Pulmonary Embolism: novel corona virus versus tuberculosis

Dr. Nidhi Dhamecha

GMERS Medical College, Sola

Dr. Qury Nagadiya

GMERS Medical College, Sola

Dr. Anurag Gupta

GMERS Medical College, Sola

Dr. Nehal Patel (✉ nehal_pedia@yahoo.com)

GMERS Medical College, Sola

Dr. Rashmi Thanvi

GMERS Medical College, Sola

Dr. Ghosha Pandav

GMERS Medical College, Sola

Case Report

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Abstract

This series describes six paediatric cases who presented as severe acute respiratory illness during the pandemic of covid-19 with high D-dimer levels. All six patients tested negative for novel corona virus. They were diagnosed as having tuberculosis on detailed investigations; High D-dimer levels are one of the most important indicators of the pulmonary embolism. Pulmonary embolism is a rare presentation of tuberculosis and this study emphasizes the need of keeping tuberculosis as an important differential diagnosis of those who present as acute respiratory distress syndrome.

Introduction

Tuberculosis(TB) is very prevalent in developing countries. PulmonaryTB usually presents with cough, fever and weight loss. Presentation as severe acute respiratory illness(SARI) due to pulmonary embolism is not usual. On the other hand, ongoing recent illness- novel coronavirus (SARS Co-V2/ COVID-19) is known for its presentation as SARS(severe acute respiratory distress syndrome) and high d-dimer levels.

We are presenting a case series of six patients who presented as (SARI) with high D-dimer. All of them on detailed investigation were diagnosed as having pulmonaryTB.

We have included six patients who presented as SARI (table1). Age ranged between 11-17 years. Duration of fever was 3-4 days except in one (patient-3, table1) where it was on-off since six months. Onset of difficulty in breathing was 1-2 days prior to admission. Five patients had no significant prior illness, whereas one had diabetes mellitus (patient-6, table1). Two patients (patient-2and 6, table1) had history of positive koch's contact. None was exposed to covid-19.

In view of current pandemic of covid-19, patients were first suspected as having covid pneumonia and primary treatment was started (oxygen therapy, antibiotics, supportive) .

On investigation, 5 out of 6 had normal total leukocyte count with neutrophilic predominance (neutrophil to lymphocyte ratio [NLR]>3). One patient (patient-1, table1) had mild leukocytosis with 80% neutrophils(NLR 8). D-dimer levels were high (normal 200-400ng/ml) in all, being significantly high (>1000ng/ml) in four (patient1, 4, 5, 6, table1) patients. Coagulation profile (prothrombin time and activated partial thromboplastin time) and renal functions were normal in all. Four patients had chest X-ray suggestive of ARDS (acute respiratory distress syndrome)(figure 2A), one patient had predominant single lung involvement in form of diffuse peripheral opacities and the other patient(patient-3,table1) had chest x-ray suggestive of miliary tuberculosis(figure 2B). HRCT thorax of four patients was suggestive of tuberculosis in form of tree in bud appearance/consolidation/cavitary lesions/mediastinal lymphnodes enlargement (figure 3A and 3B). CTPA (CT pulmonary angiography) was done in one patient(patient-6,table1) which was normal(figure 3D). All patients tested negative for novel corona virus Repeat samples for covid were sent in two patients also reported negative. Keeping in consideration other systemic findings and supportive laboratory evidences in form of sputum CBNAAT, montoux test, ultrasound abdomen all were diagnosed as having pulmonary TB with one patient(patient-5,table1) also having abdominal tuberculosis(disseminated TB). Two patients who presented with severe respiratory distress required ventilatory care and could not survive in spite of our best efforts (patient 1and2, table1). One (patient-2, table1) of them had sudden deterioration in twelve hours in both clinical and radiological picture(figure 1). Out of rest four, three patients required high flow oxygen therapy for 3-4 days. LMWH (low molecular weight heparin) was given to patients with initial high d-dimer along with methylprednisolone to patients with severe ARDS. Subsequent reports showed decline in d-dimer levels along with clinical improvement. All four patients who survived were discharged on antiTB treatment.

Discussion

PulmonaryTB is very prevalent in developing countries. Estimated incidence of tuberculosis in India(2018) was 2.69million(199/100000 population)(1). One study in adults showed series of five patients with different forms of tuberculosis presenting with pulmonary embolism having no risk factor for hypercoagulability.(2) Kwas H, et al reported 3 cases of pulmonary embolism associated with severe pulmonaryTB(3). Turken O and others describes the hemostatic changes along with inflammation leading to hypercoagulable state in severe pulmonaryTB which improves with treatment. They compared various hematological parameters in severe PTB versus that of control (4). Although not common, tuberculosis especially severe pulmonary/ disseminated is at risk for venous thrombosis (5). Goncalves, Ivone M et al presented two case reports where two adult patients had thromboembolic events following severe pulmonaryTB(6).One recent study recommended use of prophylactic LMWH(low molecular weight heparin) in patients with covid -19 pneumonia presented with high d-dimer levels on admission or sudden clinical worsening which was attributed to pulmonary embolism(7). They also recommended doing CTPA (CT pulmonary angiography) in place of non-contrast CT when possible to document pulmonary embolism(7). A study related to radiographic appearance and patterns of progression revealed predominant peripheral location, common progression pattern from unilateral focal air-space opacity to unilateral multifocal/bilateral involvement during treatment, and lack of cavitation, lymphadenopathy, and pleural effusion as the more distinctive radiographic findings of SARS(8). Our cases presented with a picture like SARS initially leading to high suspicion of covid pneumonia which on HRCT thorax showed few findings suggestive of basic etiology as tuberculosis.

Conclusion

Our case series shows that tuberculosis can present as pulmonary embolism in adolescents which presents clinically as SARI. This is the first case series reporting pulmonary embolism as the presentation of tuberculosis in children. In the era where we are attributing novel corona virus as cause of majority SARS cases, it is necessary to investigate for underlying tubercular etiology for early initiation of treatment.

Declarations

The authors declare no competing interests. All the patients consented to publish.

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Table

Table 1:

No.	Age (years) / sex	Presentation	Investigations	d-dimer (ng/ml)	x-ray	HRCT Thorax	Sputum CBNAAT	Other findings	Cov 19
1	14/M	Fever:3-4days Difficulty in breathing:1day O/E: marked distress +nt	TLC:15300 NLR: 8 S.fibrinogen:450mg/dl(n:200-400)	4438	Peripheral opacities in both lung fields	Cavitatory lesion, tree in bud appearance, pneumomediastinum	+ve	Subcutaneous emphysema	-ve (done twice)
2	13/F	Fever: 2days Difficulty in breathing: 1day O/E: marked distress +nt	TLC:7101 NLR: 3.4 S.fibrinogen: 537mg/dl	710	Bilateral midzone/lower zone consolidation with cavity	Not done	Not done	Koch's contact present	-ve
3	14/F	Fever on & off:6 months Difficulty in breathing: 1day O/E: moderate distress +nt	TLC: 7300 NLR: 2.6 S.fibrinogen:120mg/dl	600	Military TB	Not done	+ve	—	-ve
4	12/F	Fever: 4days Cough:1day Difficulty in breathing:1day O/E: severe distress+nt	TLC: 6700 NLR: 3.9	4952	Peripheral opacities in both lung fields	Ground glass opacities s/o ARDS with enlarged mediastinal lymph nodes	+ve	—	-ve (done twice)
5	11/F	Fever: 4days Cough: 2days Difficulty in breathing; 1day O/E: moderate distress +nt	TLC: 4900 NLR: 6.6 S.fibrinogen:425mg/dl	6550	Bilateral peripheral lung opacities left>right	Consolidation with cavitatory and bronchiectatic changes with enlarged mediastinal nodes	-ve	USG abdomen: ileocaecal junction Koch's	-ve
6	17/F	Fever: 4days Cough: 4days Difficulty in breathing: 1day O/E: mild tachypnoea +nt	TLC: 9600 NLR: 3.4	1343	Haziness in both upper, mid & left lower zone	Consolidation, soft tissue nodular infiltration, fibrocavitatory lesions CTPA:normal	+ve	Montoux: strong positive H/o TB in father +nt	-ve

Table 1: clinical presentation of all six patients

No.	:	patient number
O/E	:	on examination
TLC	:	Total Leukocyte Count
NLR	:	Neutrophil to Lymphocyte Ratio
TB	:	tuberculosis
HRCT	:	High-resolution computed tomography
CBNAAT	:	cartridge based nucleic acid amplification test

SARS : severe acute respiratory distress syndrome
s.fibrinogen : serum fibrinogen
ARDS : acute respiratory distress syndrome
CTPA : Computed Tomographic Pulmonary Angiography

Figures

Figure 1

X-ray 1: X-ray on admission showing consolidation with cavity. X-ray 2: 12 hours after admission showing rapid deterioration and developing ARDS

Figure 2

A: X-ray showing ARDS on admission. B: military TB

Figure 3

A: HRCT thorax showing multiple homogenous ground glass opacities along with pneumomediastinum B: similar image with a cavity C: CT thorax showing cavitory lesions D: CTPA (CT pulmonary angiography) of the same patient showing normal filling of the vessels.