Spontaneous Hemopneumothorax: Treatment by Early Thoracentesis*
Report of Four Cases

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Spontaneous hemopneumothorax as a clinical entity is being recognized with more and more frequency. Early recognition and treatment is so important in avoiding unnecessary morbidity and mortality that this condition must be considered in the differential diagnosis of all episodes of acute chest pain. Thus far approximately 58 cases have been reported in the literature, with reviews on the subject being written in 1942 by Hartzell¹ and in 1949 by Hansen.²

During the past two years at the Kings County Hospital, four cases of spontaneous hemopneumothorax were observed. One case occurred in a patient with congenital cystic disease of the lung, making this case the third to be reported in the literature.³ The other three were in young males ranging in age from 17 to 35 years with no etiology being found either at the time of the acute episode or on nine months to two years follow ups. Two of the cases studied occurred in males under 20 years of age, an age group rarely affected by this condition.¹ A case with fatal termination was also seen in a 58 year old man but necropsy revealed the presence of multiple tuberculous abscesses in both lungs. This case is not being included in our report. All cases were observed in males, a finding consistent with that of other authors, only three cases having been reported thus far in women.² The reason for this sex incidence is not known.

It is generally agreed that this condition usually occurs in healthy individuals and results from the rupture of an emphysematous bleb and subsequent tearing of small vessels which are present in adhesions between the pleura and chest wall.³ It is felt that the rupture of the bleb occurs first and as air enters the pleural cavity the lung is drawn away from the chest wall and tearing of adhesions and blood vessels within these adhesions takes place. It is interesting to note that in two of the following cases there was a history of previous pneumonic infection which could well have accounted for the presence of adhesions.

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The onset of spontaneous hemopneumothorax is not usually precipitated by trauma or strain, and is in no way related to active tuberculosis or other pulmonary infections. Although large amounts of blood and air in the pleural cavity may rarely occur during the course of active tuberculosis its presence is usually associated with operative procedures or the demonstration of large cavities. Hemopneumothorax occurring during the course of active tuberculosis should not be classified as spontaneous.

The bloody fluid removed in this condition has always failed to clot.\textsuperscript{1,4,5} An explanation for the lack of clotting has recently been advanced by Cosgriff\textsuperscript{4} who found absence of prothrombin, fibrinogen, and thrombin as well as absence of anti-coagulant activity in the pleural fluid, and concluded that clotting had taken place during the first few hours following the hemorrhage. Apparently the fibrin had been deposited on the surface of the lung and the remaining fluid was now devoid of necessary clotting elements. He felt that at least a portion of the fibrin was later dissolved by a fibrinolytic substance present on the pleural surface. In the following cases the bloody fluid removed from the pleural cavity failed to clot.

The sudden onset of dull or sharp chest pain, followed by increasing dyspnea, perspiration, and weakness is the usual history given by these patients. In some cases abdominal pain is the presenting symptom, and unnecessary laparotomy has occasionally been done.\textsuperscript{6} Signs of shock and anemia may be prominent and the patient may appear moribund when first seen. A low grade fever may be present but temperature will usually return to normal upon removal of the hemorrhagic fluid.

The prognosis of spontaneous hemopneumothorax is excellent provided the patient survives the acute episode.

The following cases illustrate some of the points stressed above:

Case 1: L.F., a 17 year old white male clerk was admitted to the hospital because of continuous dull chest pain over the right side and increasing weakness of 36 hours duration. Pain had occurred suddenly while he was seated quietly. Two months prior to admission he had had right middle lobe pneumonia which was treated successfully with penicillin. One week before admission a chest x-ray film taken by the board of health showed no abnormality. Physical examination revealed an acutely ill, pale, asthenic male. Pulse 120, respiration 28, blood pressure 110/60, temperature 100 degrees F. A mediastinal shift to the left was noted as well as signs of atelectasis of the right lung and fluid and air in the right pleural cavity. This was confirmed by x-ray and a thoracentesis done on the night of admission yielded 180 cc. of blood. A diagnosis of spontaneous hemopneumothorax was made. Hemoglobin was 11 grams, white blood count was 17,800 with 85 per cent neutrophils. Urine was negative, blood urea was 35 mgm. per cent. Mantoux in 1:100 dilution was negative, and smears and cultures for acid-fast bacilli were negative.
on the chest fluid, sputa, and gastric washings. Bleeding, clotting, and clot retraction times were all within normal limits. Thirty-six hours after admission another thoracentesis yielded 800 cc. of blood which had a hemoglobin of 10 grams and a urea of 30 mgm. per cent and which did not clot upon standing at room temperature for two hours. Five days later 1000 cc. of blood was removed. One week after admission a chest x-ray film revealed minimal blood at the right costo-phrenic sinus and almost full expansion of the entire right lung. Temperature which had been 100 degrees F. returned to normal on the third hospital day. Two weeks later chest x-ray film was completely normal. The patient remained well and nine months after the above episode had a normal chest x-ray film with full expansion of the previously collapsed lung.

Case 5: B.B., a 35 year old male entered the hospital because of pain in the left chest. At the age of three years he had bilateral bronchopneumonia but had always been in excellent health since then, until 12 hours before admission. While eating dinner he suddenly developed severe tearing pain in the left lateral chest which was followed by dyspnea. No fever, cough or chills were noted. Physical examination revealed an acutely ill male with blood pressure 100/70, pulse 120, temperature 101 degrees F. and respirations 26. Mediastinal shift to the right was present with hyper-resonance above the seventh rib and dullness below over the left chest posteriorly. Chest x-ray inspection confirmed the diagnosis of hydropneumothorax with 85 per cent collapse of the left lung. Five hundred cc. of blood was withdrawn the night of admission. Admission blood urea was 50 mgm. per cent, sugar 88 mgm. per cent. Hemoglobin was 9.5 grams, white blood count 16,600 with 78 neutrophils. Repeated sputa, gastric and pleural fluid examinations were negative for acid fast bacilli. Bleeding, clotting, clot retraction and prothrombin times were normal. Eight days after admission 700 cc. of blood, which did not clot, was removed and x-ray film inspection one day later showed almost total reexpansion of the entire lung and minimal blurring of the costo-phrenic sinus. Immediately after the second thoracentesis the temperature fell to normal and he showed marked clinical improvement. On the 12th hospital day, chest x-ray inspection revealed full expansion of the lung. Two weeks after admission, he was discharged and repeat x-ray films six months, one year, and 18 months later showed no change.

Case 3: E.K., a 22 year old white metal polisher was admitted because of left chest pain. He was in excellent health until 20 hours prior to admission, when, while walking home from work, he suddenly noted the onset of severe left chest pain and dyspnea. He went to bed, but because shortness of breath continued, he sought admission to the hospital. No other symptom was noted. Physical examination revealed an acutely ill male with a blood pressure of 98/70, pulse 160, respiration 40, temperature 101 degrees F. Mediastinum was shifted to the right with signs of fluid and air in the left chest. Hemoglobin was 12.5 grams, white blood count 34,600 with 85 per cent neutrophils. X-ray inspection showed complete collapse of the left lung with hydropneumothorax. Thoracentesis was done immediately with removal of 350 cc. of blood which failed to clot. Twenty-four hours after admission, another 800 cc. of blood was removed from the left chest. Blood pressure rose to 130/80 and remained at that level. Hemoglobin in the peripheral blood was 10.5 grams; on the chest
fluid, it was 9 grams. Daily chest taps done on the following five days, removed a total of 1500 cc. of blood. He required two transfusions of 500 cc. each and on the 10th day of hospitalization, his hemoglobin was 11 grams. Chest x-ray film on the ninth hospital day revealed complete expansion of the left lung with some blunting of the costo-phrenic sinus. Temperature, which had remained 100 to 101 degrees F., fell to normal on the fifth hospital day and remained so. X-ray films six months, one and two years later, showed no abnormality and the patient has remained in good health.

Case 4: S.B., an 18 year old white male was admitted to the hospital because of severe left chest pain and dyspnea of six hours duration. He had a long history of pulmonary difficulties dating back to the age of six years when he had a bout of blood spitting and was told he had pneumonia. Following this, the patient had numerous bouts of hemoptysis and "pneumonia." Acid fast bacilli were never recovered. He continued to experience periodic episodes of hemoptysis but was otherwise in good health until six hours prior to admission when he developed severe left chest pain and shortness of breath. Family history was negative for pulmonary disease. Physical examination revealed an acutely ill white male with blood pressure of 115/80, pulse 100, respiration 28, temperature 98 degrees F. He splinted his left chest and signs of a hydropneumothorax were present on that side. X-ray inspection confirmed the above and in addition, revealed the presence of numerous areas of cyst formation within the lung parenchyma (Fig. 1). Admission hemoglobin was 11.5 grams, hematocrit was 43 per cent, white blood count was 13,200 with a normal differential. Blood urea was 22 mgm. per cent, sugar was 106 mgm. per cent, total protein was 7.5 mgm. per cent. E.K.G. showed changes compatible with pulmonary hypertension. Thoracentesis done
on the night of admission yielded 650 cc. of blood with a hemoglobin of 13.5 grams, hematocrit of 41 per cent, specific gravity of 1050 and a total protein of 6.75 grams. One day later 350 cc. of blood was removed and subsequent thoracenteses on the third and fourth hospital days removed 200 and 300 cc. of blood. Fourteen days after admission chest x-ray inspection revealed complete reexpansion of the left lung. In addition, two large areas of radiolucency measuring 8 x 10 cm. with calcification of the walls were noted in the right mid-lung field (Fig. 2). The picture was felt to be consistent with a diagnosis of cystic disease of the lung. He was discharged on the 20th hospital day and remained asymptomatic for the next two and one half years. X-ray film taken 25 months after the above episode showed no change when compared with previous films.

**FIGURE 2a**

*Figure 2a:* Fourteen days after the acute episode. Complete reexpansion of the lung has occurred. A large calcified cyst is seen in the right lung field.—**FIGURE 2b:** The lung cyst is well outlined in the right oblique projection.

**Comment:** The treatment of spontaneous hemopneumothorax has long been a subject for debate. Head⁷ and Hopkins⁶ feel that the fluid should be removed cautiously and replaced by air so that intrapleural positive pressure remains high. These observers state that the creation of negative intrapleural pressure by the withdrawal of fluid and air might cause the hemorrhage to continue or recur. Head also feels that transfusions should be given cautiously and that blood pressure should not be raised too rapidly for fear of forcing out the clot in the bleeding vessel. More recently Dorset and Terry⁸ have recommended removal of small amounts of fluid over a relatively long period of time.

The experience of Simpson⁹ and Johnson¹⁰ however, does not appear to bear this out. These authors stress the fact that there is no danger in rapid removal of the hemorrhagic fluid by early and repeated thoracenteses. On the contrary, it is felt that this
is the treatment of choice and that morbidity and operative intervention can be kept at a minimum by this method. Johnson treated 350 cases of traumatic hemopneumothorax in this way with excellent results. Transfusions should be given to correct the anemia and other measures that are routinely employed to combat shock should be used. Rapid evacuation of the fluid and air is important not only as an emergency measure to relieve symptoms and effects of mediastinal shift, but is of value in preventing further fibrin deposition and constrictive pleurisy. If excessive amounts of fibrin and dense adhesions are allowed to form, surgical intervention and decortication is often necessary to obtain reexpansion of the lung. Spontaneous absorption of the hemorrhagic fluid may occur but the process usually is a slow one and residual constrictive effects are more apt to result if this is allowed to take place. Although infection of the fluid is rare in this condition, empyema and subsequent lung retraction have been reported. This complication can also be prevented by early aspiration.

The four cases of spontaneous hemopneumothorax presented above were all treated by prompt and repeated thoracenteses. All of the patients improved considerably following the removal of fluid and air, and respiratory and circulatory embarrassment were almost immediately corrected by this procedure. Repeated or increasing hemorrhage did not occur following chest taps and in only one case were transfusions necessary (case 3). The patients all recovered completely and full lung expansion occurred within seven to 13 days after the onset of the acute episode. In the cases reported by Hartzell, Hansen, and Dorset and Terry, where more conservative management was practiced, full expansion of the lung did not occur until 14 to 40 days following hospitalization, and presence of pleural fluid or pleural thickening was often demonstrable by x-ray inspection many months after onset of the illness. It would appear from these findings that the morbidity and length of hospital stay were markedly reduced by treatment of these cases with early and repeated chest taps. The first three patients studied were seen at intervals for periods of one to two years and were all well and had essentially normal chest x-rays when last observed. The patient with congenital cystic disease of the lung (case 4) had remained in good health with no recurrence of hemoptysis, but the lung cysts were still visible on x-ray inspection.

**SUMMARY**

Four cases of spontaneous hemopneumothorax are reported occurring in males from 17 to 35 years of age. All cases were treated by early and repeated thoracenteses with rapid and complete recovery.
RESUMEN
Se comunican cuatro casos de hemoneumotórax espontáneo que ocurrieron en hombres de 17 a 35 años de edad. En todos los casos se emplearon toracentesis tempranas y repetidas y todos recuperaron rápida y completamente.

RESUME
L’auteur rapporte 4 cas d’hémopneumothorax spontanés survenus chez des individus de 17 à 35 ans. Tous ces cas furent traités par des thoracentèses précoces, et répétées, suivies de guérison rapide et complète.

REFERENCES