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Original Article

Clinical Characteristics and Short-Term Outcomes of Pediatric Mediastinal Mass-Prospective Experience from a Tertiary Care Center in Karachi, Pakistan

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ABSTRACT

Objective: To evaluate the clinical and demographic characteristics, diagnostic approaches and management outcomes of pediatric patients presenting with mediastinal mass.

Study Design: Prospective longitudinal study.

Place and Duration of Study: Department of Pediatric Oncology, The Indus Hospital and Health Network from Dec 2021 to Jan 2023.

Methodology: One hundred pediatric patients under 17 years of age, all with radiologically confirmed mediastinal widening (defined as a mediastinum-to-chest ratio greater than 0.25) were enrolled. The clinical presentations, radiologic and laboratory diagnostic findings, sedation practices, steroids or chemotherapy use and short-term outcomes were recorded. Data were analyzed using SPSS version 21, with $p<0.05$ considered statistically significant.

Results: The median age of the patients was 9.5 years (IQR 6), with 76% being male. The most prevalent symptoms were fever (78%), lymphadenopathy (52%), and cough and dyspnea (27% each). Among the 97 patients with confirmed diagnoses, 94.8% had malignant tumors, primarily T-lymphoblastic leukemia/lymphoma (40.5%) and Hodgkin lymphoma (26.8%). A total of the 80% of the patients were discharged, 14% died, and 4% left against medical advice. No significant association was found between short-term outcomes and factors such as age, gender, sedation type or the use of steroids or chemotherapy ($p>0.05$).

Conclusion: Age, gender, type of sedation and steroid or chemotherapy use did not influence short-term management outcomes. The study helps categorize risk and formulate personalized treatment plans for patients with mediastinal masses Additional research is needed to confirm these findings, explore emerging diagnostic and therapeutic techniques, and ultimately improve patient outcomes.

Keywords: Leukemia, Lymphoma, Mediastinal mass, Outcome, Pediatric Oncology.

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INTRODUCTION

Mediastinal masses are rare, accounting for approximately 3% of all thoracic malignancies.[1] Their occurrence, however rare might pose a life-threatening emergency due to the potential involvement and impairment of vital structures. A study from China documented 409 cases of mediastinal lesions during a span of four years with 137 cases diagnosed in pediatric patients.[2] Mediastinal masses may be asymptomatic; nevertheless in 60% of cases, children present with respiratory symptoms and encounter the risk of sudden acute airway obstruction.[3] This lethal consequence is common particularly during the induction of anesthesia.[4,5] Consequently, the diagnosis and management of mediastinal masses poses significant challenges.

Mediastinal masses include both benign and malignant tumors, with the latter being more prevalent accounting for approximately 75-90% of cases.[1] Most common causes of mediastinal masses are lymphoma, neurogenic tumors, cystic lesions, and germ cell tumors.[6] Out of these lymphoma is cited as the most common diagnosis.[7] CT scan is the preferred modality for detecting and characterizing various mediastinal masses; however, MRI may be superior in certain cases, particularly in distinguishing solid from cystic masses.[8,9] Although these new technological advances are available, histological diagnosis is warranted for confirmation. Consequently, identifying risk factors for anesthesia prior to biopsy is essential.6 A study from Istanbul reviewed 120 primary pediatric mediastinal mass cases and reported that 71.6% of cases were malignant and common symptoms reported were cough (38.3%), dyspnea (21.6%), fatigue

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and fever (20.8%).[3] While a study in Karachi reported 86% malignant cases and observed symptoms of fever (81%), cough (47%) and dyspnea (37%).[10]

This study aimed to determine the clinical and demographic characteristics as well as the short-term management outcome of pediatric patients presenting with mediastinal mass at Indus Hospital and Health Network (IHHN). It also aims to compare the clinical outcomes among pediatric patients based on the type of sedation received, history of steroids administration and use of invasive procedures.

METHODOLOGY

A prospective longitudinal study was conducted at the Pediatric Hematology Oncology (PHO) and Pediatric Critical Care Departments of Indus Hospital and Health Network (IHHN) from December 2021 to January 2023.

A sample size of 91 achieves 90.283% power to detect a difference (P1-P0) of 0.1650 using a two-sided exact test with a significance level (alpha) of 0.050. These results assume that the population proportion among pediatric patients with a mediastinal widening on chest under the null hypothesis (P0) is 0.3350 2. The sample size extended up to 100 keeping 10% expected number of dropouts. A total of 100 pediatric patients with mediastinal mass, who met eligibility criteria, was selected through non-probability consecutive sampling for the study.

Inclusion Criteria: Pediatric patients of either sex, below 17 years of age with a mediastinal widening on chest radiograph or CT scan chest and having a mediastinum to chest ratio of more than 0.25 were included in the study.

Exclusion Criteria: Patients were excluded if mediastinal mass was diagnosed outside IHHN, if they were partially or completely pretreated outside IHHN or if they presented as a relapse with mediastinal mass.

After taking ethical approval (IRD_IRB_2020_08_005 dated 15-Oct-2020), data was collected using a structured questionnaire. Informed consent was taken from the parents of each study participant at the time of enrollment in the study. All patients were diagnosed and managed according to a systemic and least invasive algorithm for diagnosis of mediastinal mass being used at our hospital, which has been described below in Figure-1.

All recruited patients were classified according to disease severity of the mediastinal mass. It was classified as mild if the mass was found as an incidental finding on chest X-ray or CT scan and patient was asymptomatic, while it was classified as moderate if patient had symptoms of airway compression or displacement but not life-threatening airway or cardiovascular involvement. The disease was labelled as severe when life-threatening symptoms like orthopnea, dyspnea, pleurisy, stridor and chest wall pain were present along with radiological evidence of critical airway. Also, cardiovascular involvement superior vena cava syndrome, cardiac tamponade, cyanosis and syncope was included as severe.

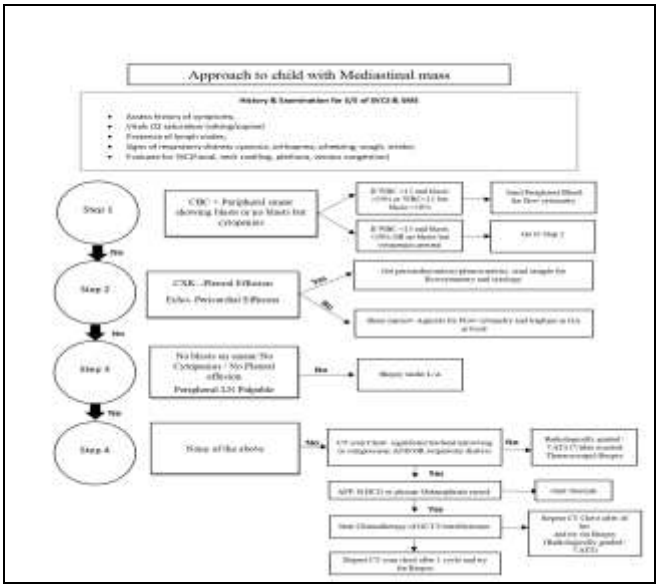

Figure-1: Algorithm for Approach to Mediastinal Mass in Children

Detailed clinical history and physical examination were recorded with emphasis on the extent of airway compromise. Diagnostic information was collected from all kinds of radiologic and histopathological investigations. These included chest radiographs, CT scan chest, ascitic, pericardial or pleural fluid analysis, flowcytometry or tissue/bone marrow biopsy as indicated. Moreover, details about whether patient received sedation and type of sedation given for the diagnostic procedure along with information regarding pretreatment with steroids or chemotherapy prior to diagnostic procedure were noted. Short-term outcomes, defined as patient follow-up for one month from the date of registration were documented as discharged, leaving against medical advice, or death.

Data was entered and analyzed by Statistical Package for the Social Sciences (SPSS) version 21.0. Four quantitative variables namely, Age(years), Hemoglobin (gm/dl), Leukocyte Count and Platelet Count were tested for their normality through Shapiro-Wilk W test and only Hemoglobin (gm/dl) found normally distributed, the other three failed the normality test.

Descriptive statistics were calculated for demographic and clinical characteristics including diagnosis. The qualitative variables were presented by their frequencies along with percentage and 95% confidence intervals. The quantitative variables first tested for their normality then presented by their Mean±SD or median (IQR) statistics. The one-way analysis of variance employed for normally distributed quantitative variable, Hemoglobin (gm/dl), to compare more than two means groups to determine if at least one group mean is different from the others, The F-ratio is used to determine statistical significance. For non-normally distributed quantities variables Age (years), Leukocyte Count and Platelet Count, Kruskal-Wallis One-Way ANOVA on Ranks were employed with the assumption that all medians are equal. For categorical variables, Pearson's chi-square statistic was used to test independence between diagnosis and outcomes based on clinical and demographic characteristics. p-value<0.05 was considered statistically significant.

RESULTS

In total, 100 pediatric patients of mediastinal mass were included in this study. The age of patients

Table-I: Clinical Features of Pediatric Patients Presenting with Mediastinal Masses (n=100)

Variable	n (%)
Presenting Complaint	
Cough	27(27%)
`Dyspnea	27(27%)
Fever	78(78%)
Night sweats	5(5%)
Pallor	22(22%)
Bone pain	16(16%)
Lymphadenopathy	52(52%)
Orthopnea	19(19%)
Facial puffiness	3(3%)
Engorged veins	2(2%)
Respiratory Distress	6(6%)
Tumor Types*(n=97)	
Malignant	92(94.8%)
Non-malignant	5(5.2%)
Diagnosis*(n=97)	
Leukemia	52(53.6%)
T-ALL	39(40.2%)
B-ALL	4(4.1%)
T-Myeloid Leukemia	3(3.1%)
AML	6(6.2%)
Lymphoma	38(39.2%)
HD	26(26.8%)
BHNL	2(2.1%)
THNL	9(9.3%)
ALCL	1(1%)
Sarcoma (Ewing's Sarcoma)	2(2.1%)
TB	5(5.1%)
Complications at presentation(n=100)	
Airway compression	60(60%)
Vessel engorgement	7(7%)
Pleural Effusion	17(17%)
Pericardial Effusion	3(3%)
Tumor Lysis Syndrome	31(31%)
Cardiac Tamponade	0(0)
Others	3(3%)
Complications during hospital stay(n=100)	
Respiratory Failure	6(6%)
Tumor Lysis Syndrome	54(54%)
Pleural Effusion	5(5%)
Pericardial Effusion	4(4%)
Infection	11(11%)
Others	7(7%)
Short-term Outcome(s)	
Discharged	80(80%)
Hospital Death	14(14%)
Prolonged Admission	2(2%)
Left Against Medical Advice	4(4%)

ALCL: Anaplastic Large Cell Lymphoma, B-NHL: B-Cell Non-Hodgkin's Lymphoma, B-ALL: B Lymphoblastic Leukemia, TB: Tuberculosis, AML: Acute Myeloid Leukemia, T-NHL: T-Cell Non-Hodgkin Lymphoma, HD: Hodgkin's Disease/ Hodgkin's Lymphoma, T-ALL: T-Cell Acute Lymphoblastic Leukemia,

**Diagnosis was not established for three patients due to early death.*

was 9.5(6.0) year, median (IQR). Of all the patients presenting with mediastinal tumors, 76(76%) were male and 24(24%) were female (Table-II). Fever was identified as the most frequently reported symptom with a frequency of 78(78%) (Table-I). The definitive diagnosis was confirmed only for 97 out of 100 patients included in this study. Of all the mediastinal masses, 92(94.8%) were malignant in nature while only 05(5.2%) were non-malignant in nature. Among 97 tumor types, T-Cell Acute Lymphoblastic Leukemia was the most common malignant diagnosis 39(40.2%) among patients suffering from Leukemia while

Table-II: Demographic and Clinical Characteristics of Pediatric Patients with Mediastinal Mass with Respect to Severity of Disease. (n=100)

Variable	Statistic	Mild Disease n (%) n= 33	Moderate Disease n (%) n=52	Severe Disease n (%) n=15	Total n (%)	*p*-value
Sex						
Male	n (%)	21(63.8)	41(78.8)	14(93.3)	76	0.065*
Female	n (%)	12(36.4)	11(21.2)	1(6.7)	24	
Age (years)	Median (IQR)	11.0(4.9)	8.0(5.7)	9.0(5.0)	9.5(6.0)	0.29**
<=5 years	n (%)	7(21.2)	13(25.0)	2(13.3)	22	0.034*
5<age<=10 years	n (%)	6(18.2)	24(46.2)	7(46.7)	37	
>10 years	n (%)	20(60.6)	15(28.8)	6(40.0)	4(41.0)	
Site of mass						
Anterior	n (%)	33(100.0)	49(94.3)	14(93.3)	96	0.64*
Posterior	n (%)	0(0.0)	1(1.9)	0(0.0)	1	
Middle	n (%)	0(0.0)	1(1.9)	0(0.0)	1	
Multiple	n (%)	0(0.0)	1(1.9)	1(6.7)	2	
Short Term Outcome						
Discharged	n (%)	26(78.8)	46(88.5)	9(60.0)	81	0.09*
Hospital Death	n (%)	4(12.1)	6(11.5)	4(26.7)	14	
Prolonged admission	n (%)	1(3.0)	0(0.0)	0(0.0)	1	
LAMA!	n (%)	2(6.1)	0(0.0)	2(13.3)	4	

** Pearson chi-square, **Kruskal-Wallis One-Way ANOVA on Ranks, P-value < 0.05 was significant.*
! Left against Medical Advise

Table-III: Association between the Demographic, Clinical Characteristics and Short-term Outcome of Pediatric Patients with the Mediastinal Mass Based on Difference in Primary Diagnosis (n=97)

Variable	Statistic	Primary diagnosis					*p*-value
		Leukemia n (%) 52(100.0)	Lymphoma n (%) 38(100.0)	Sarcoma n (%) 02(100.0)	Non-malignant n (%) 05(100.0)	Total n (%) 97(100.0)	
Age (years)	Median (IQR)	8.5(7.5)	9.5(6.7)	14.0(4)	12.0(3.5)	9.5(6)	0.05*
<=5 years	n (%)	17(32.7)	5(13.2)	0(0.0)	0(0.0)	22(22.7)	0.149**
5<age<=10 years	n (%)	17(32.7)	16(42.1)	0(0.0)	2(40.0)	35(36.1)	
>10 years	n (%)	18(34.6)	17(44.7)	2(100.0)	3(60.0)	40(41.2)	
Sex							
Male	n (%)	42(82.8)	30(78.9)	1(50.0)	0(0.0)	73(75.3)	0.001**
Female	n (%)	10(19.2)	8(21.1)	1(50.0)	5(100.0)	24(24.7)	
Severity of Mediastinal Mass							
Mild	n (%)	19(36.5)	10(26.3)	0(0.0)	3(60.0)	32(33.0)	0.01**
Moderate	n (%)	28(53.9)	22(57.9)	0(0.0)	2(40.0)	52(53.6)	
Severe	n (%)	5(9.6)	6(15.8)	2(100.0)	0(0.0)	13(13.4)	
Lymphadenopathy							
Yes	n (%)	48(92.3)	36(94.7)	0(0.0)	5(100.0)	89(91.8)	0.001**
No.	n (%)	4(7.7)	2(5.3)	2(100.0)	0(0.0)	8(8.2)	
Hemoglobin (gm/dl)	Mean±SD	7.72±2.48	9.16±2.58	9.90±0.85	9.46±1.70	8.42±2.56	0.03***
Leukocyte Count	Median (IQR)	93.4(166.3)	12.25(8.8)	13.2(2.3)	8.0(4.6)	23.5(107.0)	0.001*
Platelet Count	Median (IQR)	23.5(44.0)	503.0(455.3)	618.0(78.0)	296.0(130.0)	115.0(458.0)	0.001*
Site of mass							
Anterior	n (%)	51 (98.1%)	35 (92.1%)	2(100%)	5(100%)	93(95.9%)	0.347
Posterior	n (%)	0	1	0	0	1(1.0%)	
Middle	n (%)	1 (1.9%)	0	0	0	1(1.0%)	
More than one site	n (%)	0	2 (5.3%)	0	0	2(2.1%)	
Short-term Disease Outcome							
Discharged	n (%)	43(82.7)	30(78.9)	02(100.0)	05(100.0)	80(82.5)	0.88
Hospital Death	n (%)	07(13.5)	05(13.2)	0(0.0)	0(0.0)	12(12.4)	
Prolonged admission	n (%)	01(1.9)	0	0(0.0)	0(0.0)	1(1.0)	
LAMA	n (%)	01(1.9)	03(7.9)	0(0.0)	0(0.0)	4(4.1)	

Kruskal-Wallis One-Way ANOVA on Ranks, ** Pearson chi-square, * F-ratio, P-value < 0.05 was significant.*

Hodgkin`s Lymphoma was the most common type of lymphoma among pediatric patients diagnosed with Lymphoma accounting for 26(26.8%) of all cases.

The most frequent presenting complaint was airway compression 60(60%), followed by tumor lysis syndrome 31(31%), and pleural effusion 17(17.0%). (Table-I) Complications during hospital stay was reported as; tumor lysis syndrome 54(54.0%), infection 11(11.0%), 06(6%), respiratory failure 06(6%), pleural effusion 05(5%), pericardial effusion 04(4%) and others 07((7%). (Table-I) Short-term management led to 80 (80%) recovery and discharge, 14(14%) died in the hospital, prolonged admission 02(2%) while 4% left against the medical advice Table-I.

Severity of disease was found mild in 33(33.0%), moderate in 52(52.0%) and severe in 15(15.0%). Severity of disease was independent of gender (p=0.065) and age (p=0.29) when tested for their association through Pearson chi-square test and Kruskal-Wallis One-Way ANOVA on Ranks test respectively. However, age with grouping showed significant dependency (p=0.034) on severity of disease when tested by Pearson chi-square test. Site of mass (p=0.64) and short-term outcome (p=0.09) did not show any association with Severity of disease when tested by Pearson chi-square test. The majority (96%) of patients presented with anterior mediastinal mass, amongst them 33% had mild disease, 52% had moderate disease and 15% were presented with severe disease. Short term outcome had no association with severity of disease (p=0.09) Table-II.

Demographic, clinical characteristics and short-term outcome were compared with primary diagnosis namely; Leukemia, Lymphoma, Sarcoma and Non-malignant (Table-III). Median age (years) showed significant differences among primary diagnoses of diseases when tested by Kruskal-Wallis One-Way ANOVA on Ranks (p=0.05). The classification of age into groups was statistically non-significant when tested by the Pearson chi-square test (p=0.14). Gender (p=0001), severity of mediastinal mass (p=0.01), Lymphadenopathy (p=0.001), Hemoglobin (gm/dl) (p=0.03), Leukocytes count (p=0.001) and Platelet count (p=0.001) were highly associated with all four significant categories of primary diagnosis. Short-term disease outcome was independent of four categories of primary diagnosis. (p=0.88). (Table-III)

Out of the total 100 patients, 59(61.0%) were diagnosed by using flow cytometry while 38(39%) were based on findings of histopathology, while 3 patients remained undiagnosed. The short-term disease outcome was independent of diagnostic procedures. (p=0.06). Out of the 59 patients who went through flow cytometry, 43(72.8%) were diagnosed with the help of peripheral blood without need of any invasive testing while 16(27.2%) were diagnosed based on invasive sampling through pleural, pericardial, ascitic or bone marrow biopsy. The short-term disease outcome was independent of diagnostic procedures. (p=0.89)

During diagnostic procedures, 44(45.4%) patients were not provided sedation, 19(19.6%) were provided with general anesthesia and 34(35.0%) were provided with local anesthesia only. Short-term disease outcome

Table IV: Diagnostic Approach and Its Effect on Short-Term Disease Outcomes (n=97)

Variable	Discharged	Hospital Death	LAMA	Under treatment	Total	*p*-value
	n (%) 80(80.0%)	n (%) 14(14.0%)	n (%) 4(4.0%)	n (%) 2(2.0%)	n (%)	
Diagnosis confirmed on:					97(100.0)	
Flow Cytometry	45(57)	11(91.7)	01(50)	02(50)	59(61.0)	0.06*
Histopathology	34(43)	01(8.3)	01(50)	02(50)	38(39.0)	
Source of Flow Cytometry					59(100.0)	
Peripheral Blood	33(73.3)	08(72.7)	01(100)	01(50)	43(72.8)	0.89*
Bone /Visceral Tissue	12(26.7)	03(27.3)	0	01(50)	16(27.2)	
Type of sedation provided for biopsy					97(100.0)	
No Anesthesia	34(43.0)	08(66.7)	1(50)	1(25)	44(45.4)	0.33*
Local Anesthesia	30(38.0)	03(25.0)	0	01(25)	34((35.0)	
General Anesthesia	15(19.0)	01(8.3)	01(50)	02(50.0)	19(19.6)	
Steroids provided before biopsy.					97(100.0)	
Yes	16(20.8)	03(25.0)	0	0	19(19.6)	0.77*
No	63(79.2)	09(75.0)	02(100)	04(100)	78(80.4)	
Chemotherapy before biopsy					97(100.0)	
Yes	04(5.1)	0	0	0	04(4.1)	1.00*
No	75(94.9)	12(100)	02(100)	04(100)	93((95.9)	

Pearson Chi-square test of significance was applied. P-value < 0.05 was significant

was independent of type of sedation provided for biopsy (p=0.33). Out of all the patients included in this study, 19(19.6%) received steroids before biopsy while only 4.1% (n=4) of the patient received chemotherapy before biopsy. Both steroids (p=0.77) and chemotherapy (p=1.00) were independent of short-term disease outcome. Over 80% (n=80) of patients showed recovery and were discharged from the hospital while 14% (n=14) died during the hospital stay, 4% (n=4) left the hospital against medical advice and 2% (n=2) were alive but still admitted till the end of the study period (Table-IV).

DISCUSSION

This study investigated the frequency and patterns of presentation for mediastinal masses or tumors among pediatric patients presenting to a tertiary care hospital in Karachi. This study includes newly diagnosed mediastinal tumors, as detected by chest CT scans and the mediastinum-to-chest ratio. Most of the patients were male, with 41% aged 11 or older. These findings are consistent with previous studies conducted at other tertiary care facilities in Pakistan and Japan.[11,12,13] The most reported symptoms were fever, cough, dyspnea, and lymphadenopathy, with fever accounting for 78%. A high percentage of patients presented with dyspnea (27%), as well as lymphadenopathy (52%).

The median age at onset of mediastinal tumors varies across studies. Inclusion of both adults and children in most of these cases accounts for this variation. A study from China observed a bimodal distribution; with a higher number of cases in patients under 10 years old and between 60 and 70 years old.[2] In contrast to our finding of a median age of 9.5 years at presentation, other studies revealed a younger age of onset of 5.6 and 7.5 years.[10,14] Our study not only differs in age distribution but also in disease spectrum; a study conducted in Turkey,[15] classified 14.6% of cases as benign, whereas our analysis identified just 5% as benign. Differences in ethnicity could explain this.

The anterior side of the mediastinum contained 95% of all observed mediastinal masses. Previous studies have found anterior mediastinal masses to be more common, but the stated percentage is lower than in our study.[16] This could be attributed to fewer occurrences of germ cell cancers in our patients, which typically arise in the posterior mediastinum. Studies have shown that compared to masses in the posterior and middle mediastinum, those in the anterior mediastinum are more frequently associated with increased perioperative risks.[17] In current study, leukemia (54%) was the most common malignant diagnosis presenting with mediastinal mass, followed by lymphoma (39.5%) and Ewing sarcoma (2.1%). Within leukemia, the most frequently observed morphology was T-cell ALL, followed by Hodgkin disease in lymphomas. This finding aligns with previous studies conducted in Pakistan and Hong Kong.[12,18] Previous studies from Pakistan and other LMICs discovered a diverse range of malignant disorders in pediatric populations presenting with a mediastinal mass, such as neurogenic tumors, neuroblastoma, and germ cell tumors, which our study did not uncover.[16,18] This may be due to our center's heavy burden of leukemia and lymphoma.

The study found an overall mortality rate of 14%, which is significantly high for a group of pediatric patients in which only 15% were diagnosed with severe mediastinal disease. This result is in line with a 2016 study on pediatric patients with critical or severe mediastinal disorders carried out in Karachi, Pakistan.[14] The majority of the patients were discharged after improving or recovering; however, a minor number left against medical advice (LAMA). This finding is consistent with a prior study that found a significant proportion of recovery or survival and 4% LAMA among pediatric patients with or without mediastinal masses coming to the emergency department of a private tertiary care hospital.[19] However, our study was unable to acquire information about the causes of LAMA.

Age, tumor site, and clinical outcome did not show any statistically significant differences in the type of tumor. However, statistically significant associations were observed between tumor type and severity of mediastinal mass, lymphadenopathy, hemoglobin levels, leukocyte count, and platelet count. In addition, a significant difference in the distribution of tumor type was noted between male and female patients (p<0.05). The algorithm helped in narrowing further investigations and avoiding undue interventional procedures like if the smear showed blasts, diagnosis was established simply by sending flowcytometry avoiding invasive lymph node or bone marrow biopsy.

The current study also compared patient outcomes based on differences in age group, sex, provision of sedation for the diagnostic procedures, type of diagnostic procedure, type of sedation

provided, provision of steroids and chemotherapy before biopsy, and severity of disease. However, the severity of the disease was the only area where we observed significant differences (Table-II). Existing literature already supports the use of less invasive diagnostic procedures and considers general anesthesia as an additional threat to pediatric patients presenting with mediastinal masses, especially those with anterior mediastinal masses.[20,21] Only 19.5% of patients underwent general anesthesia using the algorithm focused on the least invasive diagnostic approach, while 45% received diagnosis without the need for anesthesia.

LIMITATIONS OF THE STUDY

This study has a few inherent limitations. A comparison of long-term survival among different diagnoses is not possible within the scope of this study as it only examines short-term outcomes. Furthermore, the sample size is not large enough to validate the algorithm for safe diagnosis and more studies with larger sample size are needed. Nonetheless, this study is among the very few that attempt to determine the pattern of presentation of pediatric mediastinal tumors in Pakistan and has a relatively larger sample than previous similar studies from the same population.

CONCLUSION

This study provides important insights into the epidemiology, presentation, and early outcomes of individuals with mediastinal masses. By identifying factors associated with favorable and adverse clinical courses, this research facilitates risk stratification and personalized management strategies tailored to individual patient needs. This study has the potential to enhance clinical practice, assist decision-making, and improve the quality of care for pediatric patients with mediastinal masses in Karachi and in similar healthcare settings.

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Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

NR & MRK: Conception, study design, drafting the manuscript, approval of the final version to be published.

AMF & GQP: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MRR & MSA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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