Spontaneous Pneumothorax of the Newborn*

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INTRODUCTION

SPONTANEOUS PNEUMOTHORAX OCCURS infrequently as a symptomatic condition in the neonatal period. However, in any case of respiratory difficulty in the newborn, this condition should be considered because prompt diagnosis and treatment can be lifesaving.

INCIDENCE

The reported incidence of pneumothorax in the newborn varies from 0.07 per cent to 37.5 per cent of all live births.1-4 The eight cases in this report represent all known cases of pneumothorax in the newborn diagnosed at Georgia Baptist Hospital and Crawford W. Long Hospital in Atlanta, Georgia, during an 11-year period from 1949 to 1960. During this time, there were approximately 50,000 live births in these hospitals.

Howie and Weed5 reported nine cases seen in Los Angeles Children’s Hospital in ten years. They pointed out that all reports giving higher incidence of pneumothorax (up to their publication in 1957) occurred from 1930 to 1937. Roentgenographic techniques were certainly different at that time, and they question the interpretation of the roentgenograms. Moreover, they also state “that of the approximately 150 cases of pneumothorax in the newborn reported or mentioned in the English medical literature, and they question the interpretation (Holz and Wieland of Basel and Hotz and Riedweg of Zürich) between 1934 and 1937. All of the cases reported by these authors had partial or mantle pneumothorax, conservative treatment without aspiration, no confirmation of pneumothorax by thoracenteses or necropsy, and little correlation of clinical condition and roentgenographic findings.”

ETIOLOGY AND PATHOPHYSIOLOGY

The cause of this condition is alveolar rupture. This may rupture directly through the visceral pleura or cause interstitial emphysema leading to pneumomediastinum. The pneumothorax may be unilateral or bilateral. All nine cases reported by Ebner6 had bilateral involvement. Only two of the eight cases in this report had bilateral disease, and one of these was questionable.

Prematurity, difficult delivery, ‘cord around the neck,’ and vigorous resuscitative measures are reported as some of the predisposing factors. More recently, the relationship with hyaline membrane syndrome has been considered.

All of the cases in this series revealed some evidence, either by x-ray or physical examination, of bronchial or bronchiolar obstruction. This is probably a much more important aspect of the etiology than has been mentioned previously.

DIAGNOSIS AND TREATMENT

The usual signs of pneumothorax including hyperresonance, mediastinal shift, absence of breath sounds, and bulging interspaces may or may not be manifest, or obvious, in the newborn. Definitive diagnosis is made by roentgenograms. Cyanosis and dyspnea developing in a previously normal appearing infant should constitute indications for immediate x-ray examination of the chest. This may occur during the first few hours of life or within several days of

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<table>
<thead>
<tr>
<th>Case</th>
<th>Weight</th>
<th>Sex</th>
<th>Condition at Birth</th>
<th>Onset of Respirotory Difficulty</th>
<th>Type</th>
<th>Treatment</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5 lb. 5 oz.</td>
<td>M</td>
<td>Section baby—Condition good.</td>
<td>48 hrs., cyanosis and retraction.</td>
<td>60%, left with shift.</td>
<td>Conservative.</td>
<td>Discharged well.</td>
</tr>
<tr>
<td>4</td>
<td>7 lb. 1 oz.</td>
<td>F</td>
<td>Required resuscitation.</td>
<td>21 hrs., decreased cry with cyanosis.</td>
<td>Right with shift.</td>
<td>Thoracotomy tube and penicillin.</td>
<td>2 days later well.</td>
</tr>
<tr>
<td>7</td>
<td>6 lb. 11 oz.</td>
<td>M</td>
<td>Spontaneous respiration with poor excursion.</td>
<td>First 24 hrs. developed respiratory difficulty.</td>
<td>25%, right with shift.</td>
<td>Isolette penicillin—Streptomycin.</td>
<td>Discharged well.</td>
</tr>
</tbody>
</table>
FIGURE 1A
FIGURE 1A: Pneumothorax, right. FIGURE 1B: Bilateral pneumothorax.

If the pneumothorax is minimal, it may be discovered accidentally and cause little or no symptoms.

Once the diagnosis has been established, treatment varies with the extent of pneumothorax. If the pneumothorax is unilateral and less than 25 per cent, and the baby is having no respiratory trouble, needle aspiration and careful observation may be all that is necessary. For those cases with more than 25 per cent pneumothorax, thoracotomy tube drainage is usually indicated. Persistent air leaks may necessitate open thoracotomy with suture. Adjunctive measures including humidity and adequate ventilation are very important to all cases.

DISCUSSION

The eight cases in this report revealed equal sex incidence. Only two babies were small or could have been termed premature. One was born by section. All had evidence of some respiratory difficulty the first 48 hours of life. At least half of them had some positive pressure resuscitation because of respiratory difficulty at birth. There were three cases of left and three cases of right sided involvement, and two were bilateral. Five cases were treated with careful observation, humidity, and antibiotics. These survived. One was treated with thoracentesis and the other two had closed thoracotomy tube drainage. One of these died because of bronchial obstruction which was never fully relieved.

SUMMARY

1. Spontaneous pneumothorax in newborns occurs infrequently.
2. Eight cases are presented with accompanying data.
3. Prompt recognition and treatment may be lifesaving.

RESUMEN

1. El neumotórax espontáneo en los recién nacidos ocurre con poca frecuencia.
2. Se presentan 8 casos con los datos acompañantes.
3. El reconocimiento inmediato del tratamiento puede salvar la vida.

RESUMÉ

1. Le pneumothorax spontané survient exceptionnellement chez les nouveaux-nés.
2. L'auteur en rapporte huit cas, avec leur observation.
3. La précocité du diagnostic et du traitement peut sauver la vie.

ZUSAMMENFASSUNG

1. Spontanpneumothorax bei Neugeborenen kommt selten vor.
2. Bericht über 8 Fälle mit den zugehörigen Daten.
3. Rasche Feststellung und Behandlung können lebensrettend sein.
MYOCARDIAL RUPTURE

The total analysis of 206 cases of myocardial rupture which occurred at the Los Angeles County Hospital is reported by Griffith and associates. Myocardial rupture rarely occurs under the age of 50 years. Although the incidence of myocardial infarction invariably is reported to be higher among men than women, this material indicates that cardiac rupture is somewhat more likely to develop in women (110 women, 53.9 per cent), 94 men (46.1 per cent). Myocardial rupture is relatively rare in Negro patients.

Reasonably good correlation was obtained between electrocardiographic indications of acute myocardial infarction and necropsy incidence of myocardial necrosis. As was anticipated, myocardial rupture occurred at or immediately adjacent to the site of necrosis. Ordinarily, myocardial ruptures occur in the left ventricle. In this series, the most frequent site of rupture was in the anterior wall, especially at the junction of the anterior wall and the septum.

In the final years and three months of this survey, the incidence of rupture following myocardial infarction has undergone a sharp decrease at the Los Angeles County Hospital. This decrease is presumably due to better management of the acute episode of myocardial infarction and more particularly to the use of vasopressor drugs and anticoagulants. Anticoagulants did not increase the incidence of the rupture, but cardiac tamponade is relatively frequent in patients with myocardial rupture maintained on anticoagulants.


BENCE-JONES PROTEINURIA IN BRONCHOGENIC CARCINOMA

Bence-Jones proteinuria occurs in about 50 per cent of cases of multiple myeloma and is considered almost pathognomonic of multiple myeloma when it is present in large amounts, but it is occasionally demonstrated in small amounts in cases of leukemia and certain instances of metastatic invasion of bone by carcinoma from other sites. There seems to be a definite correlation between the content of plasma cells in the bone marrow, changes in the serum gamma globulin level and the presence of Bence-Jones proteinuria. Theoretically, changes in serum protein levels in malignant lymphomas, multiple myeloma or neoplastic disease are due to malnutrition of hepatic impairment from infiltration and/or involvement of the hematopoietic system. In this case, the electrophoretogram revealed a decrease in the gamma globulin level and a total globulin level within normal range. It is significant that the serum calcium and serum inorganic phosphate levels were within normal limits in spite of gross cellular infiltration with anaplastic tissue throughout the vertebrae. The very high serum alkaline phosphatase level of 106 units (normal 3 to 15 units) is consistent with widespread bony invasion, as is also the high erythrocyte sedimentation rate. It is worthy of note also that the bronchogenic carcinoma which was responsible for this patient's death and which was the primary site from which widespread metastatic invasion occurred in the liver and the vertebrae, remained undetected, giving rise to no appreciable signs in the chest and was not revealed by several radiographic examinations.


JEJUNAL REPLACEMENT OF LOWER ESOPHAGUS

Nutritional functional studies have been done on seven patients who had jejunal replacement of the lower esophagus for benign stricture. This seems to be a reasonably satisfactory operation for benign stricture of the esophagus. It is a time-consuming, but not a technically difficult operation. Nutrition and the functional results are good. Competent esophago-gastrostomy, as described by Maliard and Fekete (1960), is a simpler operation and, if consistently satisfactory, might supersede jejunal loop replacement in many cases, but it does place part of the stomach in the thorax which, in every other operation, has led to further esophagitis.