Chronic Obstructive Pseudoemphysema*

Report of a Case

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S\nyer and James' reported a case of a six-year-old boy who had repeated episodes of bronchitis and bronchopneumonia. A chest skiagram revealed increased radiotranslucency of the right lung with marked decrease in the vascular markings. On fluoroscopy, the heart shifted to the right on inspiration. Bronchography showed abrupt termination of larger bronchi on the right side, but normal left sided filling. Bronchoscopy was normal. McLeod' reported nine adult cases and in each of his cases the affected lung showed increased translucency, more marked on expiration, with decreased vascular markings and a small hilar shadow.

Many reports and reviews have since been published from England and the Continent, but only a few from America. To the best of our knowledge, no case has been reported from India. This being a rare disease, the following case is being documented.

CASE REPORT:

A 14-year-old boy had accidentally inhaled a vegetable foreign body at the age of one year. He was treated for a "pneumonia"-like ailment for two weeks. At the age of two years, he had "whooping cough" lasting for three months. Ever since then, he was found to be lagging behind the other children as far his growth was concerned, although he could take part in school sports. There was no history of smoking or an allergic diathesis.

Physical examination revealed a moderately built but poorly nourished boy in no physical distress. There was no cyanosis or clubbing of digits. There was no tracheal shift. The physical findings were limited to the chest. There were medium and coarse crepitations over the entire left side of the chest. X-ray film of the chest revealed increased transradiancy on the left side (Fig. 1). This finding was further accentuated on repeating the x-ray in deep expiration (Fig. 2). This finding was repeatedly confirmed on fluoroscopy and mediastinum moved distinctly to the right in expiration. Bronchography revealed dilated bronchi with failure of the contrast medium to enter the smaller bronchi and alveoli (Fig. 3). Bronchoscopy demonstrated the patency of all the major bronchi.

Pulmonary Function Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal Volume</td>
<td>400 ml</td>
</tr>
<tr>
<td>Rate</td>
<td>17 per minute</td>
</tr>
<tr>
<td>Minute Volume</td>
<td>6.8 liters</td>
</tr>
<tr>
<td>Inspiratory Reserve</td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>1.25 liters</td>
</tr>
<tr>
<td>Inspiratory Capacity</td>
<td>1.7 liters</td>
</tr>
<tr>
<td>Expiratory Reserve</td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>0.7 liters</td>
</tr>
<tr>
<td>Vital Capacity</td>
<td>2.0 liters (predicted western 3.6 liters)</td>
</tr>
<tr>
<td>Forced Expiratory</td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>1 second 85%</td>
</tr>
<tr>
<td>Maximum Breathing Capacity</td>
<td>48.6 liters (predicted 110 liters/m)</td>
</tr>
<tr>
<td>O_2 consumption</td>
<td>300 ml per minute</td>
</tr>
</tbody>
</table>

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Discussion

The discovery of unilateral hyperlucency of lung is not a rare finding in any large radiologic unit, but finding of unilateral hyperlucency does not necessarily mean a diagnosis of Swyer-James and McLeod’s syndrome.

The causes of true hyperlucency of the lung may be divided into two major groups: those with normal resistance to air flow and those associated with abnormally increased airway resistance, including the syndrome under discussion. If there is normal opacification in expiratory films or better if there is equal and rapid egress of air from both lungs, the absence of obstruction is proved. In unilateral hyperlucency due to partial airway obstruction, the roentgenographic abnormality is accentuated in expiratory films and fluoroscopy shows delayed emptying and a mediastinal shift to the opposite side. If this is due to major endobronchial obstruction, namely stricture, adenoma or malignant tumor, the lesion can be seen on bronchoscopy, tomography or bronchography.

Chronic obstructive emphysema affecting one lung has been described and can be distinguished on bronchography. There may be spreading of the bronchi, arcuate patterns around bullae and attenuation and elongation of smaller branches giving a picture unlike that seen in the bronchograms of our patient which shows a typical “pruned tree” appearance of the bronchi due to abrupt termination of the contrast medium at the level of smaller bronchi (Fig. 3). Proximally, the bronchi show c usual dilatation.

Distension and occlusion of bronchi and bronchioles in this syndrome may result from an unusual form of infection in childhood. Hypoplasia and emphysema result from this. A history of infection, often a severe chest illness in childhood, is usually available and is probably the cause of bronchial and bronchiolar lesions. In most cases there is no evidence as to whether the infectious agent was viral or bacterial, although in some, tubercle bacillus seemed to be responsible. It is difficult to guess as to what was the exact nature of respiratory infection in the present case.

A syndrome akin in some respects to this condition has been seen in hypoplasia or absence of pulmonary artery on one side. In a report of five cases, it was found that bronchiectasis was present in two cases on the side of the hypoplastic pulmonary artery. It is believed that hypoplasia of a pulmonary artery is probably
a separate entity from idiopathic unilateral hyperlucent lung. It is suggested that until there is further knowledge of the pathogenesis and etiology of these conditions, an absolute differentiation between them may not be possible.

REFERENCES

INDICATOR-DILUTION DETERMINATIONS OF CARDIAC OUTPUT

A total of 532 groups of indicator-dilution determinations of cardiac index were performed in four groups of patients, many with mitral regurgitation. The indicator, indocyanine green, was injected into the right atrium and sampled from both the pulmonary and systemic arterial systems. The potential problem imposed by early recirculation of indocyanine green in the latter but not the former dilution curves. The absence of physiologically significant differences between the two sampling sites demonstrates that even severe mitral regurgitation does not vitiate indicator-dilution determination of cardiac output after right heart injection and systemic arterial sampling if the downstroke of the primary dilution curve permits a straight line semilogarithmic extrapolation.


PATHOLOGY OF HUMAN AORTIC VALVE HOMOGRAFT

An account of the pathology of the successful aortic valve homograft at various stages, from the time of insertion up to two years later, is given. Some of the complications in unsuccessful cases include the post-perfusion pulmonary syndrome, embolism, accidental ligation or cannulation-dissection of the coronary arteries, aortic hemorrhage, graft detachment, cusps perforation, and bypass cannulation dissection of the iliac artery spreading throughout the aorta.

The graft is usually well accepted by the host and becomes firmly united along its upper and lower margins by fibrous tissue which covers the sutures and smooths out the junction. There is almost no immune resection to the dead foreign tissue and rejection problems do not arise. The notable feature is the thickening of the bases of the cusps and the author considers that as this extends, it will limit the useful life of these grafts, though they provide a valuable alternative to the man-made prosthesis.


USE OF THE BALL VALVE PROSTHESIS

The aortic and mitral valves can be operated upon successfully and totally replaced with a prosthetic device of the ball valve type with good long-term results. Fifty-eight cases are reported. In aortic valvular disease, the outcome in the immediate postoperative period is influenced by the presence of caleitic aortic stenosis as well as the presence or absence of disease in the coronary arteries. The authors have significantly decreased the mortality (from 28.5 per cent to 15.4 per cent) in patients who were suffering from mitral disease by leaving the papillary muscle-chordae tendineae mural leaflet relationship intact. This adds strength to each contraction and prevents the low output syndrome seen so often in the immediate postoperative period in patients where they were totally excised. There have been no late deaths in the follow-up period to date (22 months) in any patient with replacement of aortic or mitral valves with the ball valve prosthesis.