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RESEARCH ARTICLE

EVALUATION OF A CASE OF RECURRENT RESPIRATORY TRACT INFECTIONS.

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Abstract

Introduction:-

A rare case report

Introduction:-

A 40 year old Hindu female,housewife ,with 2 children,of thin body build presented with chief complains of shortness of breath for one year,which was progressive in nature and of MMRC grade II severity.She also complained of on off cough with scanty expectoration.

History of past illness:-

Her history of past illness revealed that she was on and off symptomatic since long with recurrent respiratory tract infections which got relieved with medications from local physicians.
She was not a known case of Pulmonary Tuberculosis / Diabetes Mellitus / Hypertension / Chronic Kidney Disease / Sickle Cell Disease.
She had no addictions.

General examination:-

On general examination, she was found to be febrile (temperature – 101.2 degree Fahrenheit).She had mild pallor and clubbing (greade II). Her pulse rate was 110 / minute, oxygen saturation was 86% at room temperature and her blood pressure was 100 / 60 mm Hg. Her respiratory rate was 32 / minute.

Examination of the respiratory system:-

Her respiratory system examination revealed that there was shifting of trachea to the left side. There was crowding of ribs on the left side. Diminished vesicular breath sounds were heard over left infrascapular and infra- axillary areas. Coarse crepitations were heard in the same areas.

Investigations:-

On investigations, her complete haemogram revealed a total leucocyte count of 12,600 / cumm, A differential count of neutrophils – 80 %, lymphocytes – 17 %, eosinophils – 3 %. Her haemoglobin was 8.2 gram %, her fasting blood sugar was 90 milligram / deciliter. Her blood urea was 27milligram / deciliter and serum creatinine was 0.9 milligram / deciliter. Her ELISA test for HIV was negative.

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Two of her sputum samples for AFB(acid fast bacilli) tested negative. Sputum for gram stain revealed gram positive cocci in chains. Sputum for culture / sensitivity revealed Streptococcus pneumonia sensitive to Amoxycillin, Piperacillin, Ofloxacin, Ceftazidime, Ceftriaxone and Cefaperazone.

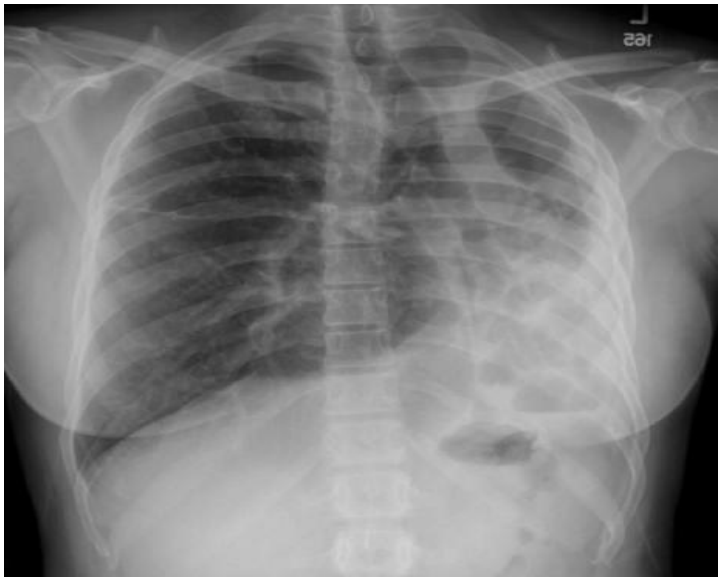
Provisional diagnosis:-
With the patient's chief complains, present and past history, general and Systemic examinations, and investigations, our provisional diagnosis was " Bronchiectasis of the Left lung (lower lobe)".
We then proceeded further with the imaging studies such as chest X – Ray (postero anterior view), Contrast enhanced computerized tomography of the lungs followed by Bronchoscopy.

Imaging studies:-
CHEST X-RAY POSTERO ANTERIOR VIEW – revealed features of loss of lung volume of left lung and shifting of mediastinum to left side with cystic lesions in the left lower lobe.

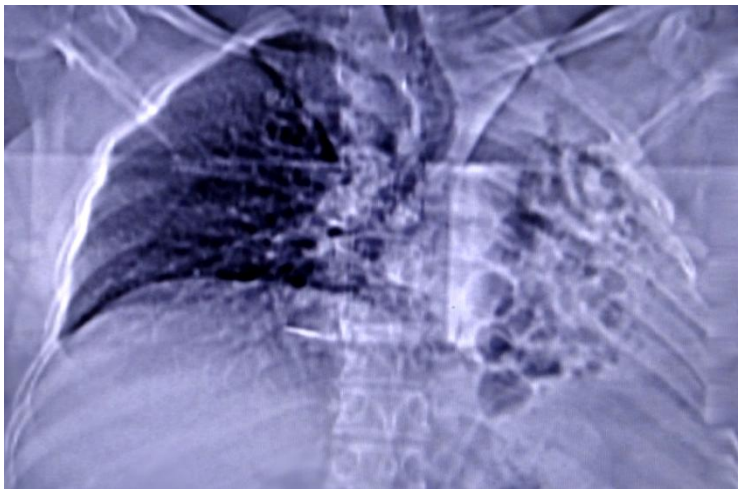
Ultrasound of thorax, abdomen and pelvis:-
revealed there was no pleural effusion. No abnormality was detected in abdomen and pelvis.

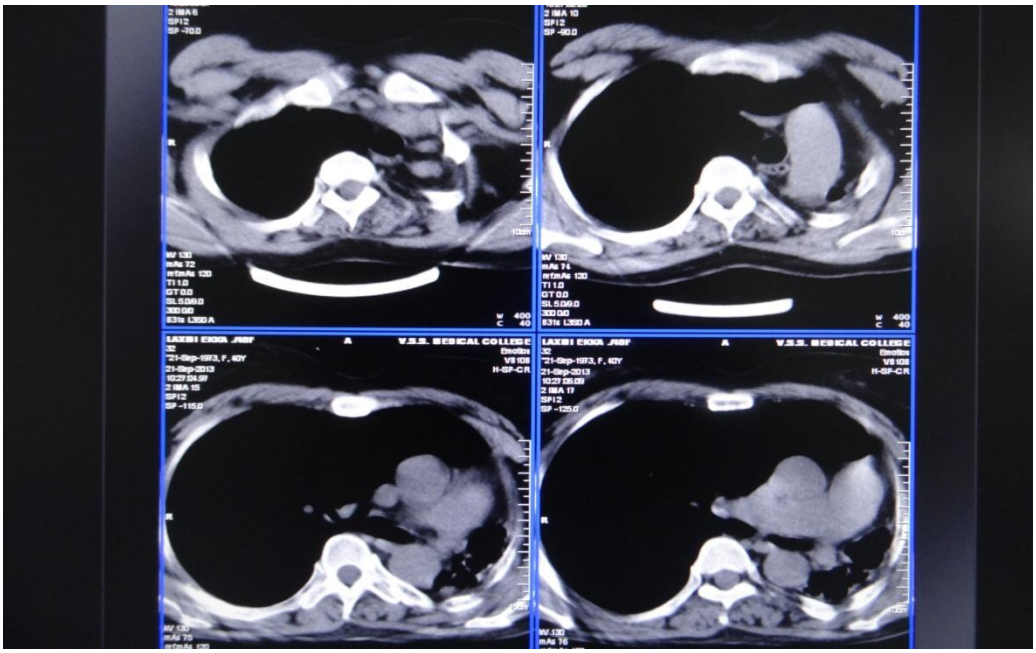
Contrast enhanced computerised tomography of chest:-
revealed decreased volume of left lung with multiple cystic lesions and shifting of trachea to the left. There was compensatory hyperinflation of the right lung with herniation to the left.

Chest x-ray pa view:-
Features of loss of lung volume on the left side Shifting of trachea to left side Cystic lesions changes in the left lower lobe Hyperinflation and herniation of the right lung.



Cect Of Chest:-
Decrease volume of left lung with multiple cystic lesions Shifting of trachea to left Approximation of ribs on left side.



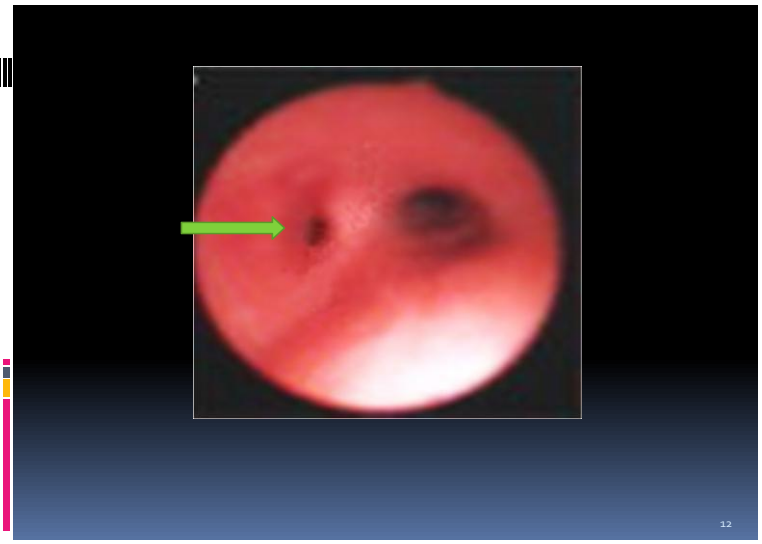


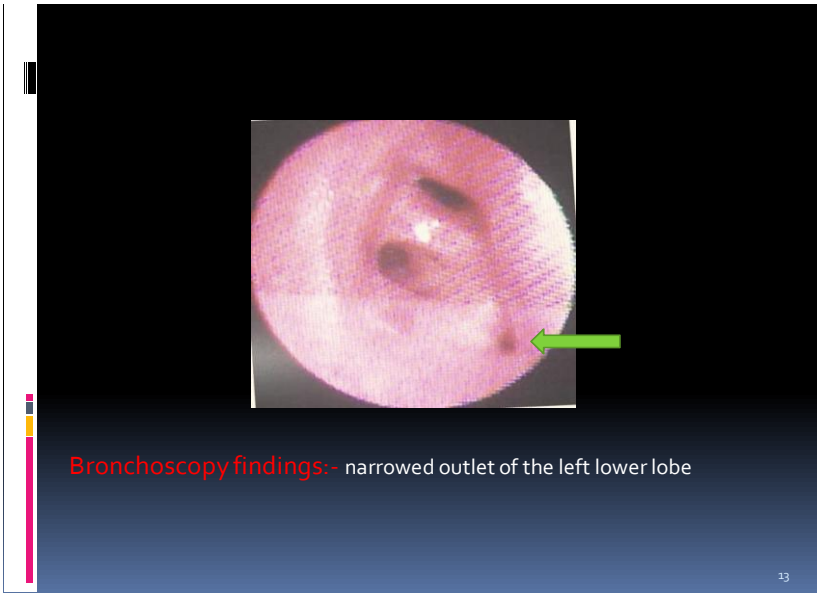
Non contrast ct study shows

Decrease vol. of left hemithorax Shifting of trachea & mediastinum to left Trachea normally divided to left and right bronchus.

Diagnosis:-

Unilateral left pulmonary hypoplasia with bronchiectatic changes. The diagnosis was cofirmed with bronchoscopy which revealed the underdevelopement of left bronchial tree.

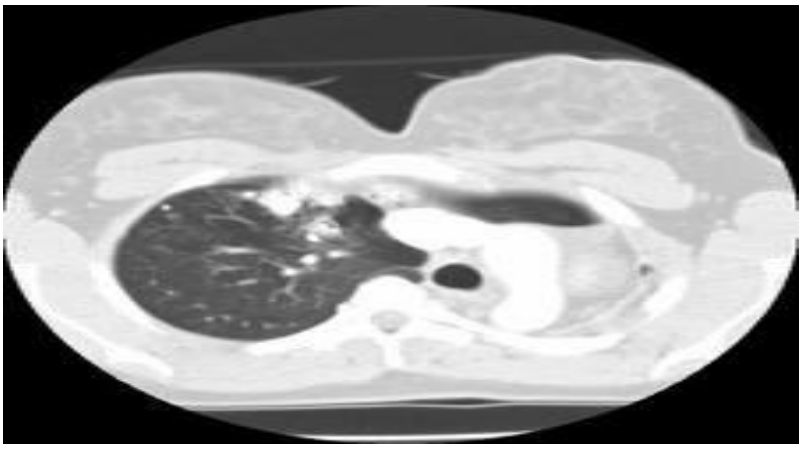




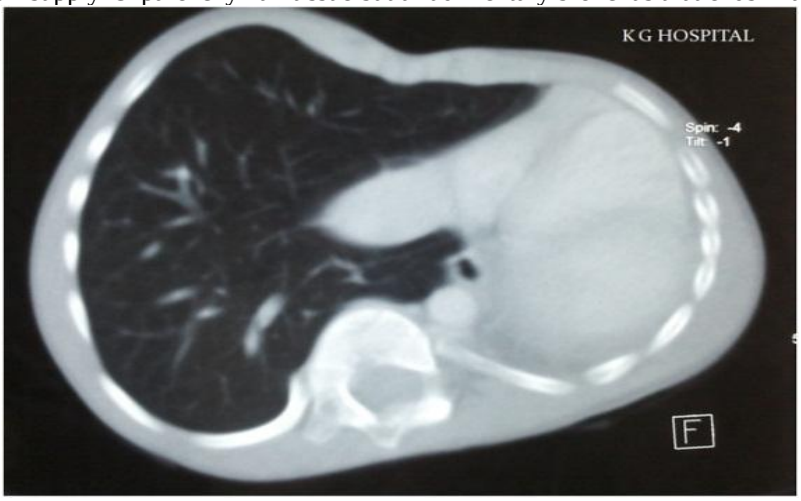
Discussion:-

Hypoplasia of lung is a rare congenital anomaly in which gross morphology of lung is unremarkable ,but in which there is decrease in number or size of airways,vessels & alveoli.
Bronchiectatic changes have also been reported in the hypoplastic lung.
Development of the bronchial tree takes place at about 26th to 31st day of intrauterine life.
Monaldi divided the maldevelopment of lung in four groups.
Group I: No bifurcation of trachea
Group II:Only rudimentary main bronchus
Group III:Incomplete developement after division of main bronchus.
Group IV: Incomplete development of subsegmental bronchi & small segments of the corresponding lobe.
According to Boyden there are three degrees of maldevelopement

Agenesis:-
Complete absence of one or both lungs with no trace of bronchial or vascular supply or of parenchymal tissue



Aplasia:-
Suppression of all vascular supply & parenchymal tissue but a rudimentary bronchus that ends in a blind pouch



Hypoplasia:-
It refers to deficient or incomplete development of parts of the lung ,resulting in an abnormally low number or size of bronchopulmonary segments or alveoli.

Epidemiology:-
The true prevalence is not well known (1.4% of all births according to Knox), but in cases of premature rupture of membranes at 15 - 28 weeks gestation, the reported prevalence of pulmonary hypoplasia ranges from 9 to 28%.

Aetiology:-
Causes can be primary or secondary. Secondary causes are more common. Secondary causes can be intra or extrathoracic

Intra-thoracic causes:-
congenital diaphragmatic hernia - most common intrathoracic cause extralobar sequestration agenesis of the diaphragm mediastianal mass(es) / tumour(s) mediastinal teratoma decreased pulmonary vascular (arterial) perfusion from a congenital cardiovascular anomaly - e.g tetralogy of Fallot unilateral absence of the pulmonary artery.

Extra-thoracic causes:-
oligohydramnios
Potter sequence
preterm premature rupture of membranes (PPROM)
skeletal dysplasias - especially those causing a narrow fetal thoraxthanatophoric dysplasia
achondrogenesis

osteogenesis imperfecta
short rib polydactyly syndrome
Main differential diagnosis of hypoplastic lung is SWYER-JAMES SYNDROME which refers to hyperlucent lobe or lung and functionally by air trapping during expiration initiated by viral bronchiolitis.

Pathological Diagnosis Of Pulmonary Hypoplasia:-
is done by taking fresh lung weight, fixed lung volume, radial alveolar count and estimates of tissue maturity.Precise characterization of the morphological changes is best performed by morphometric measurement after inflation of the lungs to a known transpulmonary pressure.
In the autopsy specimens, hypoplastic lungs are smaller, weigh less than normally expected for their age. There is decrease in number of size of alveoli. Abnormalities of **pulmonary arterial system** have also been identified in the pathology specimens consisting of decrease elastic tissue in the larger arteries .There is Increased muscle in normally muscular arteries and extension of muscle into non-muscular arteries.

Radiographic Findings:-
There is partial or total absence of aerated lung in one or both hemithorax and approximation of ribs.There is also elevation of ipsilateral diaphragm and shifting of the mediastinum. In most cases the controlateral lung is over inflated & displaced along anterior mediastinum into the involved hemithorax.

Although both conditions are associated with decreased lung volume on one side ,Swyer-james syndrome demonstrate air trapping on radiographs or HRCT scans performed at the end of maximal expiration.

Clinical Findings:-
depend on degree of pulmonary abnormality and presence of other congenital malformations. Usually ,however the patient is symptomatic & may present during childhood or adult life. Diagnosis may be established with chest x-ray,computerized tomography of thorax ,fiber optic bronchoscopy,and if possible pulmonary angiography.
The diagnosis may sometime be done antenatally by USG,DOPPLER or MRI.

Antenatal Ultrasound:-
It may show the presence of oligohydramnios and / or also show any of the causative anomalies. Several sonographic parameters may give indirect clues as to the presence and extent of pulmonary hypoplasia.

Fetal lung head ratio - reduced (ratios less than 1 usually indicate a poor prognosis) Fetal chest circumference (or thoracic circumference - TC) below 5^{th} percentile - is reduced in the case of intra-thoracic causes, however both these parameters can be normal.

Magnetic Resonance Imaging:-
It is being increasingly used to predict the presence of pulmonary hypoplasia.

Factors used for prediction are -
Fetal lung volume
The relative lung volume
The ratio of lung volume to body weight

Computerised Tomography Scan:-
Is being used to assess the degree of underdevelopement and to differentiate hypoplasia from other conditions that may closely mimic it radiographically such as atelectasis from other causes and severe broncheiectasis with collapse and advanced fibrothorax.

Treatment:-
Treatment of hypoplasia is in form of medical as well as surgical care both before & after delivery.
Before delivery it is usually directed towards correcting maternal conditions.

After delivery respiratory support is given ranging from oxygen to mechanical ventilation including ECMO(Extracorporeal membrane oxygenation). Surfactant administration at 4ml/kg –has been reported to increase

survival rate In adults treatment consists of control of infections & other symptomatic treatment in the form of expectorants & bronchodilators.
Management of other complications are done accordingly.

Conclusion:-

Whenever a patient presents with progressive dyspnea ,recurrent respiratory tract infections and unilateral small hemithorax ,PULMONARY HYPOPLASIA should be kept in mind as an important diagnosis, although it is a very rare condition.

It is important to spread this vital message amongst the medical fraternity .