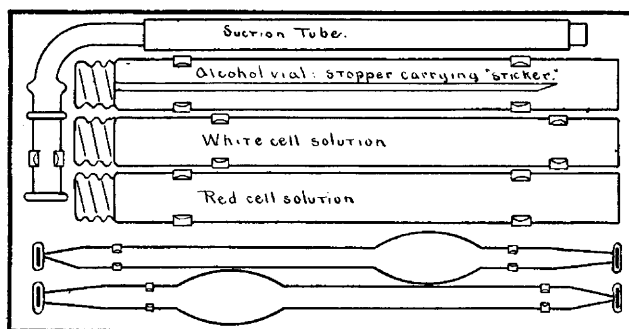


2-dram bottles containing diluting fluid for red and white cells respectively, and the usual rubber suction-tube. These are held in place on a thin metal plate by appropriate clips. The pipettes have in addition end-clips, each shod with a piece of soft rubber tubing, which, by pressing against the ends, prevent leakage from the filled pipettes. These, however, may be omitted in favor of short rubber caps for the pipette-ends, or of the time-honored rubber band stretched over the pipette from end to end. The straight portion of the suction-tube lies in a short piece of brass or copper tubing soldered to the metal plate.

I use two 1 to 100 pipettes, making either red or white counts with either pipette. Thus, the case will provide for two red-cell counts, two white-cell counts or



Handy pocket case for blood pipettes and solutions.

one of each. Slides or cover-glasses for blood-smears are carried in the case simply wrapped in tissue-paper. The metal plate which carries the outfit is preferably fastened to the cover of the case, since the fastening prevents breakage and the low edges of the cover do not interfere with the removal of the pipettes or bottles from their places. The advantage of the clean needle continuously immersed in alcohol over the usual unclean pocket "sticker" need scarcely be mentioned. The actual size of the case is  $4\frac{3}{4}$  by  $2\frac{1}{2}$  inches and the depth  $\frac{5}{8}$  inches.

Dr. F. Hecker has made the useful suggestion that if the depth of the case were slightly increased a Sahli hemoglobinometer might be added to the outfit.

## PNEUMOCOCCEMIA; BILATERAL EMPYEMA; RECOVERY \*

EDWARD A. ARONSON, M.D.

AND

HARRY OLSAN, M.D.

Adjunct Attending Physician at Mount Sinai Hospital;  
Intern at Mount Sinai Hospital

NEW YORK

*Patient.*—M. D., a boy aged  $4\frac{1}{2}$  years, was admitted to Mount Sinai Hospital June 14, 1910. He was the second of four children. The mother had had no abortions; father denied syphilis; the other children were all healthy. The delivery of this child was normal; it was breast-fed, and always well up to time of its present illness.

*Present Illness.*—This began with an eruption four weeks before admission. This eruption was described by the father as a "red shine." At the onset there was fever but no vomiting. The duration of the fever was not noted, but the child appeared well enough two weeks later to be taken out and exposed to cold, which was followed by elevation of temper-

ature, slight cough, generalized edema of the face and body and bloody urine. A physician, called in for the first time on the latter occasion, diagnosed the condition as postscarlatinal. The child did not improve and was admitted to the hospital two weeks later, June 14.

*Examination.*—On admission physical examination showed that the general condition of the child was very poor; there was marked apathy, and extreme dyspnea and cyanosis. In short, the child looked almost moribund. The throat showed slight reddening. The chest showed marked inspiratory retraction of the lower ribs.

*Lungs:* The lungs anteriorly were negative; posteriorly the right lung showed flatness over the entire chest almost to the apex; breathing was diminished above, absent below. On the left side there was dullness from the angle of the scapula to the base, where it became flatness; no breathing at the base.

*Heart:* The apex beat could not be made out; right border, mid-sternum; left border, one finger-breadth outside of nipple line; action was regular, rapid, and of small force, and the pulse was of correspondingly poor quality.

*Abdomen:* Slightly distended and tympanitic; no tenderness anywhere.

*Liver:* Fifth space above and felt three finger-breadths below the free border of the ribs; edge sharp and not tender.

*Spleen:* Palpable one finger-breadth below free border of ribs.

*Skin:* A few small pustules over the chest, and the abdomen was covered by a number of dry crusts. Desquamation was noted on palms of hands and soles of feet.

There was some glandular enlargement.

*Urine:* Normal, grossly and microscopically.

*Blood-Count:* Leukocytes 23,800; polynuclears 82 per cent.; large lymphocytes 5 per cent.; small lymphocytes 11 per cent.; large mononuclears 2 per cent.

At the time of admission the pulse was 128; respiration 58; and temperature 101.4 F.

A bilateral empyema was suspected and then confirmed by aspiration.

*Treatment and Course of Disease.*—On account of the patient's poor condition, it was decided to relieve him at once, at least temporarily, by aspirating the left chest; ten ounces of pus were withdrawn. This afforded him some relief but four hours later, under local anesthesia, an intercostal incision was made by Dr. Leo B. Meyer, the surgeon in charge of the service, and pus was evacuated; a drainage-tube was inserted, and the patient reacted well after the operation. The child's condition precluded any more radical procedure than simple incision.

June 17, two days later, the patient's condition became very poor again; the dyspnea increased and the temperature ran up to 104.2 F.; respiration 60 and pulse 160. The left side was discharging freely, but owing to his poor condition, we decided to resect a rib on the right side two fingers below the angle of the scapula. This was done without anesthesia, by Dr. Meyer. Drainage was introduced and the wound dressed.

June 18: Patient's condition improved; respirations less labored, and pulse still rapid. The patient did fairly well for the following ten days when the temperature began to rise again, although both sides were discharging freely.

June 1: General condition poor; patient complained of some pain in the right hypochondrium and some tenderness in this area. Wounds look clean and are discharging quite freely.

July 4: Temperature 103.6 F.; pulse 140; tenderness over the whole liver area, some bulging in the lateral aspect of the upper right abdomen.

July 6: On the fifth the temperature dropped from 103.8 to 97.4 F.; general condition very poor; heart irregular at times; quality of pulse fairly good; liver area remained about the same. There was a swelling in the right cheek directly over the superior maxilla, showing slight fluctuation.

July 8: The face swelling increased in size, and was incised through the mouth. A large amount of very foul pus was evacuated. This pus contained a large number of saprophytic bacteria. A blood-culture made showed the presence of pneumococci.

\* From the Isolation Service, Mount Sinai Hospital.

July 11: Owing to the frequent variation in temperature and the persistent tenderness in the right hypochondrium, the right subphrenic space was repeatedly aspirated, but no pus was found.

July 13: General condition somewhat worse; marked cyanosis and dyspnea noted; wound of the right cheek drained well. The lung signs showed dull tympany over the front of both lungs, some dulness and even flatness behind with numerous fine crepitant râles over the whole lung area. The heart was negative. The child was unable to sit up without apparent pain and difficulty in breathing. Lying on the right side caused the child to cry out and become markedly dyspneic and cyanotic. The liver was enlarged and tender, though somewhat less so than formerly. The bulging over the liver area was unchanged; spleen still palpable.

July 19: Until this time the child was in fair condition, but on this day the temperature rose again to 104 F.; this rise was due to retention of pus on the right side. The pus was evacuated and the wound drained.

July 27: A second blood-culture showed the absence of pneumococci.

July 29: Temperature rose on this date, due to retention of discharge.

August 1: Condition better; liver tenderness less marked; heart action rapid, regular, and fair. Dr. A. V. Moschowitz was asked to see the patient on account of suspected subphrenic abscess. His opinion was that there was retention above the diaphragm, and he advised more complete drainage. This was done and the signs rapidly cleared up.

August 10: The condition of the wound on the right side was very much improved; probe could still be introduced for several inches; discharge was slight and of a serous character.

August 13: Discharge had entirely ceased; wounds closed; liver tenderness had disappeared and the child was discharged cured.

A study of the case shows the following facts: 1. The child had scarlet fever. 2. Two weeks after the onset of the first symptoms he was probably exposed to a pneumococcus infection. 3. On admission there was no evidence of pneumonia, but of a bilateral empyema. 4. A pneumococcemia was shown by a blood-culture taken on July 8. 5. There was a possible metastasis in the cheek. Recovery ensued.

We find that the presence of scarlet fever was shown by the history of a rash, and of a general edema, and by the desquamation of the hands and the soles of the feet on admission. Many authors make but casual mention of the occurrence of empyema after scarlet fever, although we do know that it may occur after any of the infectious diseases. While empyema is of frequent occurrence, bilateral empyema is rather rare and varies according to different authors. We can say, however, that it occurs in from 1 per cent. to 3 per cent. of all cases of empyema. The pus in empyema following scarlet fever most frequently contains the streptococcus or the staphylococcus, and less often the pneumococcus, which, if present, may follow as a result of a pneumonia complicating the scarlet fever. As to the pneumococcus infection, we have a history of probable exposure to the pneumococcus two weeks after the onset of the first symptoms. The patient may, at that time, have had a pneumococcus infection of the lung, of which on admission, two weeks later, there were absolutely no signs.

Endeavoring to account for the pneumococcus infection, we find that our patient was exposed two weeks after the onset of the scarlatinal symptoms. We know that the pneumococcus inhabits the normal throat. Taking into consideration the diminished resistance of the child following scarlet fever, plus these pneumococci, (which, as Arnold and Grawitz have shown, can pass through the lung tissue and into the pleural cavity with-

out infecting the lungs), plus a hydrothorax accompanying the general edema, we can perhaps conclude that the pneumococcus empyema possibly followed such an infection.

Desguin, in his excellent monograph,<sup>1</sup> says that a pneumococcus infection of whatever part of the body is always accompanied by a pneumococcemia. He states further that the pneumococcemia may precede the appearance of a local lesion. As the presence of the pneumococcus in the blood is not a normal condition, in our case the micro-organism may have entered the blood from the congested throat usually seen in scarlet fever. From this it may also be possible that the empyema was secondary to the pneumococcemia. We must not lose sight, however, of the fact that there may have been a preceding pneumococcus pneumonia followed by empyema, although from the history and the signs on admission this could not be positively determined. The empyema was confirmed by the aspiration of pus from both sides of the chest, each of which showed the presence of pneumococci as reported by the pathologic department: Pus from left chest: pneumococcus, polynuclears 100 per cent.; pus from right chest: pneumococcus, polynuclears 97 per cent., lymphocytes 3 per cent.

The first blood-culture also showed the pneumococcus as seen from the following report: Culture made by Dr. Olsan July 8, 1910, 5 c.c. of blood being used. This blood was incubated partly in glucose-bouillon, partly in agar, and partly in 2 per cent. glucose-agar. In all the media pneumococci were found, there being on solid media seven colonies to the cubic centimeter of blood. The organism was typical in every respect. This culture was found positive six weeks after probable infection, which is an unusually long time for a pneumococcemia to persist, according to Desguin. A second blood-culture was made by Dr. Celler July 22, 1910, 5 c.c. of blood being used. This was incubated in glucose-bouillon, in agar, and in glucose-agar. All the media remained sterile, the time of observation being six days.

At the time the face induration appeared pneumococci were still probably present in the blood, and although pneumococci were not recovered from the pus evacuated from the swelling, owing to exuberant growth of saprophytic bacteria, there is a strong likelihood that this focus can be considered a metastasis. Two weeks after the first culture was made, a second was taken and found to be negative. At the time the general condition of the boy improved considerably, and although at times there was a tendency for the temperature to rise again it was always found to be due to slight retention of pus. Dr. Meyer in his comment on the case says, that from the surgical standpoint the method of treating a bilateral empyema is of interest, especially if the patient is in as bad a condition as this one was. To have opened the two sides of the chest at the same time would probably have been fatal. Incision and drainage of one side so as to give the child some lung with which to breathe, and to permit some lung expansion on one side before opening the other, seems to be the best method of procedure. If the child's condition had not been so desperate, rib resection would have been performed at the first operation, but the first consideration was to get the chest opened and drained and the child removed alive from the operating-table.

As a matter of fact, in young infants, intercostal incision is frequently sufficient and is certainly worthy

1. Desguin: *La septicémie à pneumocoques*, 1908.

of a trial as being the simpler operation. In this case drainage was as satisfactory from simple incision as from the site where the resection was done. Up to this time, three months after discharge from the hospital, the boy has remained entirely well.

## FRACTURE OF THE CLAVICLE

### ITS DIAGNOSIS BY TRANSMISSION OF RESPIRATORY SOUNDS \*

SEWARD ERDMAN, M.D.

Adjunct Assistant Surgeon to Bellevue Hospital; Assistant  
Attending Surgeon to Lincoln Hospital

NEW YORK

In a paper, read before The Society of Practical Medicine in May, 1907, entitled, "Diagnosis of Fracture of the Clavicle by Auscultation of Voice and Breath Sounds," I called attention to the fact that in normal individuals there is distinct transmission of both voice and breath sounds probably from the trachea, outward along the shaft of the clavicle to its outer extremity.

When a small-belled stethoscope is accurately applied to the outer extremity of the clavicle, breath sounds and voice sounds of a distinctly bronchial or tracheal quality are to be heard.

In a series of over 300 normal persons thus tested, it appeared that the whispered voice was the most reliable test and that in over 95 per cent. of all the cases a more or less intensely bronchial whisper could be heard over the acromial end of the clavicle.

In over two-thirds of the cases the spoken voice as well as the whisper was of this quality, and audible. In about one-third of the cases the respiratory murmur was distinctly audible and of this bronchial character, in addition to the spoken and whispered voice.

It was also noted that the transmission of these sounds was limited very strictly to the area over the shaft and outer extremity of the clavicle, and that if the stethoscope were moved even one-half inch forward, or outward, or backward, away from the clavicle, the sound transmissions were lost or so completely modified as to offer a clear demarcation.

Conclusions: Granted that there exists normally a transmission of voice sounds from the trachea outward along the clavicle, a fracture of the bone should cause a break in sound propagation; and such is found to be the case.

In the series of fifteen cases reported at that time, the results were most striking, for, in all these cases of fracture, there was complete loss of these auscultatory signs on the injured side, in contrast to their presence on the normal clavicle. In one case of green-stick fracture, the intensity of the sounds was very much diminished although they were not entirely lost.

As bony union takes place, there is a gradual return of these signs, but this does not seem to occur until after the fourth week from the time of fracture.

In cases of prominence of the inner fragment of the clavicle, it is often very easy to place the stethoscope over this fragment and to recognize clearly the sounds which no longer are audible over the outer fragment.

#### TRANSMISSION OF FREMITUS

Since writing the above-cited paper, I have made use of a still simpler method, based on the same principles,

but dependent on the fact that vocal "fremitus" is likewise transmitted along the clavicle unless there be a break in the continuity of the bone.

Whereas the diagnosis with the stethoscope as above mentioned can usually be made, nevertheless there are a number of patients, especially children, who apparently cannot whisper and thus the test is rendered unsatisfactory; or there is difficulty in applying the stethoscope.

On the other hand, the recognition of vocal fremitus by the palpating finger is more easily attained and even the cries of the youngest child afford means for this test.

#### METHOD

The examiner stands directly behind the patient, who should best be seated on a plain stool or chair. Place the thumb or index-finger of each hand on the corresponding clavicle of the patient, and without pressure.

Commencing near the sternal end of the shaft of the clavicle gradually move the examining fingers symmetrically outward along the clavicles while the patient repeats some sonorous words, e. g., "ninety-nine, ninety-nine, etc."

In the absence of a fracture the palpable fremitus will be easily detected and of equal intensity on the two sides, all the way out to the extreme end of the bone.

If there be a complete fracture, the fremitus is suddenly lost or very greatly lessened at the point of fracture and beyond. So delicately may this sign be elicited that it is often possible to follow accurately the obliquity of the line across the shaft at the point of fracture.

The normal fremitus of the whole scapular region and chest is very different in intensity and is easily distinguishable.

#### VALUE OF THE METHOD

In many cases of fracture of the clavicle, inspection alone, or the most superficial palpation, reveals without difficulty the presence and the site of the break, and no further examination is necessary; but for the above method I claim the ease with which the signs are to be elicited, the freedom from painful palpation of the fractured bone, and its great value as an aid in the diagnosis of the cases in which the fracture is in the outer end or in the shaft without deformity, and in all doubtful cases.

#### LITERATURE

Auscultation to elicit crepitus at the site of fracture has long been in use, especially for fracture of the ribs; but in 1893, Vajana<sup>1</sup> of Palermo described a method for diagnosis of fractures of many of the long bones and bones of the skull by combined percussion and auscultation.

The stethoscope is placed on a subcutaneous portion of the bone and, with the plexor and pleximeter, percussion is now made at points along the bone in all directions from the stethoscope, and when a line of fracture is crossed there is loss of the sound transmission.

In 1902, J. Plesch<sup>2</sup> of Budapest, described the same method as original, having doubtless overlooked Vajana's communication.

A. H. Andrews<sup>3</sup> suggests the use of the tuning-fork instead of the plexor and pleximeter.

1. *Riforma med.*, June, 1893, ix, part 2, p. 651.

2. *Ungar. med. Presse*, August, 1902, vii, 497.

3. *Chicago Med. Recorder*, 1903, xxiv, 182, 185.

\* Communication received July, 1910, for publication.