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NUTRITIONAL STATUS IN MULTI DRUG RESISTANCE-PULMONARY TUBERCULOSIS PATIENTS

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ABSTRACT

INTRODUCTION

Tuberculosis is a wasting disease. In the 21st century, tuberculosis is still the most frequent underlying cause of wasting worldwide.

MATERIALS AND METHODS

100 subjects were enrolled in our study after informed consent. 50 study subjects were MDR-pulmonary tuberculosis patients and rest 50 were healthy controls. The nutritional status indices (Body Mass Index, Serum total protein, serum albumin, Blood hemoglobin) of study and control groups were compared.

RESULTS

The p value of BMI and serum total protein between study and control group were found to be 0.01 and that of serum albumin and hemoglobin were found to be <0.0001. p value <0.05 is considered to be significant.

CONCLUSION

The MDR-Pulmonary tuberculosis patients were having malnutrition and have lower level of serum protein, serum albumin and blood hemoglobin. Nutritional supplementation may help to improve outcome in tuberculosis patients. Nutritional supplementation may represent a novel approach for fast recovery in tuberculosis patients. In addition, raising nutritional status of population may prove to be an effective measure to control tuberculosis.

KEY WORDS

MDR-TB, wasting disease, Nutritional status indices

INTRODUCTION

Pulmonary tuberculosis is a communicable disease of global importance. At present, the Global annual incidence of TB is 8.8 million and in India 1.8 million TB cases occur annually, accounting for around one-fifth (21%) of the world's new TB cases. This makes India the highest TB burden country in the world [1,2].

It is a chronic infectious disease caused by *Mycobacterium tuberculosis* and is characterized by prolonged cough,dyspnea,chest pain and hemoptysis.The systemic manifestations includes

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fever,malaise,anorexia,weight loss, weakness and night sweats.

Tuberculosis is a wasting disease. In the 21st century, tuberculosis is still the most frequent underlying cause of wasting worldwide [3]. The degree of cachexia is most profound when Multi Drug Resistance-tuberculosis (MDR-TB) occurs in patients with HIV-infection/AIDS [4]. While the mechanisms involved in weight loss are not well known, current evidence points to tumour necrosis factor-alpha (TNF-α) to be the cytokine responsible for this phenomenon. TNF-α, in addition to inducing immunopathological effects such as tissue necrosis and fever, is also thought to induce the catabolic response[5]. Further, several second-line drugs used to treat MDR-TB such as PAS, fluoroquinolones cause significant anorexia, nausea, vomiting and diarrhoea interfering with food intake, further compromising the cachectic state[6]. Therefore, nutritional support is a key factor in the care of patients with MDR-TB, especially those undergoing major lung surgeries. Though definitive evidence is not yet available, it is generally believed that malnourished patients are at a greater risk of developing post-operative complications [7].

Nutritional assessment and regular monitoring of the nutritional state by a dietician are essential for the successful management of MDR-TB patients and should be an essential part of tuberculosis control programmes.

Thus the main objective of our study was to investigate the nutritional status of MDR-TB patients and compared with that of healthy controls.

MATERIALS AND METHODS

The study was conducted jointly in the department of Biochemistry and Microbiology, Lady Hardinge Medical College and Associated Hospitals, New Delhi, India and Chest Clinic, Lok Nayak Hospital.

100 cases were enrolled in our study after informed consent during March 2007 to March 2008.They were divided into two groups

Group 1(Study group)-50 cases of Multi Drug Resistance-Tuberculosis (MDR-TB)

Group 2(Control group)-50 healthy subjects.

Selection criteria-The study groups includes pulmonary tuberculosis patients who are proved to be resistant to isoniazid and rifampicin by culture and drug susceptibility testing.

The controls were age and sex matched apparently healthy subjects.

Heights (meters) and weights(kilograms) of the study and control groups were measured and Body Mass Index(BMI) were calculated by using the formula BMI= Weight(kg) / Height^2(m^2).

Blood samples were collected from the subjects of study and control groups in plain vials.The samples were processed properly and then serums were separated.

Estimations of serum total protein

Serum total protein and albumin were assayed in Clinical Autoanalyser (CX 9,Beckman Coulter).

The serum total protein was estimated by Biuret method.

Principle-Cupric ions,in an alkaline medium, interacts with protein peptide bonds resulting in the formation of a purple coloured complex.

Normal values of serum total protein are 6.4-8.3 gm/dl.

Estimations of serum albumin

The serum albumin was estimated by Bromocresol green method.

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Principle- Albumin+Bromocresol Green→ Albumin-BCG complex
The reaction between albumin in serum and the dye bromocresol-green produces a change in colour to blue-green that is proportional to the albumin concentration.
Normal values of serum albumin are 3.5-5.5 gm/dl.

Blood haemoglobin levels of study and control subjects were also measured.

Statistical analysis
The data generated in this study was analyzed for mean, standard deviation and student t-test by using SPSS 17 software. P value < 0.05 is considered as significant.

RESULTS

The nutritional status indices (Body Mass Index, Serum total protein, albumin, Blood hemoglobin) of study and control groups were compared in the following table.

Table I.
Nutritional status indices among study and control groups

Nutritional indices	BMI(kg/m^2)	TP(gm/dl)	Alb(gm/dl)	Hb(gm/dl)
	Mean±SD			
Study groups (n=50)	18.3±0.5	5.7±0.6	3.1±0.4	10.5±1.4
Controls (n=50)	23.9±1.3	6.6±0.5	4.4±0.6	12.4±1.3
P value	0.01*	0.01*	<0.0001*	<0.0001*

*P value < 0.05 is significant.

The mean±SD of BMI,serum total protein,serum albumin and hemoglobin were shown in table I. The p value were calculated by using SPSS version 17 software and were found to be significant.

Table II.
Nutritional status indices in study and control groups

Groups	BMI(kg/m^2)		TP(gm/dl)		Alb(gm/dl)		Hb(gm/dl)	
	<18.5	≥18.5	<5.5	≥5.5	<3.5	≥3.5	≤10	>10
Study groups (n=50)	33(66%)	17(34%)	18(36%)	32(64%)	37(74%)	13(26%)	21(42%)	29(58%)

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Control groups (n=50)	0(0%)	50(100%)	1(2%)	49(98%)	1(2%)	49(98%)	0(0%)	50(100%)

In our study,we observed that 66% subjects of study group were having BMI <18.5, 36% of subjects of study group were having serum total protein <5.5 gm/dl, 74% subjects of study group were having serum albumin <3.5 gm/dl. 42 % subjects were having anemia(Hb ≤10).

DISSCUSSION

Our present study compares the BMI,serum total protein, serum albumin and hemoglobin of Multi-Drug Resistance-Pulmonary Tuberculosis(MDR-TB) and healthy controls.

We observed a significantly lower concentration of serum total protein, serum albumin, blood hemoglobin in study group as compared to healthy controls. The BMI of study groups were also significantly lowered as compared to the healthy controls. This observation is in accordance with the study by *Elvina Karyadi et al* [8] and *Adedapo KS et al* [9].

The MDR-Pulmonary tuberculosis patients were having malnutrition and have lower level of protein, albumin and hemoglobin .Nutritional supplementation may help to improve outcome in tuberculosis patients. Nutritional supplementation may represent a novel approach for fast recovery in tuberculosis patients. In addition, raising nutritional status of population may prove to be an effective measure to control tuberculosis.

Thus, nutritional assessment and regular monitoring of the nutritional state by a dietician are essential for the successful management of MDR-TB patients and should be an essential part of tuberculosis control programmes.

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