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ORIGINAL RESEARCH

A study on clinical profile of patients with mediastinal lymphadenopathy at a tertiary care hospital

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ABSTRACT
Enlargement of intra thoracic lymph nodes can be due to a variety of causes including infection, inflammation, neoplastic etiology, or just nonspecific reactive hyperplasia. Etiology of mediastinal lymphadenopathy differs in different regions of the world. While sarcoidosis, lymphoma, and metastatic cancer are the common causes in the developed countries, infections such as tuberculosis (TB) are more likely causes in the developing countries. All patients who were diagnosed with mediastinal lymphadenopathy in CXR, CT Chest or PET CT scan were recruited for the study. They were screened using inclusion and exclusion criteria. Patients were explained about this procedure in detail, got their informed consent. They were evaluated for general anesthesia. From those patients who were fit for procedure, we collected the clinical details according to study proforma. Chest x ray was helpful in detecting only 22.4% patients with mediastinal lymphadenopathy while CT Chest succeeded in detecting mediastinal lymphadenopathy in all 58 patients. PET CT could detect metabolic activity in 36.2% patients.

Key words: Mediastinal lymphadenopathy, CT Chest, PET CT scan

INTRODUCTION

The enlargement of lymph nodes, either localized or generalized, can be the consequence of several different pathologic mechanisms. Lymphadenopathy may represent an increase in the number and size of lymphoid follicles with proliferation of lymphocytes as a response to a new antigen. There can be enlargement of lymph nodes with infiltration of the node by cells normally not present, such as metastatic tumor or leukemic cells. Lymphadenopathy can occur secondary to unknown stimuli that cause normal cells to become transformed to lymphoma cells and to proliferate autonomously. Lymph nodes can be infiltrated by polymorphonuclear cells, a condition called lymphadenitis, or lymph nodes can be infiltrated by macrophages laden with metabolites, as in lipid storage diseases.[1,2]

The mediastinum is the region in the chest between the lungs that contains the heart and other thoracic viscera,except the lungs. Interest in the mediastinum as a separate body region stems from the diversity and importance of the structures it contains and the multiplicity of disease processes by which it can be affected.[3]

Enlargement of intra thoracic lymph nodes can be due to a variety of causes including infection, inflammation, neoplastic etiology, or just nonspecific reactive hyperplasia. Etiology of mediastinal lymphadenopathy differs in different regions of the world. While sarcoidosis, lymphoma, and metastatic cancer are the common causes in the developed countries, infections such as tuberculosis (TB) are more likely causes in the developing countries.Mediastinal lymphadenopathies are frequently seen with a neoplastic or an inflammatory disease in which knowledge of lymph node involvement is a significant prognostic factor. Therefore, detection and characterization of mediastinal lymphadenopathies is a keystone for treatment of the patients.[4]

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METHODOLOGY

STUDY SITE

DEPARTMENT OF PULMONOLOGY

STUDY DESIGN

Cross sectional comparative study.

INCLUSION CRITERIA

- Patients undergoing EBUS TBNA.
- Patients aged between 10-80yrs.
- Patients of both genders.
- Presence of mediastinal lymphadenopathy in CT chest/ PET CT/CXR.
- Informed Consent.
- Patients who are hemodynamically stable.
- Patients with no baseline hypoxemia.
- Patients without recent myocardial infarction.
- Patients without any evidence of uremia.

EXCLUSION CRITERIA

- Pregnant females.
- Patients who are not hemodynamically stable.
- Patients with altered coagulation profile.
- Patients aged less than 10yrs and more than 80yrs.
- Patients having baseline hypoxemia.
- Patients who had recent myocardial infarction within six weeks.
- Patients with evidence of severe uremia.
- Poor performance status.
- Patients who are found unfit for general anesthesia.

STUDY PROCEDURE

All patients who were diagnosed with mediastinal lymphadenopathy in CXR, CT Chest or PET CT scan were recruited for the study. They were screened using inclusion and exclusion criteria.

Patients were explained about this procedure in detail, got their informed consent. They were evaluated for general anesthesia. From those patients who were fit for procedure, we collected the clinical details according to study proforma.

RESULTS

Most of the patients belonged to the older age group (31. 03% in the age group of 46-6Oyrs), with lesser number of patients presenting with mediastinal lymphadenopathy in the age group below 30 yrs.

Table1: Age distribution of the study group

Age	No. of Cases	Percentage
<= 30	8	13.79%
31 - 45	16	27.59%
46 - 60	18	31.03%
61 & Above	16	27.59%
Total	58	100%

- The most common age group was 46-60 yrs.
- The least common age group was below 30 yrs.

Table 2: Showing weight distribution

Weight [kg]	No. of Cases	Percentage
<= 60	14	24.14%
61 - 75	32	55.17%
76 & Above	12	20.69%
Total	58	100%

- Majority of the patients had weight between 61-75 kg.
- Only few patients weighed above 76kg.

In study patients of 58, male patients with mediastinal lymphadenopathy were more 36(62. 07%) than females 22(37.9%).

Table 3: Sex distribution in the study group

Sex	No. of Cases	Percentage
Male	36	62.07%
Female	22	37.93%
Total	58	100%

- Nearly 2/3rd of the study population were males.
- Only 1/3rd of the study population were females.

In our study, 56.9% of the patients had fever, 74.1% had cough, 58.6% had shortness of breath, 20.69% had joint pain,31% had history of weight loss and 34.4% had hemoptysis.

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Table 4: Showing symptom profile

Symptom Profile	No. of Cases	Percentage
Fever	33	56.90%
Cough	43	74.14%
Shortness of breath	34	58.62%
Joint pain	12	20.69%
Weight loss	18	31.03%
Hemoptysis	20	34.48%

- Majority of the patients presented with cough.
- Shortness of breath was the second common symptom.
- Joint pain was seen in only a few patients.

In our study, only 39.7% patients gave past history of cigarette smoking.

Since 37.9% patients in the study group were females, it may have contributed to this disparity.

Table 5: Showing past history of smoking

PastH/OSmoking	No.ofCases	Percentage
Yes	23	39.66%
No	35	60.34%
Total	58	100%

- Majority of the patients were never smokers.
- Only 2/5th of the patients were smokers.

In our study, only 18.97% patients gave past history of tuberculosis.

Table 6: Showing past history of Tuberculosis

Family H/O Tuberculosis	No. of Cases	Percentage
Yes	6	10.34%
No	52	89.66%
Total	58	100%

- Only 1/5thof the patients had past history of Tuberculosis.
- Only 8.6% patients had a family history of malignancy which was insignificant statistically.

Table 7: Showing family h/o Malignancy

Family H/O Malignancy	No. of Cases	Percentage
Yes	5	8.62%
No	53	91.38%
Total	58	100%

- Majority of the patients had no family history of lung malignancy.
- Only 1/10thpatients had family history of lung malignancy.

In our study, only 10.3% patients had history of contact withtuberculosis recently.

Table 8: Showing family H/O Tuberculosis

Family H/O Tuberculosis	No. of Cases	Percentage
Yes	6	10.34%
No	52	89.66%
Total	58	100%

- Only 1/10thpatients had family history of Tuberculosis.

In our study, 53.4% patients were suffering from Diabetes and 43.1% were suffering from systemic hypertension.

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Table 9: Showing distribution of Diabetes

Diabetes	No. of Cases	Percentage
Present	31	53.45%
Absent	27	46.55%
Total	58	100%

- More than 1/2 of the study population were Diabetic.

Table 10: Showing distribution of Hypertension

Hypertension	No. of Cases	Percentage
Present	31	53.45%
Absent	27	46.55%
Total	58	100%

- More than 1/2 of the study population were hypertensives.

CXR could diagnose mediastinal lymphadenopathy in only 22.4% patients, while CT chest was able to detect mediastinal lymphadenopathy in all patients. PET CT could detect metabolic activity in only 36.2% patients.

Table 11: Showing Investigations

Investigations	No. of Cases	Percentage
Chest X-ray	13	22.41%
CT Chest	58	100.00%
PET CT	21	36.21%

- CT Chest could detect mediastinal lymphadenopathy in all patients.
- CXR was able to make a diagnosis only in 1/5thof the patients.
- PET CT scan could pick up metabolically active mediastinal lymph nodes in nearly 2/5th of the patients.

DISCUSSION

The study group included 58 patients, out of which 62.1% were males and 37.9% were females. Most of them were within the age group of 46-60years (31%). In a study by TanushreeGahlot*et al*.[5] 40% of patients belonged to the age group 40-60yrs and 63% were males and 37% were females. Similarly, in another study conducted by Matthew Evison*et al*.[6] on 'Isolated mediastinal and hilar lymphadenopathy' 63% patients were males and 37% were females.

In our study majority of the patients, that is 32% belonged to the weight band of 61-75 kg. Mean weight was 67. 98kg.Similarly in a study conducted by HilalSazak*et al*.[7]on assessment of pre anesthetic data of patients undergoing EBUS TBNA, the body weight of majority of patients ranged between 60.4-88kg.

In our study, 56.9% patients presented with fever, 74.1% patients presented with cough, 58.6% presented with shortness of breath which was significant, while only a small group complained about joint pain [20.7%], weight loss [31%] and hemoptysis [34.5%].Similarly in a study conducted by TanushreeGahlot*et al.* [5].Inagroupof100patients, mostofthempresentedwithfever(most common-64%), followed by cough (48%). Shortness of breath was seen in 4% patients. Associated clinical features included weight loss (n = 42) and hemoptysis (n = 10).

In our study, 39.7% patients gave history of smoking. But in a study conducted by Kirchner.J *et al*.[8] on 'The prevalence of enlarged mediastinal lymph nodes' 52% of the patients were smokers. The disparity can be attributed to the cultural differences seen in Western world and developing countries like India were females usually stay away from smoking, and 37.9% of the patients in our study group were females. Since cigarette smoking is an important predisposing factor for many lung diseases, it is important to get that history for diagnostic purposes.

Only 19% gave previous history of Tuberculosis. Since reactivation of Tuberculosis can be an important etiology for mediastinal lymphadenopathy in an endemic country like India, it is important to rule out that possibility. Similarly, in a study conducted by Woo Jung Koh*et al*. [9], in South Korea, only 2% patients with old pulmonary TB had hilar lymphadenopathy. Since the most common manifestation of post primary TB is upper lobe infiltrates, incidence of mediastinal lymphadenopathy is comparatively less.

In our study, only 8.6% patients gave family history of lung malignancy. In a study done by Ergun*et al*.,[10] they found that in the family members of patients with lung cancer, the risks of lung, gastrointestinal system and breast cancer development were increased. In their study 38% patients had positive family history of cancer, among them 41.9% had lung cancer.

Since Pulmonary tuberculosis is a contagious disease, recent history of contact with any relatives diagnosed with Pulmonary TB can predispose the patient to tuberculosis. But in our study only 10.3% patients gave family history of Tuberculosis.Similarly, in a study done by F.J. Bently*et al*.[11] only 15% patients with recent family history of TB actually developed pulmonary TB. Early diagnosis of TB, better

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treatment modalities and effective prophylactic measures may be responsible for the decreased rate of transmission.

In our study, 53.4% patients were suffering from diabetes mellitus, while 43.1% were suffering from systemic hypertension. These comorbid conditions have implications in pre anesthetic work up of these patients. Uncontrolled diabetes can also make the patients prone to infections post procedure. Similarly, in a study done by HilalSazak*et al*.[7] on 'Assessment of pre anesthetic data in subjects undergoing EBUS TBNA' they found 16.9% patients were suffering from diabetes and 29.2% patients were suffering from hypertension.

In our study, mediastinal lymphadenopathy was diagnosed by using Chest X ray, CT Chest and PET CT. CXR was helpful in diagnosing only 22.4% cases with mediastinal lymphadenopathy, while CT chest could pick out mediastinal lymphadenopathy in all 58 patients. PET CT showed an uptake in about 36.2% patients. CT chest is considered as the gold standard imaging modality for diagnosis of mediastinal lymphadenopathy. In a study conducted by Tanushree [*et al*. CT chest could detect mediastinal lymphadenopathy in all 100 patients with subcarinal [55.72%] lymph node being the most common one involved.[12]

CONCLUSION

- In this study out of 58 patients who presented with mediastinal lymphadenopathy, 31% belonged to older age group 46-60yrs. In this study population of 58, males [62.1%] were more in number compared to females [37.9%]. Majority of the patients [55.2%] belonged to the weight band of 61-75 kg.
- In this study most of the patients presented with complaints of fever [56.9%] and cough [74.1%], with shortness of breath, weight loss and hemoptysis found in only a small group of the population.
- The percentage of smokers in this study population was 39.7% and only 19% had past history of tuberculosis.
- Only 8.6% gave family history of malignancy and 10.6% gave family history of tuberculosis recently which was not significant.
- There was reasonable prevalence of comorbidities such as Diabetes mellitus [53.4%] and Hypertension [43.1%] among the study population.
- Chest x ray was helpful in detecting only 22.4% patients with mediastinal lymphadenopathy while CT Chest succeeded in detecting mediastinal lymphadenopathy in all 58 patients. PET CT could detect metabolic activity in 36.2% patients.

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Section: Anaesthesia

Original Research Article

TO COMPARE THE EFFICACY OF USING VIDEOLARYNGOSCOPE AGAINST AIRTRAQ LARYNGOSCOPE FOR INTUBATION IN PATIENTS BY SIMULATING CERVICAL STABILISATION

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Keywords:
Airway management, Airtraq laryngoscope, Video Laryngoscopy, Body Mass Index.

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Abstract

Background: Airway management is a crucial responsibility of the anesthesiologists. During direct laryngoscopy, proper positioning of the head and neck is essential for optimal laryngeal visualisation which requires flexion of cervical spine and extension of the atlanto-occipital joint for the alignment of oral, pharyngeal and laryngeal axes. This position is also known as sniffing position. **Materials and Methods:** The study was carried out at Mount. Zion Medical College, Chayalode, Adoor, and includes 50 adult patients belonging to ASA physical status I and II, Aged 18–50 years, of either sex. Patients will be randomly allocated into two equal groups (25 patients each) using the closed envelope method: Group A: 25 patients will receive general anaesthesia with endotracheal intubation using Airtraq laryngoscope. Group V: 25 patients will receive general anaesthesia with endotracheal intubation using Video Laryngoscopy. After obtaining local Ethics Committee approval and informed written consent from each patient, all patients will be properly assessed preoperatively. **Results:** This prospective, randomized, single blind (subject), case controlled study compared the intubating conditions with Airtraq laryngoscope and Macintosh laryngoscope and evaluated the advantages and safety, effective airway time, airway trauma and hemodynamic response. All data were collected and tabulated. 50 patients were randomly selected and included in this study. Twenty five patients were randomly assigned to undergo tracheal intubation with Airtraq laryngoscope (group A) and twenty five underwent tracheal intubation with Video Laryngoscopy (group VL). Mean age, sex distribution and Body Mass Index of the patients in both the group were compared and there were no statistically significant differences between the groups. **Conclusion:** In conclusion, the Airtraq laryngoscope offers a new approach to tracheal intubation of patients with anticipated and unanticipated difficult airway. The Airtraq reduced the difficulty of tracheal intubation and the degree of hemodynamic stimulation compared with the Macintosh laryngoscope. These findings demonstrate the efficacy of the Airtraq in many clinically relevant contexts and adds to the evolving body of knowledge regarding this potentially useful device.

INTRODUCTION

Airway management is a crucial responsibility of the anesthesiologists. During direct laryngoscopy, proper positioning of the head and neck is essential for optimal laryngeal visualisation which requires flexion of cervical spine and extension of the atlanto-occipital joint for the alignment of oral, pharyngeal and laryngeal axes. This position is also known as sniffing position.[1]

In patients with cervical spine injury, airway management poses a bigger challenge due to risk of neurological damage related to neck movements; thus manual-in-line stabilisation is commonly

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applied to minimise neck movement during tracheal intubation. Such immobilisation can render intubation under direct laryngoscopy more difficult.[2] Difficulties in airway management increases the risk of hypoxia, which can also lead to devastating neurological outcomes. These issues have prompted the development of number of alternatives to Macintosh laryngoscope such as Videolaryngoscopes, fiberoptic larngoscopy, Airtraq®, etc. These laryngoscopes do not require the alignment of pharyngeal, laryngeal and oral axis and thus do not require sniffing position.[3]

Video laryngoscopes comprises a Macintosh blade connected to a video unit. The familiarity of the Macintosh blade, and the ability to use the videolaryngoscope as a direct or indirect laryngoscope, may be advantageous. (VLs) have been shown to enhance intubation success rates of tracheal intubation, in patients with difficult airways and hence have a definite role in difficult airway management.[4]

The Airtraq optical laryngoscope (AOL) improves the view of the larynx and outperforms the Macintosh for accuracy, success, response time, and number of attempts to intubate, both in normal and difficult airways. It was designed using optic laryngoscopy technology, which lacks some of the useful features of videolaryngoscopy.[5]

This study is being designed to determine the effectiveness of Videolaryngoscope when compared with Airtraq laryngoscope when performing tracheal intubation in adult patients using manual-in-line stabilisation simulating cervical spine injury.

Primary Objective

To compare the efficacy of using Videolaryngoscope against Airtraq laryngoscope for intubation in patients by artificially simulating cervical stabilization (manual in-line stabilization and/or application of a cervical collar to limit mouth opening and neck movement)

To compare the ease and success rate of intubation with Videolaryngoscopy as assessed by

a. total intubation time
b. number of attempts

Secondary Objective

To compare the glottic view, need for external laryngeal manoeuvres, hemodynamic changes and airway morbidity in the two groups.

MATERIALS AND METHODS

The study was carried out at Mount. Zion Medical College, Chayalode, Adoor and includes 50 adult patients belonging to

a. ASA physical status I and II
b. Aged 18–50 years, of either sex scheduled for elective surgery under general anaesthesia with endotracheal intubation.

Patients included in the study will have the following airway criteria

1. Modified Mallampati classes I, II, III & IV
2. Modified Cormack- lehane grades I, II, III & IV

Patients will be randomly allocated into two equal groups (25 patients each) using the closed envelope method:

Group A: 25 patients will receive general anaesthesia with endotracheal intubation using Airtraq laryngoscope.

Group V: 25 patients will receive general anaesthesia with endotracheal intubation using Video Laryngoscopy.

After obtaining local Ethics Committee approval and informed written consent from each patient, all patients will be properly assessed preoperatively.

The patients with cervical spine injury often require the use of semi-rigid cervical collar or manual in-line stabilization to prevent neck movements, which may lead to poor laryngeal view on direct laryngoscopy and lead to difficulty with intubation. In this study, as we hope to simulate similar difficult airway scenario for cervical spine immobilization, we will be providing manual in-line stabilisation and also fixing a cervical collar to further restrict mobilisation.

On arrival to the operating room, patients will be connected to the standard monitors, including ECG, noninvasive arterial blood pressure and pulse oximeter. They will all be subjected to the same anaesthetic protocol. Pre-oxygenation with 100% oxygen for 3 minutes will be done. Induction will be performed using midazolam 0.03mg/kg, fentanyl 1µg/kg and propofol 1.5–2mg/kg. The pillow will be removed, and the neck immobilized using MILS applied by an experienced individual holding the sides of the neck and the mastoid processes, thus preventing flexion/extension or rotational movement of the head and neck.

Orotracheal intubation is facilitated with vecuronium 0.1 mg/kg, following which orotracheal intubation is performed using the selected intubation device for each group with the endotracheal tube after ensuring full muscle relaxation.

Trachea will be intubated using an appropriate sized endotracheal tube. Placement of ETT should be confirmed by bilateral chest auscultation and EtCO2 waveform and tube will be secured.

Haemodynamic variables such as SBP, DBP, and HR will be documented at first, third and fifth minute following endotracheal intubation.

Assessment of laryngoscopy and intubation procedure

1. Number of trials to successful intubation.
2. Manoeuvres during laryngoscopy.

A. BURP manoeuvre ‘backward, upward, rightward and posterior external laryngeal pressure’.

B. Using an intubating stylet in the second trial of laryngoscopy.

3. Endotracheal tube insertion time will be calculated from the time of introducing the laryngoscope blade through the patient’s mouth until successful intubation confirmed by the normal capnogram waveform.
4. Success/failure rate.

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5. Complications like airway injury, bronchospasm, technical failure of the videolaryngoscope, or a reduction of oxygen saturation below 90%.

RESULTS

This prospective, randomized, single blind (subject), case controlled study compared the intubating conditions with Airtraq laryngoscope and Macintosh laryngoscope and evaluated the advantages and safety, effective airway time, airway trauma and hemodynamic response. All data were collected and tabulated.

50 patients were randomly selected and included in this study. Twenty five patients were randomly assigned to undergo tracheal intubation with Airtraq laryngoscope (group A) and twenty five underwent tracheal intubation with Video Laryngoscopy (group VL). Mean age, sex distribution and Body Mass Index of the patients in both the group were compared and there were no statistically significant differences between the groups.

Table 1: Age and BMI comparison

Parameter	Group A (AirtraQ)		Group V Video Laryngoscopy		P Value
	Mean	SD	Mean	SD	
Age in years	36.63	13.91	37.4	12.82	0.825
BMI	25.302	4.375	24.66	3.37	0.527

Table 2: gender distribution

Parameter assessed	Group	N	Mean	SD	P Value
Duration	Group A (AirtraQ)	25	11.03	6.071	<0.0001
	Group V Video Laryngoscopy	25	17.2	5.047	

Table 4: Preinduction

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	83.03	12.944	
	Group V Video Laryngoscopy	25	88.73	16.613	0.144
Systolic BP	Group A (AirtraQ	25	120.50	15.431	
	Group V Video Laryngoscopy	25	127.20	17.878	0.126
Diastolic BP	Group A (AirtraQ	25	79.20	9.792	
	Group V Video Laryngoscopy	25	83.13	12.889	0.118
MAP	Group A (AirtraQ	25	93	11.277	
	Group V Video Laryngoscopy	25	97.63	14.129	0.166
Spo2	Group A (AirtraQ	25	100	0	
	Group V Video Laryngoscopy	25	100	0	-

Table 5: Preintubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	86.87	10.734	
	Group V Video Laryngoscopy	25	88.83	14.697	0.556
Systolic BP	Group A (AirtraQ	25	111.50	15.13	
	Group V Video Laryngoscopy	25	115.13	18.25	0.405
Diastolic BP	Group A (AirtraQ	25	74.17	11.61	
	Group V Video Laryngoscopy	25	73.87	11.57	0.921
MAP	Group A (AirtraQ	25	86.57	12.22	
	Group V Video Laryngoscopy	25	87.67	13.47	0.749
Spo2	Group A (AirtraQ	25	100	0	
	Group V Video Laryngoscopy	25	100	0	-

Table 6: 1 min Post intubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	102.07	17.648	
	Group V Video Laryngoscopy	25	116.43	14.115	0.001
Systolic BP	Group A (AirtraQ	25	129.00	18.118	
	Group V Video	25	150.80	18.430	

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	Laryngoscopy				0.001
Diastolic BP	Group A (AirtraQ	25	88.67	11.842	
	Group V Video Laryngoscopy	25	100.50	13.354	0.001
MAP	Group A (AirtraQ	25	102.03	13.520	
	Group V Video Laryngoscopy	25	117.30	14.707	<0.001
Spo2	Group A (AirtraQ	25	99.90	.548	
	Group V Video Laryngoscopy	25	99.80	.761	0.001

Table 7: 3 min Post intubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	92.30	14.003	0.004
	Group V Video Laryngoscopy	25	103.40	14.483	
Systolic BP	Group A (AirtraQ	25	120.43	16.913	0.006
	Group V Video Laryngoscopy	25	133.57	18.578	
Diastolic BP	Group A (AirtraQ	25	80.83	11.546	0.018
	Group V Video Laryngoscopy	25	88.43	12.506	
MAP	Group A (AirtraQ	25	94.07	12.881	0.008
	Group V Video Laryngoscopy	25	103.60	14.036	
Spo2	Group A (AirtraQ	25	100	.000	
	Group V Video Laryngoscopy	25	99.97	.183	0.312

Table 8: 5 min Post intubation

Parameters	Group	N	Mean	SD	P Value
Heart rate	Group A (AirtraQ	25	84.80	10.506	
	Group V Video Laryngoscopy	25	90.30	13.899	0.089
Systolic BP	Group A (AirtraQ	25	112.73	12.188	
	Group V Video Laryngoscopy	25	120.70	15.825	0.033
Diastolic BP	Group A (AirtraQ	25	75.07	10.123	0.435
	Group V Video Laryngoscopy	25	77.20	10.867	
MAP	Group A (AirtraQ	25	87.53	10.644	
	Group V Video Laryngoscopy	25	91.70	12.349	0.167
Spo2	Group A (AirtraQ	25	100	0	
	Group V Video Laryngoscopy	25	100	0	-

Table 9: Airway Trauma

Group	Trauma		P value
	Yes	No	
Group A (AirtraQ)	1 (6.67)	24(93.33%)	0.64
Group V Video Laryngoscopy	2 (10%)	23 (90%)	

Table 10: Operator grading

Operator grading	Group		P Value
	Group A (AirtraQ)	Group V Video Laryngoscopy	
1	23 (93.33%)	16 (66.67%)	0.033
2	1 (3.33%)	6 (23.33%)	
3	1 (3.33%)	3(10%)	
4	0(0%)	0(0%)	
5	0(0%)	0(0%)	

DISCUSSION

Expert airway management is an essential skill of an Anaesthesiologist.

Difficulties with tracheal intubation are mostly caused by difficult direct laryngoscopy with impaired view to the vocal cords. Unfortunately, despite all the information

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currently available, no single factor reliably predicts these difficulties.[6]

Consequently, many difficult intubations will not be recognized until after induction of anaesthesia. Unanticipated difficult intubation can lead to critical situations, especially in those patients who are at risk for gastric regurgitation, who are difficult to ventilate by mask or who have limited cardiopulmonary reserves.

When a person is in supine position and head in neutral position, the laryngeal axis is almost horizontal. The pharyngeal axis is approximately 30-450 from the horizontal axis and the oral axis almost perpendicular to the laryngeal axis.[7]

Successful direct laryngoscopy for the exposure of the glottis opening requires the alignment of oral, pharyngeal and laryngeal axes. Elevation of head about 10 cm with pads below the occiput aligns the laryngeal and pharyngeal axes.[8]

It was generally easy to insert the Airtraq laryngoscope, to obtain a full view of the glottis, and to intubate the trachea without major complications. In this device, the tracheal tube can be attached to the side of the blade and the tip of the tube is visible on the viewfinder. Once the glottis was positioned in the centre of the viewfinder, it was easy to advance the tube into the trachea.

There was one difficulty though. Inserting the Airtraq too close to the glottis will only allow the initial posterior movement of the tube and result in a failure to intubate. The 'back and up manoeuvre' which involves withdrawing the device away from the glottis and lifting the device up before attempting to intubate helps to overcome this problem.[9]

The mean time to intubate with the Airtraq group was 11.03 seconds and in the Macintosh group it was 17.2 seconds and it was found to be statistically significant when computed with Levene's test for equality of variances.[10]

In the test conducted by Chrisen Maharaj et al in Ireland in live patients it was 20.3 seconds with Macintosh and 13.2 seconds with the Airtraq laryngoscopes.

CONCLUSION

In conclusion, the Airtraq laryngoscope offers a new approach to tracheal intubation of patients with anticipated and unanticipated difficult airway. The Airtraq reduced the difficulty of tracheal intubation and the degree of hemodynamic stimulation compared with the Macintosh laryngoscope. These findings demonstrate the efficacy of the Airtraq in many clinically relevant contexts and adds to the evolving body of knowledge regarding this potentially useful device.

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Original Research Article

To assess the pulmonary impairment in treated pulmonary tuberculosis patients using spirometry

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Abstract

Background: Tuberculosis is one of the leading causes of death due to infectious Disease worldwide, with an estimated 8.9 million new cases and 1.6 million Deaths worldwide.

Aim: To study the type and degree of pulmonary impairment in treated pulmonary Tuberculosis patients using spirometry. To co -relate present symptoms and radiological findings and to assess the degree of impairment. For identification of impairment (obstructive, restrictive or mixed) that contribute to long term disability and decreased quality of life.

Materials and methods: Retrospective observational study was done in Meenakshi Medical College Hospital. A total of 75 treated pulmonary tuberculosis patients were taken for study with clinical data, chest x-ray pattern, smoking and biomass fuel exposure history were recorded. Their pulmonary function was assessed using spirometry.

Results: All patients were symptomatic and most common symptom was breathlessness. Chest radiograph showing 1 or 2 zones involved patients were 40 (53.3%) and more than 3 zones involved were 35 (46.7%).Most of the patients 51 (68%) showed a Restrictive pattern in spirometry, 10 (13.3%) showed an obstructive pattern and 14 (18.7%) showed a mixed pattern. Smoking and Bio-mass fuel exposure did not show a significant co-relation with spirometry pattern but initial sputum positive patients and defaulter patients showed a significant co-relation with spirometry pattern.

Conclusion: The most common pulmonary impairment pattern in treated pulmonary tuberculosis patients was Restrictive pattern. Hence pulmonary tuberculosis need follow up even after treatment for early detection and treatment for their pulmonary disability.

Key words

Tuberculosis patients, spirometry, Smoking, Chest radiograph, Breathlessness.

Introduction

Tuberculosis is one of the leading causes of death due to infectious Disease worldwide, with an estimated 8.9 million new cases and 1.6 million Deaths worldwide. It is unknown how many survivors of tuberculosis are living today; however, when the incidence of tuberculosis and the success of therapy are considered, the numbers of living tuberculosis survivors are substantial and increasing [1].

The presence of extensive residual lung lesions may be a predictor of permanent disability following tissue destruction, cor-pulmonale and susceptibility to opportunistic infections, leading to reduced quality of life. Histo -pathological findings resulting from tuberculosis include the formation of caseating granuloma, tissue liquefaction, and cavity formation [2]. When these occur in the lung, many survivors experience permanent anatomic changes. These result in pulmonary sequelae that are characterized by bronchial and parenchymal structural changes, including broncho-vascular distortion, bronchial stenosis bronchiectasis, emphysematous changes, residual cavities and fibrosis.

Additional evaluation for patients after tuberculosis has been cured is currently recommended only for those patients who have suggestions of disease recurrence [3].Studies of pulmonary function in individuals with pulmonary tuberculosis demonstrated variable patterns and severity of impairment. Pulmonary function studies can show restrictive, obstructive, or mixed patterns and range from normal to severe impairment. These findings are currently incompletely characterized. These patients do not completely represent the populations affected by tuberculosis. Accurate estimates of the frequency and extent of pulmonary impairment from tuberculosis are important to patients and clinicians. Pulmonary function tests (PFTs) objectively quantify lung function and impairment, and are used to evaluate persons with chronic lung disease [4]. To determine the pattern and extent of pulmonary function abnormalities that is attributable totuberculosis.

Materials and methods

Study setting

Study was conducted in Department of Respiratory Medicine, Meenakshi Medical College Hospital and Research Institute. Institutional ethics committee approval obtained.

Study design: Retrospective study design was used.

Period of study: September 2012 to September 2014.

Sample size: Seventy five patients were evaluated in the study.

Inclusion criteria: All treated pulmonary tuberculosis patients who has completed treatment according to RNTCP guidelines, now smear negative and declared cured.

Exclusion criteria: Patients who had any respiratory disorders like Bronchiectasis, Asthma, Interstitial lung diseases and prior history of ATT treatment.

Details of the study

This was a retrospective observational study with a sample consisting of 75 patients from Chest and TB Department, Meenakshi Medical College, Kanchipuram, Tamilnadu. The period of data collection was from November2012 to November 2013. The study included adult patients diagnosed with pulmonary tuberculosis treated over a period of 6months or more and declared cured according to RNTCP guidelines. Patients with tuberculosis in other organs, any respiratory disorders prior to ATT treatment were excluded from the study. Patients were selected by analyzing their previous records, presenting symptoms initial sputum status, Treatment duration, post treatment chest radiographs were recorded. The radiological

changes were ranked according to the number of zones involved. Information was collected through a standardized form with demographic data age, gender, ethnicity clinical data, medications and smoking habits. Next, we performed a spirometry with assessment of lung function using the variables: forced expiratory volume in 1s (FEV1), forced vital capacity (FVC), FEV1/FVC ratio. FVC, FEV1, FEV1/FVC ratio was compared with gender, ethnicity, height and weight. Airway obstruction was defined as anFEV1/FVC ratio of <70% and an FVC of >80% predicted, restrictive defects as an FEV1/FVC ratio of >70% and an FVC of <80% predicted, and mixed defects were FVC of <80% predicted and an FEV1/FVC ratio of <70%. Interpretive algorithms were used in determining restrictive or obstructive patterns [5].The device used was the Spirometer Koko Legent ML3500 (Microlab, USA). In the test the patient was seated with elbows bent and his mouth firmly attached to the mouthpiece. The nose clip was also used to prevent air leakage. The patient was asked to perform a forced expiration starting from total lung capacity (TLC). FVC maneuvers were performed three times; the best results were considered. Tests were performed according to Guidelines for Pulmonary Function Tests. The results were expressed as mean and standard deviation for data with normal distribution.

Statistical analysis

The analysis of categorical variables the chi-square test was used and for the analysis of continuous variables the t-test. All tests were performed using the statistical program Statistical Package for Social Sciences (SPSS) version 13.0 for Windows. We considered the significance level of 5% ($p<0.05$).

Results

Seventy five patients were taken for study. Their age, gender, present symptoms like cough, sputum, and breathlessness were noted. Smoking habit and bio-mass fuel exposure history was noted. Initial sputum status before treatment and duration of treatment, present chest radiograph and Spiro metric values were recorded. It was observed that most of the patients were among 40 to 70 years of age group who presented with respiratory symptoms and showed decrease in lung function. Among 75 patients, 19 (25.4%) were from 50 -59 years of age group and 19 (25.4%) were from 60-69 years of age group. 17 (22.7%) patients were within 40-49 years age group, 8 (10.6%) were within 30-39 years age group. The rest 4 (5.3%) were less than 30 years of age and 8 (10.6%) more than 70 years of age as per **Table - 1**.

Table - 1: Age distribution and spirometry pattern of patients studied.

Age group (years)	Pattern							
	Restrictive		Obstructive		Mixed		Total	
	No	%	No	%	No	%	No	%
<30	3	75.0	1	25.0	0	0.0	4	100.0
30-39	7	87.5	0	0.0	1	12.5	8	100.0
40-49	11	64.7	1	5.9	5	29.4	17	100.0
50-59	14	73.7	3	15.8	2	0.5	19	100.0
60-69	12	63.2	2	10.5	5	26.3	19	100.0
>70	4	50.0	3	37.5	1	12.5	8	100.0
Total	51	68.0	10	13.3	14	18.7	75	100.0

There was a male predominance in our study. It was observed that 51 (68%) of patients were males and 24 (32%) were females. The male: female ratio was 2.1:1 observed in this study. Most of the females who respiratory symptoms and showed pulmonary impairment were within

40 -60 years of age group and males were within 60-70 years of age group. Most of the patients were symptomatic, the most common presenting was breathlessness in63 patients (84%) followed by cough and sputum in 61 patients (81.3%). Out of 75 patients taken for study, 57 (76%) were sputum positive initially before tuberculosis treatment. Out of the 57 patients, 44 (77.2%) showed a Restrictive pattern, 3 (5.3%) patients showed a obstructive pattern and 10 (17.5%) patients showed a mixed pattern as per **Figure - 1**.

22 out of 75 patients were defaulters who had taken treatment for more than six months and have completed treatment under category 2 according to RNTCP guidelines. Out of 22 patients, 21 (95.5%) showed a Restrictive pattern. 1 (4.5%) patient showed a obstructive pattern as per **Table - 2**.

Figure – 1: Showing co-relation between Initial sputum status and spirometry pattern.

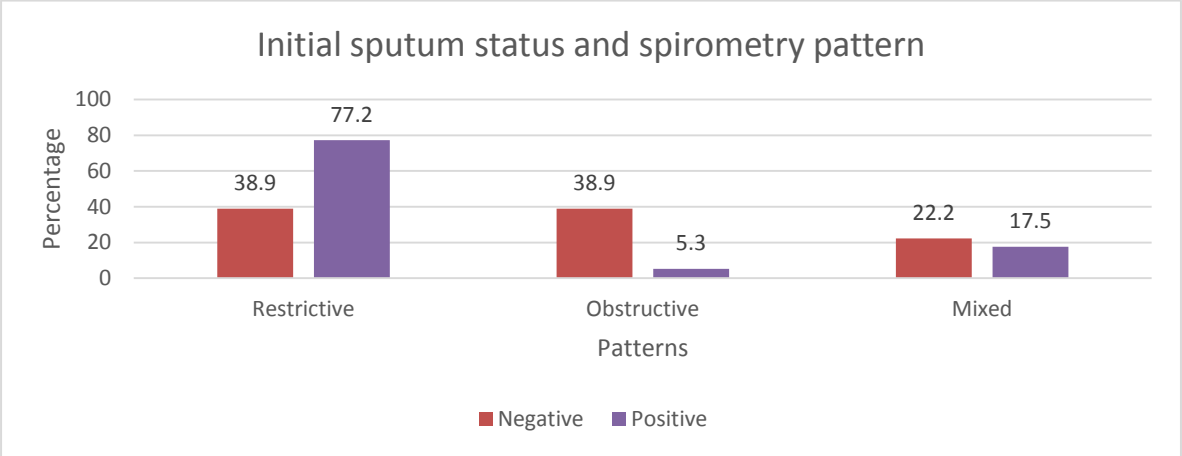

Table – 2: Comparing mean values between pattern.

Variables	Pattern	N	Mean	Std. Dev	F-Value	P-Value
FVC	Restrictive	51	53.71	14.045	23.849	<0.001
	Obstructive	10	84.1	9.171		
	Mixed	14	51.5	12.177		
	Total	75	57.35	16.789		
FEV1	Restrictive	51	51.9	14.731	5.528	0.006
	Obstructive	10	61	6.633		
	Mixed	14	42.36	13.276		
	Total	75	51.33	14.527		
FEV1/FVC	Restrictive	51	101.41	15.925	59.15	<0.001
	Obstructive	10	66	5.416		
	Mixed	14	63.93	5.484		
	Total	75	89.69	21.824		

Discussion

In our study, It showed a male predominance than females with a ratio of 2.1:1 and most patients were between fifty to seventy years age group and all the patients were symptomatic including cough, sputum and breathlessness due to pulmonary tuberculosis sequelae and showed decrease in pulmonary function We found no

differences between the groups in relation to the prevalence of smoking. Smoking and biomass fuel exposure are important factors in the decline in lung function, but apparently was not determinant in the differences found. However we found a strong co-relation between initial sputum status and pulmonary function impairment, also treatment defaulters who had taken treatment for more than six months also showed more decrease in lung function. In a previous study done by Jotam G. Pasipanody, et al. [6] done in health science Centre, University of north Texas states that most of the patients with treated pulmonary tuberculosis showed a restrictive pattern on spirometry, Pulmonary impairment was more common in cigarette smokers; however, after adjusting for demographic and other risk factors, the difference did not reach statistical significance. They concluded that pulmonary tuberculosis is associated with frequent pulmonary damage despite microbiological cure. In another study conducted by S.K. Verma, S. Kumar, Kiran, et al. [7] done at Chhatrapati Sahuji Maharaj Medical University, Lucknow, Uttar Pradesh, India. The authors found that out of 73 patients studied only 15 patients had obstructive airway disease by spirometry criteria, 21 patients had mixed obstructive with restrictive disorder. Restrictive pathology was seen in 37 patients. However, they concluded that the exact abnormality that results from tuberculosis infection has to be considered in detail with future studies and a better understanding of the pathophysiology of airflow limitation may point the way to therapeutic strategies for control of symptoms in these patients. Respiratory impairment arises from several anatomical features for example; damage to bronchi resulting from extensive fibrosis or endo bronchial stricture can cause airflow obstruction [8]. Greater lung volume loss appears to stem from parenchymal injury and subsequent fibrotic process [9]. Our study demonstrated the existence of significant functional limitations in patients with sequelae of pulmonary tuberculos is. These limitations are more obvious and serious when failure occurs initial treatment and second-line drugs are needed. Smoking and biomass fuel exposure history was not a significant predictor of pulmonary function deterioration but smear-positive disease extensive pulmonary involvement with poor radiological improvement and prolonged duration of treatment showed a significant co-relation with pulmonary function deterioration. These findings highlight the need for the strategies to prevent treatment non-compliance and subsequent rescue regimens.

Conclusion

In conclusion, the most common pulmonary impairment pattern in treated pulmonary tuberculosis patients was Restrictive pattern followed by mixed pattern and obstruction. After completion of pulmonary Tuberculosis treatment, the risk factors of pulmonary function deterioration include smear positive disease, extensive disease before treatment, prolonged treatment duration and less radiographic improvement after treatment. Hence pulmonary tuberculosis need follow up even after treatment for early detection and treatment for their pulmonary disability.

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Section: Respiratory Medicine

Original Article

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The Role of C Reactive Protein in Fever without Focus among Children Aged Between 1 – 3 Years

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Abstract

Background: The incidence of invasive pneumococcal disease in children has come down because of polysaccharide vaccine. The increased incidence of bacteremia among young children may be due to part of maturational immune deficiency in the production of opsonic Ig Ganti bodies to the polysaccharide antigens present on en capsulated bacteria. Fever is a common present in gsymp to min paediatric out patient practice and in children less 3 years of age. Approximately 20%to30% of the children may have no identifiable cause off ever after history and physical examination. **Subjects and Methods:** Children in the age group of 1-3 years presenting to the outpatient department were screened for temperature >39°C and who satisfied inclusion criteria were included in the study. Temperatures were recorded either in the axillary or rectal areas. Informed consent was obtained from parents or guardian & clearance of Institutional Ethical Committee Review Board. Blood samples were taken for total WBC count, ANC, ESR and CRP and at the same time samples for blood culture. Blood cultured in various media incubated overnight and colony morphology was read. **Results:** CRP >6mg/d1 was observed in 25 cases of children who had SBI giving rise to sensitivity of 75.8%, 46 children who did not have SBI have CRP <6mg/d1 giving a specificity of 39.3%. Among 96 cases with CRP more than 6mg/d1 only 25 (26%) cases had SBI giving PPV of 26%. Among 54 cases of CRP <6mg/d1 46(85%) cases did not have SBI giving a NPV of 85.2%. **Conclusion:** CRP determines more selective strategy for children with SBI for additional diagnostic studies and appropriate antibiotic therapy.

Keywords: C reactive Protein, Fever, Children.

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Introduction

Fever without localizing sign sorsymptoms, usually of acute on set and present for less than one week. It is more common in children less than 36 months of age. Children with fever in whom cause could not be identified after 3 week of evaluation asan out patient or after 1 week of evaluation in hospital.[1]

Fever is a common manifestation of infectious diseases but is not predictive of severity. Many common viral and bacterial infections are-usually benign in normal hosts and respond well to appropriate anti microbial or supportive therapy. Other infections such assepsis, meningitis, pneumonia, osteoarticular infections, pyelonephritis, ifuntreated, may have significant morbidity ormortality. They are considered to be serious bacterial infections.

Most febrile episodes in a normal host can be diagnosed by a careful history and physical examination and require few if any laboratory tests. Febrile patients at increased risk for serious bacterial infections are neonates, infants less than three months children between 3 months to 36 months, children with hyperpyrexia 3 and immune-compromised patients. Approximately 30% off ebrile children between 1 yr to 3 years have no localizing sign sofinfection.[2]

The incidence of invasive pneumococcal disease in children has come down because of polysaccharide vaccine. The increased incidence of bacteremia among young children may be dueto part of maturational immune deficiency in the production of opsonic Ig Ganti bodies to the poly saccharide antigens present on encapsulated bacteria.[3]

Fever is a common presenting symptom min paediatric out patient practice and in children less 3 years of age. Approximately 20% to 30% of the children may have no identifiable cause off ever after history and physical examination.

Although most of these children will have a benign viral illness. Children less than 3 years of age area increased risk of clinically undetectableerious bacterial infection (SBI). The incidence of serious bacterial infection is roughly about 10-15%ofpreviously healthy children presenting with rectal temperature more than39°C. Approximately2-

3%of these children have Occult Bacteremia(OB) 2-8% have UTI depending on the age and gender. Other causes of serious bacterial infection include occult bacterial pneumoniain 3% of children less than 3 yrs, 5% will have other infections such as bone and joint infection, meningitis, soft tissue infection or bacterial enteritis. Although anti biotictreatment is necessary for children with serious bacterial infection it is also important to limit therapy in those children at greatest risk.[4]

Common etiological agents in less than 3 yrs: Group B Streptococci and List eriamonocytogens, Salmonella, E.coli, Neisseria etc. Fever is a controlled increase in body temperature over the normal values for an individual. Body temperature is regulated bythermo-sensitive neurons located in the pre opticoranteri or hypothalamus that respond to changes in blood temperature as well as to directneural connections with cold and warmreceptors located in sk in and muscle.[5]

Thermoregulatory responses include ere directing blood to or from cutaneous vascular beds, increased or decreased sweating, extra cellular fluid volume regulation(via Argininevaso press in) and behavioral responses, such as seeking awarmeror cooler environmental temperature. Normal body temperature also varies in a regular pattern each day. This circadian temperature rhythm, or diurnal variation, results in lowerbody temperature in early morning and temperatures approximately higher in the late afternoon and early evening.[6]

Subjects and Methods

Study Design: Descriptive Study Evaluation of a Diagnostic Test

Study Population: lyr to 3 yrs

Sample Size: 150 .

Inclusion Criteria:

- Children aged 1 yr to 3 yrs
- Fever more than 12 hours up to 7 days 1
- Without obvious focus of infection on clinical examination.
- Exclusion Criteria
- Children who have received prior antibiotics and vaccines.
- Children with underlying immunological disease.

Manoeuvre

Children in the age group of 1-3 years presenting to the outpatient department were screened for temperature >39°C and who satisfied inclusion criteria were included in the study. Temperatures were recorded either in the axillary or rectal areas. Informed consent was obtained from parents or guardian & clearance of Institutional Ethical Committee Review Board. Blood samples were taken for total WBC count, ANC, ESR and CRP and at the same time samples for blood culture. Blood cultured in various media incubated overnight and colony morphology was read. Urine analysis, urine culture, colony count, chest radiograph were done. CSF analysis was done for selected cases. Patients were reviewed thereafter. CRP was done by slide agglutination method. Qualitative CRP followed by Semiquantitative

CRP was performed. CRP-Agglutination in highest serum dilution corresponds to amount of CRP in mg/dl. The findings were recorded in a prescribed data entry form (Annexure). CRP Estimation: It is based on the principle of agglutination. One drop of test specimen is placed on a slide after centrifugation using a disposable pipette to which a drop of CRP reagent is added. Both test specimen and the reagent to be uniformly mixed over the entire circle, using a mixing stick.

Results

CRP >6mg/d1 was observed in 25 cases of children who had SBI giving rise to sensitivity of 75.8%, 46 children who did not have SBI have CRP <6mg/d1 giving a specificity of 39.3%. Among 96 cases with CRP more than 6mg/d1 only 25 (26%) cases had SBI giving PPV of 26%. Among 54 cases of CRP <6mg/d1 46(85%) cases did not have SBI giving a NPV of 85.2%.

Table 1: Comparison of characteristics of CRP positive and negative

Duration of fever	CRP			P-value
	Total	Positive (%)	Negative (%)	
< 24 Hours	21	9	12	0.0614
24 - 72 Hours	115	76	39	
> 72 Hours	14	11	3	
Total	150	96	54	

When fever was more 24 hours duration CRP was positive in 87(90.67%) cases when compared to 42 cases (77.7%) across CRP negative. However duration of fever is insignificant. p value is 0.0614

Table 1(ii): Comparison of characteristics of CRP positive and negative

Age Group	CRP			P value
	Total	Positive (%)	Negative (%)	
1-2 years	61	37	24	0.4799
2-3 years	89	59	30	
Total	150	96	54	

Among age more than 24 months 59 (61.5%) cases were CRP positive, when compared to 30 (55.5%) across CRP negative. p value is insignificant. (0.4799).

ROC for variables associated with SBI. Area under the curve for CRP 0.575 (95% CI: 0.468, 0.682); for ESR 0.555 (95% CI: 0.457, 0.660); for ANC 0.689 (95% CI: 0.581,0.796); and for WBC 0.911 (95% CI: 0.859, 0.962).

Table 2: Predictors of SBI (based on ROC curve)

	CUTOFF	Sensitive	Specificity	P red Value Positive	P red value Negative	Likelihood Ratio
WBC	13.4	81.8 (68.7, 95)	82.1 (75.1, 89)	56.3 (42.2, 70.3)	94.1 (89.6, 987)	45.6 (30, 69.3)
ANC	19.3	63.8 (50.1, 77.6)	97.1 (93.8, 100.3)	90.9 (81.1, 100.7)	85.5 (79.1, 91.9)	219.1 (70.4, 682.2)
ECR	17.1	54.5 (37.6,	55.6 (46.6, 64.6)	25.7 15.5,	81.3 (72.7,	12.3 (8.5, 17.8)

		71.5)		36)	89.8)	
CRP	6.9	75.8 (61.1, 90.4)	39.3 (30.5, 48.2)	26 17.3, 34.8)	85.2 (75.7, 94 7)	12.5 (9.8, 15.9)

Based on the ROC curve, cutoff point is fixed for each variable. For WBC the cutoff is 13.4 thousands per cu.mm. At this cutoff point sensitivity increased to (81.8%). The cutoff point for ANC is 19.3 thousands per cu.mm. The sensitivity goes up by two and a half fold. Cutoff point for ESR is 17.1 mm. The cutoffs for each variable, along with p value, Sensitivity, Specificity, PPV, NPV, Likelihood ratio.

Discussion

150 cases were included in the study. Out of 150 cases 96 cases were CRP positive, among them 25cases of SBI were identified. 9 cases were occult bacteremia (both CRP and blood culture positive). 4 cases of S.Pneumoniae, 4 cases of H.influenzae and 1 case of Klebsiella were isolated. 6 cases of urinary tract infection were identified (both CRP and urine culture positive) 1 case of klebsiella, 4 cases of E.coli, 1 case of H.influenzae were found in this study. 11 cases were diagnosed as pneumonia (both CRP and chest x ray positive). CRP has been evaluated as predictors of bacterial illness in febrile children. CRP was found to be having a sensitivity of 75.8%, specificity of 39.3% PPV of 26%, NPV of 85% and likelihood ratio of 12.5% in the present study.

The sensitivity of the present study correlates with Issacman and Pullium study but specificity is slightly higher than the Issacman study. Inpullium study only 77 children were included, the sample size was small. In Issacman study sample size is higher than the present study. Probably the sample size would have altered the sensitivity. The likelihood ratio is also increased when compared to other studies. CRP was found to be a useful screening test for occult bacterial infection.[7]

Receiver operating characteristic curves (ROC) for CRP, ESR.ANC, WBC were constructed. Based on the curve, cutoff values for each variable was determined that simultaneously maximizes the sensitivity and specificity. For each variable, patients were dichotomized into 2 groups based on the cutoff value and c2 analysis was done to assess the association between the dichotomized variables and the presence of SBI. For WBC cutoff fixed at 13.4 cells per cu.mm, which increases sensitivity from 60.6 % to 81.8%. ANC has a cutoff point fixed at 19.3 cells/cu.mm which increases sensitivity from 33.3% to 63.8%. ESR has a cutoff point.[8]

Multilevel likelihood ratios and CRP concentration were calculated. A CRP concentration of < 5mg/d1 had a likelihood ratio of SBI of 0.25 corresponding to a NPV of 94%. A CRP concentration of >15 mg/di had a likelihood ratio of SBI 14.6, corresponding to PPV of 80%. Likelihood Ratios are a powerful clinical tool because a clinician may estimate the pretest probability of the presence of disease in a particular patients.

This study demonstrates CRP is both more sensitive and specific Indistinguishing children with occult serious bacterial infection from those without bacterial illness. Based on the curve CRP concentration of more than 4.5mg% that maximizes the sensitivity. A CRP concentration more than 6mg/dl is helpful rather than total WBC of more than or equal to 15,000.[9]

CRP concentration is dependent on the duration of fever suggesting that CRP is more reliable as an indicator of bacterial infectionif fever has been present for more than 24hours[10].However significant number of cases were also negative for CRP in this study.

predicting children with occult serious bacterial infection because when a febrile young child with no identifiable source of fever presents the clinician is faced with the dilemma for workup and antibiotic therapy.

The most useful test would predict children at risk of bacterial infection and therefore need workup and possible antibiotic therapy. Urinary tract infection remains common occult bacterial infection confirmed by culture and colony count. The results of urine culture are delayed by 24 to 48 hours. Similarly, the diagnosis of occult bacteremia by blood culture is delayed by a mean of 15 to 16 hours and up to 48 hours. Blood culture are positive in 3 to 5% of febrile young children with pneumonia. Children who received a chest radiograph, true prevalence remains unclear. More over it is very difficult to differentiate viral from bacterial pneumonias based on the chest radiograph alone.

CRP concentration measured from blood is a readily available inexpensive test. With recent availability of rapid CRP tests we can readily use in emergency settings. CRP may become valuable diagnostic tool in the initial evaluation of febrile young children for occult serious bacterial infection and determine which children need additional diagnostic tests and antibiotic therapy.

Conclusion

- Semiquantitative CRP is useful in predicting occult serious bacterial infection in children between 1 — 3 yrs.
- CRP is considered to be better predictive test than total white blood cell count and absolute neutrophil count.
- CRP and ANC or CRP, ANC &WBC combination is more useful than isolated CRP concentration.

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