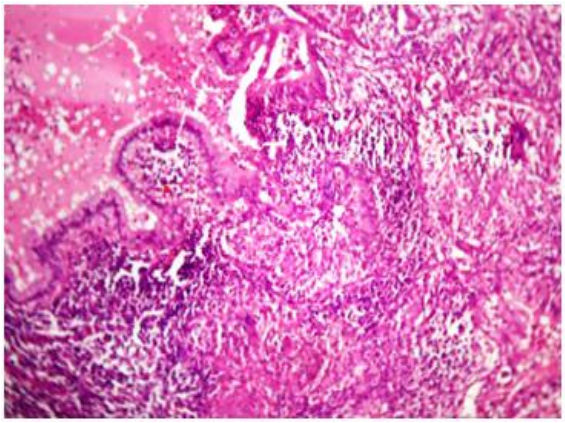


Figure 9: Endocervical tissue with granulomatous inflammation H&E x 100

Table 4 : Age wise distribution of total No. Of Tuberculosis cases

Age (years)	Number of cases	Percentage (%)
o-9	26	8.7%
10-19	66	22.2%
20-29	11	20.9%
30-39	51	17.2%
40-49	41	13.8%
50-59	23	7.7%
60 and above	27	9.1%
Total	296	100%

In our present study Tuberculosis cases were observed in a wide range (9 months- 80 years) with highest frequency in 10-19 years (22.2%), followed by 20-29 years (20.9%).

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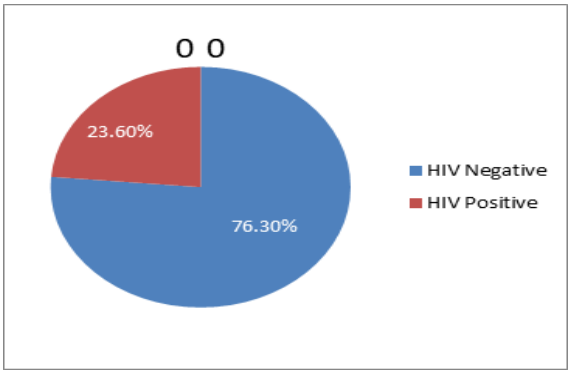
Table 5: Sex incidence of Hiv positive Tuberculosis cases

Sex Incidence	No of cases
Males	35
Females	35
Total	70

Total number of HIV Positive cases with Tuberculosis: 70 (23.6%)
Males: 35 (50%)
Females: 35 (50%)
HIV negative cases: 226 (76.3%)
In our present study there is equal sex incidence in HIV positive
Tuberculosis cases

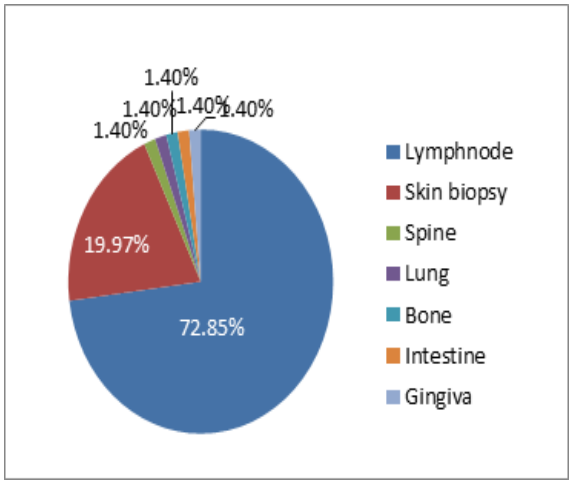


HIV status in total number of tuberculosis cases

Table 6: Organ wise distribution of total HIV cases with Tuberculosis

Organ	No. Of cases	Percentage (%)
Lymphnode	51	72.8
Skin biopsy	14	19.97
Lung	1	1.4
Spinal abscess	1	1.4
Intestine	1	1.4
Gingiva	1	1.4
Bone	1	1.4
Total	70	100

In our present study extra pulmonary Tuberculosis was most common than pulmonary Tuberculosis in HIV positive cases. Lymphnode was the most common organ involved (72.8%), followed by Skin biopsy (18.5%) in HIV positive cases.



HIV Positive cases- Organ wise distribution

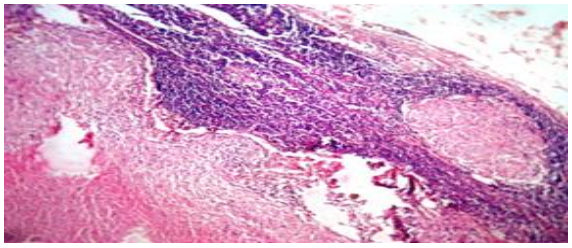


Figure 10: Lymphnode with caseation in HIV positive patient H&E x 100

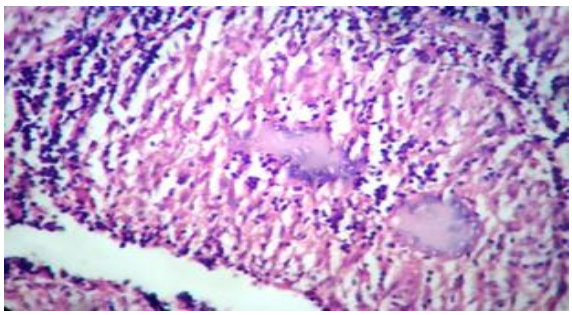


Figure 11: Lymphonode withepitheloid cellH IV positive patient H&E x 200

Table 7: Age wise distribution of HIV positive Tuberculosis cases

Age	No. Of cases	percentage
1-9	1	1.4
10-19	15	21.4
20-29	20	28.5
30-39	17	24.2
40-49	7	10.0
50-59	5	7.1
60-69	5	7.1
Total	70	100

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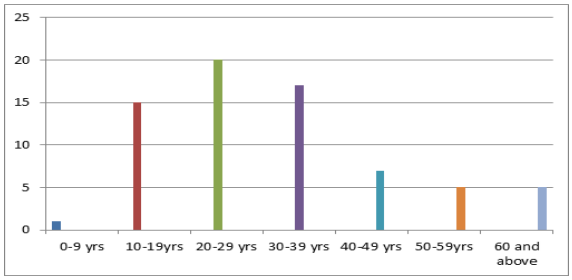
In the present study highest frequency of HIV positive cases seen in the third decade (28.5%), followed by fourth decade (24.2%).



Bar diagram showing the age wise distribution of HIV positive Tuberculosis cases

Table 8: Organ wise distribution of total HIV negative Tuberculosis cases

Organ	No. Of Cases	Percentage(%)
Lung & pleura	78	34.5
Lymphnode	37	16.3
Bone	37	16.3
Intestine	28	12.3
CNS	12	5.3
Skin biopsy	9	3.9
FGT	6	2.6
Genito-urinary	6	2.6
Ear biopsy	5	2.2
Pericardial biopsy	3	1.3
Vocal cord biopsy	3	1.3
Breast biopsy	2	0.8
Total	226	100

In our present study, Lung & pleura was the most common organ involved by the Tuberculosis in HIV negative cases (34.5), followed by lymphnode (16.3).

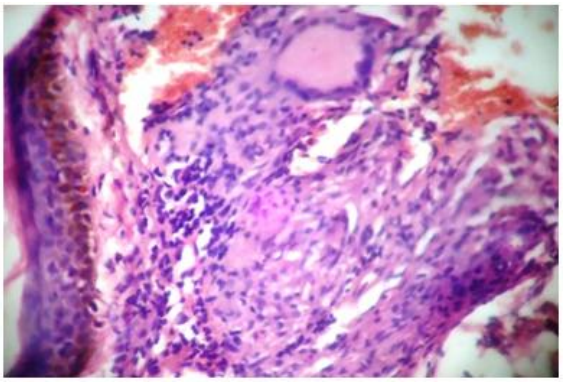


Figure 12: Skin with granulomatous inflammation H&E x200

DISCUSSION

The aim of present study is to study the age, sex incidence of Tuberculosis, the risk factors, incidence of Tuberculosis in HIV and non HIV patients, common sites of involvement of Tuberculosis in general population and HIV patients and morphological pattern of Tuberculosis in HIV and non HIV patients. The results thus obtained are analysed and discussed in the light of other studies available in the literature.

Incidence of co – infection: In the present study the percentage of HIV-Tuberculosis co- infection is 23.6%, which is comparable with the findings of other studies of S. Rajasekaran et al,[7] Abdul Raut menon et al,[8] Sameer Singhal et al,[9] where the HIV-Tuberculosis co- infection was 4% 30% ,7% respectively.

Age incidence: In the present study 74.1% patients with HIV – Tuberculosis co – infection belong to the age group of 10 – 39 years, highest frequency (28.5%) being in the age group of 20 – 29 years. The findings of present study are in accordance with other studies. A study by Sameer Singhal et al,[9] found that 75% of HIV – Tuberculosis infection was in patients between the age group of 16 – 45 years. Deivanayagam et al study shows 74.94% of patients belonged to 21 – 40 years age group.[10]

S. Rajasekaran et al,[7] observed 86.5% of HIV – Tuberculosis patients belonged to 15 – 44 years age group. In the study of Praveen Kumar et al,[11] most patients (76%) belonged to the age group of 20 – 39 years. Pratima Gupta et al,[12] observed the majority (64.28%) of patients belonged to the age group of 21 – 40 years. National AIDS control organisation (NACO) 61 also shows 89% of cases in the age group of 15 – 44 years.

Sex incidence: In the present study both males and females are equally affected by co-infection. In the studies of S. Rajasekaran et al,[7] Pratima Gupta et al,[12] Praveen kumar et al,[11] Deivanayagam et al,[10] the HIV –Tuberculosis co-infection showed male predominance 74.5%), 71.42%, 90.5%, 79.25% respectively. NACO13 statistics also show that among the patients affected with co- infection 74% males and 26% females.

Site of involvement: In the present study, among the HIV-Tuberculosis co-infection cases only 1.4% of cases are pulmonary Tuberculosis, and rest of cases are (98.6%) extra pulmonary involvement. In the

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study of Sameer Singhal et al,[9] ratio of pulmonary Tuberculosis to extra pulmonary Tuberculosis was found to be equal. Pratima Gupta et al,[12] observed among the co-infection patients 64.28% had pulmonary Tuberculosis and 35.71% had extra pulmonary Tuberculosis. Praveen Kumar et al,[11] found among co- infection cases 45.65 were extra pulmonary Tuberculosis and remaining were pulmonary Tuberculosis.

Soumya Swaminathan et al observed among co-infected cases 72% had pulmonary Tuberculosis and 28% had extra pulmonary Tuberculosis. In the study of Deivanayagam CN et al,[10] 83.88% of pulmonary Tuberculosis and 16.2% of extrapulmonary Tuberculosis was found. The small percentage of pulmonary Tuberculosis in HIV positive patients in the present study is influenced by the fact that most of the Tuberculosis patients are diagnosed under Revised National Tuberculosis Control Programme (RNTCP) by sputum smear examination and given anti tuberculous treatment.

Figure 13: Decortication (Pleura) specimen showing small 'tubercles'

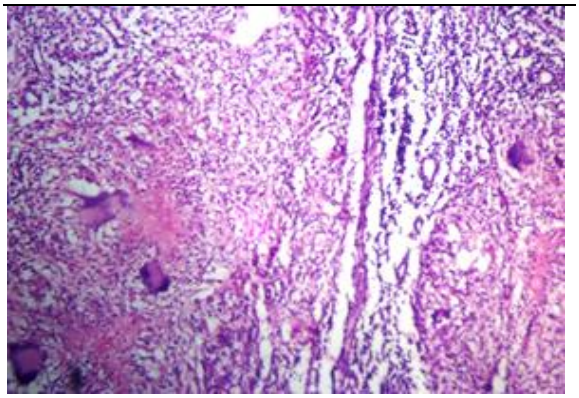

Figure 14: Pleural tissue with granulomatous inflammation H&E x100

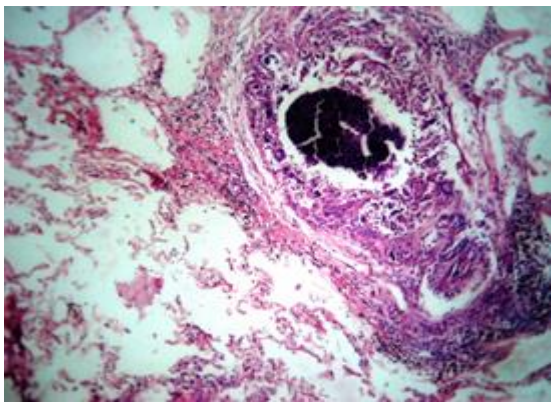

Figure 15: Lung tissue with granulomatous inflammation with calcification H&E x100

Incidence of extra pulmonary Tuberculosis in co-infection: In the present study among the extra pulmonary Tuberculosis 73.8% shows lymphnode involvement, mostly cervical lymphnode. In the study of Sameer singhal et al9, in extrapulmonary Tuberculosis cases, Tuberculous lymphadenitis and pleural effusion were the common manifestations.

In the study by Soumya Swaminathan et al14 among the extrapulmonary Tuberculosis cases in co-infected patients 29% had lymphadenopathy. Extrapulmonary Tuberculosis is more common in HIV –Tuberculosis co-infection. especially with advanced immunosuppression than in non- HIV- Tuberculosis patients. Praveen kumar et al11 study observed that extrapulmonary Tuberculosis was seen in 45.6% among HIV-Tuberculosis cases, lymphadenopathy was observed 30.9%, followed by pleural involvement (9.5%).

Figure 16: Intestinal tuberculosis showing mass obstructing intestine

Occupation: In the present study majority of the patients are manual labourers (70%) followed by truck drivers (30%). However the percentage of professions seems to vary in different studies due to the difference in the occupation patterns and the source from where the patients were selected.

A study by Praveen Kumar et al,[11] revealed that majority of co-infected patients were labourers followed by truck drivers. Rajasekaran et al,[15] reported that majority of co-infected patients were farmers and transporters. Purohit et al,[16] and Thanasekaran et al,[17] reported that majority of co-infected patients were truckers. Mohanty et al,[18] reported 36.8% were manual labourers, in females 80% were commercial sex workers.

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Geographic incidence: HIV infection is rising and is emerging as the most important risk factor for Tuberculosis. The joint united nations programme on HIV (UNAIDS) estimates that globally a total 39.4 million people living with HIV, 70.1% are in sub – Saharan Africa and 16.1% are in South East Asia.[19] In the study of Pratima Gupta et al,[12] rising trend of HIV infection was found as 1.19% in 1999 to 1.19% in 2000, 1.90% in 2001, 2.81% in 2002, 3.90% in 2003, 4.00% in 2004 and 4.19% in 2005.

Morphological features of Tuberculosis in HIV and non HIV patients: In the present study 80% cases shows granulomas with giant cells, epitheloid cells, caseous necrosis, inflammatory cells. In remaining 20% cases, poorly formed granulomas or no granulomas, with non caseous necrosis, nuclear debris, neutrophils, lymphocytes were observed.

The manifestations of Tuberculosis differ depending on the degree of immunosuppression in HIV patients, In patients with more advanced immunosuppression shows (CD4+Tcell count <200 cells / mm3) shows abscence of granuloma's in tissue.[6]

In HIV patients with Tuberculosis less number of granulomas are present than individuals with Tuberculosis alone.[20]

Other opportunistic infection and HIV related tumors in co-infection: In the present study common opportunistic infection observed in co-infected patients was candidiasis (45%) and no HIV related tumors were observed. SK. Sharma et al72 found, in 135 hospitalised HIV positive patients, Tuberculosis was the commonest opportunistic infection (20%), followed by candidiasis (39.3%), pneumocystitis jiroveci (PCP) (7.4), cryptococcal meningitis (3.7) and toxoplasmosis (3.7%). In their study, two patients had visceral leishmaniasis and two cases of HIV associated lymphoma were encountered.

CONCLUSION

- Among the HIV- Tuberculosis co-infected patients, extrapulmonary Tuberculosis mainly lymphnode involvement was the most common manifestation.
- Tuberculosis and HIV infections were mostly seen in low socioeconomic group people (labourers) and young , adolescent age groups
- Tuberculosis is the most common opportunistic infection in HIV infected

Individuals

- Mortality and morbidity increased in dual infection (HIV- Tuberculosis) than single disease alone
- Early diagnosis and prompt institution of anti Tuberculosis treatment reduce the mortality and morbidity in HIV and non HIV patient.

In Tuberculosis patient and co- infected patients, the implication of HIV/AIDS control programmes are substantial as Tuberculosis has now become an integral part of HIV/AIDS care.73 Our present study too represents a high incidence of HIV and Tuberculosis co-infection, emphasizing the need for an integrated programme for HIV and Tuberculosis.

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