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Clinico-Epidemiological and Diagnostic Profile of Extra Pulmonary Tuberculosis Among Population in North Andhra, South India

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Abstract

Background & Objectives : Extra pulmonary tuberculosis (EPTB) constitutes 15 to 20% of total cases of tuberculosis in India. It is high in incidence among HIV and Pediatric group and involves almost all systems of the body. Cbnaat (Catridge-based nucleic acid amplification test) is of definitive value in its diagnosis. The present study aims at knowing the prevalence of EPTB among the population of Visakhapatnam of North Andhra. **Material & methods:** 12,372 cases of EPTB out of total cases (old & new) of 67,017 are studied from the data at District Tuberculous Center, Visakhapatnam for the period 2007 to Aug 2018. **Results & Discussion:** FNAC samples of lymph nodes and others reported highest (177) among EPTB followed by pleural effusion (28) and pus & abscess (30) showing similar and bronchial wash (26). In the present study EPTB showed overall prevalence of 18.80 similar to Indian average of 15 to 20%. PTB : EPTB is 4 : 1 in males and 2 : 1 in females showing more in incidence in the latter. Hence the target group for EPTB is more of female population as they are vulnerable due to anaemia, malnutrition and low immunity. **Conclusion:** Though the emphasis is more on PTB case finding, EPTB is also significant and has to be paid attention in the control of tuberculosis.

Keywords : EPTB, Cbnaat, prevalence, percentage, ratio, tuberculosis.

Introduction

Tuberculosis is still remains thorn in our soul despite intense efforts to control it. Even today India has the highest [7]TB burden accounting for 1.9 million cases out of 9.1 million globally. Extra pulmonary tuberculosis (EPTB) involves almost every organ system in the body. Its burden ranges from 15 to 20 % of all TB cases among HIV –Ve patients and about 40 to 50% in HIV +Ve new TB patients. EPTB has significant impact on the people and the economy. Diagnosis is difficult. Latest [6]Gene-Xpert (Cbnaat) has revolutionised the diagnosis of TB particularly EPTB. Visakhapatnam city is situated in North Andhra Coastal area of Southern India with a population of about 45.5 lakhs with 15% tribal. Most of the city population are migrants and industrial pollution is a matter of concern in this part of the state which may be a contributing factor for the high incidence of tuberculosis relatively. EPTB cases are noticed at the famous 1200 bedded King George Hospital (KGH).

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Present Study

It Is an observational study of the data collected from the District Tuberculous Center (DTC) of Visakhapatnam, District in North Andhra which caters to the population of the three districts Srikakulam, Vizianagaram and Visakhapatnam. About 12,825 new cases of EPTB are identified among the total old and new cases of 67,017 from 2007 to Aug 2018 from the pooled data of DTC. Tabulated and calculated on excel sheet and the relevant health status indicators are derived as per bio statistics. **Limitations:** Factors like HIV status, Diabetes, Anaemia, alcohol, smoking, pollution, slum area problem and co-morbid conditions like COPD, CKD, CANCER etc. are not part of the present study due to the paucity of data. The emphasis is on the highly sensitive Cbnaat diagnostic result of the cases of EPTB.

The above map of Visakhapatnam district shows the 20 + TU centers. The large Green (Light & Dark) shaded area indicates the tribal belt which contains 8 TU equal to rural 8 – caters to 14.42% of the total population, largest in the state of AP

Material and Methods

The material for the study is obtained with permission from the district tuberculous officer, Visakhapatnam. The method adopted is the tabulation and calculation on the excel sheet at the research center of GIMSR. The bio-statistician is consulted to adopt the relevant statistical methods applied wherever necessary. The health status indicators such as the incidence, prevalence, case fatality rate, the failure and default rate of EPTB cases among the population of Visakhapatnam city and district are considered for the study. The study is done with the permission of the institutional research body on self financing mode as it is performed out of our academic interest on such a vital topic of tuberculosis.

Bio-statistics

Certain relevant health status [10]indicators like prevalence, incidence, PTB-EPTB ratio, case fatality rate, relapse rate, failure rate and default rate are calculated as per the formulae though the emphasis is made on prevalence of EPTB.

Table 1: CASE PROFILE DATA 2007 – 2014

YEAR	AREA	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EPTB +VE	RELAPSES	FAILURE	TAD	OTHERS	TOTAL CASES
2007	URBAN	916	509	533	170	22	30	74	2254
	RURAL	1167	638	357	209	11	17	83	2488
	TRIBAL	478	137	46	42	9	7	4	723
Total :		**2561**	**1284**	**936**	**421**	**42**	**54**	**161**	**5465**
2008	URBAN	880	591	549	108	15	61	74	2278
	RURAL	1155	537	412	201	17	53	93	2468

	TRIBAL	486	246	98	68	13	16	4	932
Total :		**2521**	**1374**	**1059**	**377**	**45**	**130**	**171**	**5678**
2009	**URBAN**	894	535	434	170	16	26	75	2151
	RURAL	1199	633	410	254	28	60	94	2698
	TRIBAL	504	176	77	82	3	6	9	857
Total :		**2597**	**1344**	**921**	**506**	**47**	**92**	**178**	**5706**
2010	**URBAN**	852	593	426	200	25	30	90	2216
	RURAL	1191	651	431	211	35	43	121	2683
	TRIBAL	504	219	77	79	17	7	22	925
Total :		**2547**	**1463**	**934**	**490**	**77**	**80**	**233**	**5824**
2011	**URBAN**	921	521	438	199	26	34	104	2243
	RURAL	1232	556	386	222	44	44	124	2608
	TRIBAL	543	219	102	77	4	8	25	978
Total :		**2696**	**1296**	**926**	**498**	**74**	**86**	**253**	**5829**
2012	**URBAN**	877	426	489	143	11	21	117	2084
	RURAL	1294	573	391	175	20	32	116	2601
	TRIBAL	624	340	142	63	10	20	20	1219
Total :		**2795**	**1339**	**1022**	**381**	**41**	**73**	**253**	**5904**
2013	**URBAN**	947	397	494	165	20	25	89	2137
	RURAL	1284	463	370	171	12	27	115	2442
	TRIBAL	536	216	116	73	9	16	21	987
Total :		**2767**	**1076**	**980**	**409**	**41**	**68**	**225**	**5566**
2014	**URBAN**	946	404	478	247	28	29	127	2259
	RURAL	1347	527	382	248	15	32	107	2658
	TRIBAL	679	150	145	81	15	38	24	1132
Total :		**2972**	**1081**	**1005**	**576**	**58**	**99**	**258**	**6049**

Relapse= reporting TB after complete treatment.
Failure = Sputum +ve in the middle of treatment.
TAD = Treatment after default.

Table 2:Year and prevalence rate

YEAR	TU REGION	POPULATION AT RISK	NEW EPTB CASES	PREVALENCE RATE/ 1 LAKH
2015	URBAN	27,69,383	660	23.83
	RURAL	19,77,979	304	15.37
	TRIBAL	10,15,082	150	14.78

TOTAL :		**57,62,444**	**1,114**	**19.33**
2016	URBAN	21,78,359	768	35.26
	RURAL	15,89,463	341	21.45
	TRIBAL	6,72,621	156	23.19
TOTAL :		**44,40,443**	**1,265**	**28.49**
2017	URBAN	21,93,299	732	33.37
	RURAL	16,00,368	398	24.87
	TRIBAL	6,77,242	184	27.17
TOTAL :		**44,70,909**	**1,314**	**29.39**
Aug-18	URBAN	21,93,299	580	26.44
	RURAL	16,00,368	238	14.87
	TRIBAL	6,77,242	78	11.52
TOTAL :		**44,70,909**	**896**	**20.04**
TOTAL :			**4,589**	**24.31**

Table 3: CHANGING TREND OF TB PREVALENCE FROM 2007 TO 2018 - VISAKHAPATNAM DISTRICT IN ANDHRA PRADESH

CHANGING TREND OF TB PREVALENCE FROM 2007 TO 2018 - VISAKHAPATNAM DISTRICT IN ANDHRA PRADESH			
YEAR	**POPULATION AT RISK**	**CASES OLD & NEW**	**PREVALENCE**
2007	4069450	5465	134.29
2008	4112740	5678	138.06
2009	4155178	5706	137.32
2010	4202021	5824	138.60
2011	4240606	5829	137.46
2012	4318579	5904	136.71
2013	4349045	5566	127.98
2014	4351557	6049	139.01
2015	5762444	6073	115.00
2016	4440443	6076	144.46
2017	4470909	5614	134.80
2018	4470909	3233	74.36
Total old & new cases :		**67017**	

Table 4: EPTB CASE STATISTICS FROM 2007 TO AUG 2018 OF VISAKHAPATNAM DISTRICT

EPTB CASE STATISTICS FROM 2007 TO AUG 2018 OF VISAKHAPATNAM DISTRICT					
YEAR	**NEW CASES**	**EPTB OUT OF NEW CASES**	**EPTB % OUT OF NEW CASES**	**TOTAL CASES (OLD & NEW)**	**EPTB % OF TOTAL CASES**
2007	4781	936	19.58	5465	17.12
2008	4954	1059	21.37	5678	18.67
2009	4862	921	18.94	5706	16.14
2010	4944	934	18.89	5824	16.04
2011	4918	926	18.82	5829	15.88
2012	5156	1022	19.82	5908	17.30
2013	4823	980	20.31	5566	17.60
2014	5058	1005	19.86	6049	16.61
2015	5079	1114	21.93	6073	18.34
2016	5096	1265	24.82	6086	20.78
2017	4759	1314	27.61	5614	23.40
Aug-18	2799	896	32.00	3233	27.71
Total :	**57229**	**12372**	**22.00**	**67017**	**18.80**

Table 5: GENDER DISTRIBUTION OF PTB & EPTB AND THE RATIO

GENDER DISTRIBUTION OF PTB & EPTB AND THE RATIO					
YEAR	**SEX**	**PTB**	**EPTB**	**EPTB %**	**PTB : EPTB**
2015	**MALE**	2672	547	20.47	4.88 : 1
	FEMALE	1293	567	43.85	2.28 : 1
	TOTAL	**3965**	**1114**	**28.10**	**3.56 : 1**
2016	**MALE**	2587	635	24.55	4.07 : 1
	FEMALE	1244	630	50.64	1.97 : 1
	TOTAL	**3831**	**1265**	**33.02**	**3.03 : 1**
2017	**MALE**	2441	683	27.98	3.57 : 1
	FEMALE	1004	631	62.85	1.59 : 1
	TOTAL	**3445**	**1314**	**38.14**	**2.62 : 1**
2018	**MALE**	1860	706	37.96	2.63 : 1
	FEMALE	917	643	70.12	1.43 : 1
	TOTAL	**2777**	**1349**	**48.58**	**2.06 : 1**

CBNAAT DATA

EPTB – CBNaat samples at DTC & KGH – from 2016 TO 2018

2016 - 240 samples
2017 - 492 samples
2018 - 905 samples
Total - 1637 samples

EPTB – CBNaat samples at District Hospital – RJY from 2017, 2018

2017 – total samples - 112
RIF – Sensitive - 46
RIF – Resistant - 2
2018 - total samples - 178
RIF – Sensitive - 59
RIF – Resistant - 2

The above data from Rajahmundry (RJY), AP shows Rifampcin resistance of 4.34 in 2017 and 3.39 in 2018.

Table 6: EPTB - CBNAAT DISEASE PROFILE OF VISAKHAPATNAM FOR 2016,2017,2018

EPTB - CBNAAT DISEASE PROFILE OF VISAKHAPATNAM FOR 2016,2017,2018			
Sample type	**CBNAAT tested**	**Rifampcin sensitive**	**Rifampcin resistant**
[12]**FNAC** (lymph node, thyroid, parotid, breast, tumours etc.)	**622**	**177**	**8**
Pleural effusion	**265**	**28**	**1**
Pus & abscess	**123**	**30**	**3**
Ascitic fluid	**123**	**4**	**0**
Bone & joint	**102**	**15**	**1**
Csf	**135**	**4**	**1**
Gastric lavage	**135**	**3**	**-**
Bronchial wash	**94**	**26**	**1**
Endometrial	**9**	**1**	
Biopsy	**26**	**2**	**0**
Hydrocele fluid	**2**	**-**	**-**
Drain site fluid	**1**	**-**	**-**
Total :	**1637**	**290**	**15**

The above CBNAAT sample data is collected from two main centers, DTC & KGH. Rifampcin resistance is 5% of total TB samples tested +Ve with Cbnaat.

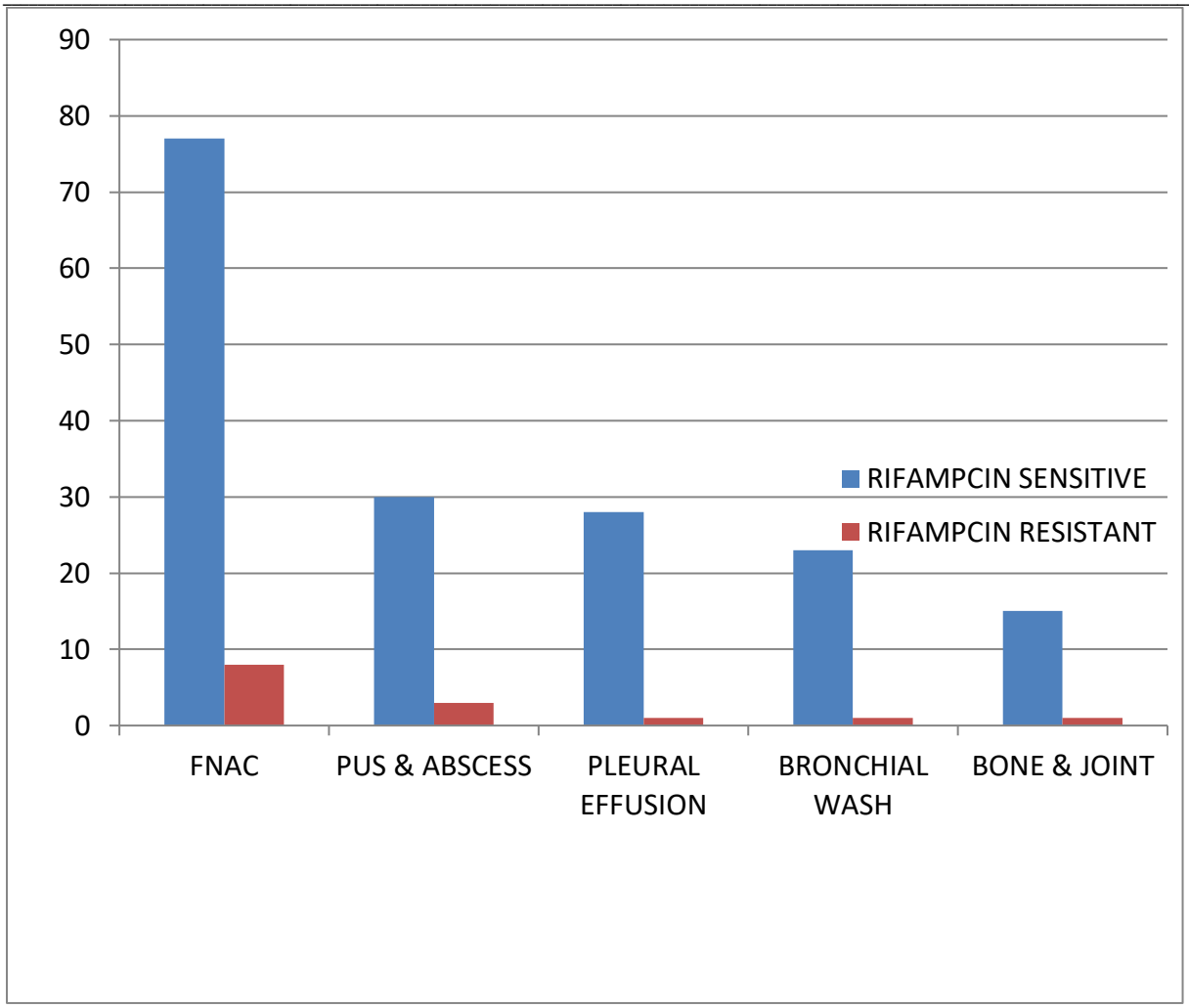

Fig 1: Bar Diagram showing the RIF sensitive and resistant on Cbnaat – Frequency distribution.

Table 7: RIFAMPCIN RESISTANCE - IN INDIA - 2016

RIFAMPCIN RESISTANCE - IN INDIA - 2016	
NEW TB CASES	20%
IN PREVIOUSLY TREATED TB PATIENTS	67%
IN NOTIFIED TB PATIENTS	41%

Results

Detailed case profile data of PTB & EPTB is shown in Table-1 for the period 2007 to 2014. As per table – 2, the prevalence of EPTB among urban, rural and tribal areas of Visakhapatnam shows an increasing trend from 2015 to Aug 2018, rate ranging from 19.33 in 2015 to 29.39 in 2017. The average prevalence for the period [9]2015 to 2018 is 24.31 per one lakh population. The overall prevalence of total TB including PTB plus EPTB from 2007 to 2018 is about 135(Table – 3). EPTB percentage of total cases (Old & New) is about 18.80% for the period 2007 to 2018(Table-4). Hence, the EPTB share of total TB cases is similar to Indian average of 15 to 20%. Table – 5 shows the PTB : EPTB gender ratio in males is about 4:1 but in females it is 2:1 for the period of study 2015 to 2018. The [5]**C B**

N A A T diagnostic results confine to 2 to 3 years for 2016,2017,2018, as this Gene-Xpert has come into force recently throughout India, yet not spread widely. The present sample study shows EPTB of lymph node (FNAC) maximum in occurrence followed by abscess and pleural taking next. The Rifampcin resistance in the present study population is 4 – 5%(Table-6) far less than Indian average(Table-7). The bar diagram-1 gives a telltale picture of Rifampcin sensitivity pattern of different diseases of EPTB. Out of total 1637 samples received for Cbnaat testing at DTC and KGH, 290 are +Ve for EPTB Rifampcin sensitive and 15 resistant, sample size is increasing gradually. Which shows the improved awareness among medical personnel towards the definitive diagnosis of tuberculosis. This trend shows better compliance of the treatment of tuberculosis esp. EPTB. The Cbnaat profile when compared Visakhapatnam to another center Rajahmundry shows similar trend. Hence the pattern is almost same in the state of Andhra Pradesh. The failure rate and the default rate of all cases of TB from 2007 to 2014 is 16% and 1.5% respectively, and the case fatality rate maintains at 1.5% for the period 2015 to 2018.

Discussion

Often EPTB diagnosis depends upon strong clinical suspicion by the doctor. Surprisingly, most of the clinicians/specialists are not aware of importance of the high sensitive genetic test like the Cbnaat. General feeling medical fraternity is TB means PTB but EPTB is no less common and it is very high even upto 50% among HIV +ve people effected with TB due to reactivation as the immunity is compromised in them. Surgical implications of EPTB is an important consideration as [8]ATT may cure the disease but leaves the residual sequelae like adhesions of intestines, obstruction to CSF flow, lung fibrosis, bone loss etc. EPTB is often clinical than epidemiological. [1,2]

Other studies : As per Pooja Singh Gour retrospective study in 2017 in North India of 552 patients, 252 are EPTB cases which are more common in female gender in the age group 31 to 40 years, and in males between 41 to 50 years. Co-infection is often reported with [4]diabetes and HIV and only 12% are retreatment cases which is 24% in PTB. MDR is more often reported with PTB. Pleural followed by lymph node is the pattern of EPTB in their study and even in the present study FNAC is followed by abscess and pleural equally. Another recent study by Anita Velingker from Goa for the period 2013 to 2015 of 1,598 cases revealed 31% incidence of EPTB cases with 47% among HIV +Ve with diabetes. Here also pleural is followed by lymphatic in the incidence maximum among 30 to 50 years age group.

Conclusion

The prevalence of EPTB maintains a plateau without much fluctuations over years as per the present study. The case burden is more in the society as they are not suspected and not referred to Cbnaat centers. [11]With the establishment of more and more of Gene-Xpert machines network allover the areas, EPTB case load can cross the tip of the iceberg coming to the surface. Provision has to be made in [3]RNTCP in this aspect. There is no separate emphasis on EPTB control by the RNTCP. Hence all the hospitals (both private & govt) have to be directed by the G.O.I. to tackle cases of EPTB in co-ordination with the control agencies. EPTB resulting in surgery has to be done free of cost or at gross concession at all private hospitals. A special provision has to be made through the health insurance scheme. It has to be made compulsory for all private hospitals to purchase Gene-Xpert so that more cases of EPTB can be diagnosed and the drug treatment can be provided by the govt. nodal agencies.

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