

drugs were given simultaneously. A convulsion came on in two and one half minutes, which was followed by almost constant spasms and convulsions with no intervals of rest at all. This animal died twenty-eight minutes after injection, apparently from exhaustion, as there was no spasm or convulsion at the time of death, and no symptoms of the presence of the nitrite, at least in overdose.

Rabbit No. 6. Strychnia, one twentieth of a grain, and nitrite of amyl, nineteen minims, were given as before. Convulsion came on in nine minutes, the delay being probably due to the fact that quite a large amount of blood escaped after the hypodermic needle was withdrawn, and with the blood escaped quite a quantity, probably, of the injected and as yet unabsorbed fluid. This animal lived about three hours, during which time it had numerous convulsions and spasms. This increase of time before death may be attributed to the hæmorrhage above stated.

It is evident from the foregoing accounts that —

First. Nitrite of amyl does prolong life in strychnia poisoning, although its action is so fleeting compared to that of its adversary that it can only be used to tide over the patient until more persistent remedies or antidotes, such as potassium bromide or chloral, can be administered.

Second. That it cannot be used by inhalation as an antidote with any chance of security from a fatal termination, owing to the facts regarding expiration before stated.

Third. That the longer the nitrite be given after the strychnia the less good it will do, *provided* the strychnia has already shown itself by convulsions or otherwise. This is true not because the nitrite is less powerful after the first convulsion, but because death is more apt to come before nitrite can fully act.

Fourth. That the nitrite has to be given in such quantities and at such times that its full physiological action be present constantly, otherwise in the instant which may supervene between the after effects of one dose and the beginning of the next the patient may die.

Fifth. That in cases of strychnia poisoning, the nitrite of amyl being used as an antidote, an injection of the nitrite should be given, and the patient kept moderately under its influence by inhalations until other remedies are obtainable.

The writer cannot account for the disparity existing between the results of Dr. St. Clair Gray and his own. It is certain that one twentieth grain of strychnia invariably causes death in the rabbit, as the foregoing experiments would prove. It is probable that some mistake must exist as to the amount of Dr. Gray's doses from errors of a typographical character or from impurity of the strychnia used. His doses, as before stated, were one half grain to ten drops of nitrite, and that he found one quarter grain often caused death, when given alone, in one convulsion. That one quarter grain of strychnia should cause death in a rabbit in one convulsion cannot be wondered at when we consider that a twentieth grain is a maximum dose for a man for continuous use. Many deaths are recorded from one quarter and one half grain doses in man. One man who took one half of a grain was dead in twenty minutes.

It may be well to state that the strychnia used by the writer was very carefully selected, as was also the nitrite of amyl.

## LATENT ACUTE PERITONITIS OF IDIOPATHIC ORIGIN. LARGE AMOUNT OF PUS IN THE ABDOMINAL CAVITY. EVACUATION. RECOVERY.<sup>1</sup>

BY Z. B. ADAMS, M. D., FRAMINGHAM, MASS.

"L'on peut dire avec vérité que le pus est la sécrétion normale du péritoine enflammé." — *Nouveau Dict. de Med. et de Chirurgie*, Article "Péritonite Aiguë."

FRANCES L., four and a half years old. Parents and grandparents all living and healthy. The fourth of five children. No family history of disease of any kind.

*Previous history.* Two weeks before birth, for no obvious reason, the mother felt something break suddenly, and a large quantity of liquor amnii was discharged. At that time all feeling of motion ceased. The labor was at full term, easy and rapid. The child was very feeble, scarcely breathed, and was estimated to weigh not more than four pounds. She looked like a seven months' child. There was a firm knot in the cord. For the first week the child was kept alive by artificial heat, and was apparently too weak to nurse. At the end of that time she began to gain. Livid ecchymoses appeared upon the buttocks and bowels.

The child thrived, and at the date of sickness was forty-one inches high and well nourished, but not fat. Her digestion was more liable to disturbance than that of the other children.

When about eight months old she was tipped out of her carriage and fell a few feet off a bank, was picked up insensible, but soon recovered. She became very pale and vomited from the shock.

On the 17th of May, 1884, after a somewhat hearty dinner, Frances complained of feeling ill, was nauseated, feverish, and languid. The night was restless, and she had several loose stools with pain in bowels. Seen by me the morning after, the face was flushed, temperature 104° F., pulse 120, nausea, diarrhœa, no tenderness of bowels, no pain, no tympanites. Complained only of feeling tired. The parents feared scarlatina or diphtheria. At night the temperature was 105° F., pulse 140; she was rather restless, but did not complain of pain. The symptoms were attributed by me to indigestion.

On the next day, May 19th, the youngest child was attacked with similar symptoms, which, however, soon disappeared.

Frances continued to have diarrhœa for about a week. The stools were slimy, containing mucus. The nausea gradually subsided, as did the fever, but she did not recover. She made no complaint of pain and there was no tenderness of the abdomen. She remained languid, did not care to get up, had a pulse of 120, and a temperature occasionally rising to 102° F. in the evening, but not above 100° F. in the day. There was no marked tympanites, but rather dullness of the abdomen. The appetite did not return. The skin was dry and the expression one of indifference. The symptoms were of a mild typhoid character. There was no hectic, no headache, nor sweating. Sleep not disturbed and mind perfectly clear, but not interested in anything. The stools became scanty and occasionally mucous in character. It was supposed by me that there was some bowel obstruction. The most careful examination revealed no tenderness anywhere and no tumor. The

<sup>1</sup> Read before the Middlesex South District Medical Society, October, 1884.

form of the belly was not unusual, but there was some general distention, and there was dullness on percussion in spots. The symptoms did not warrant the diagnosis of peritonitis, either tubercular or from other causes. There was no colic pain, no tenderness on pressure, no fluctuation, no enlarged glands. There was no complaint of tenesmus. The tongue was moist and coated.

This condition continued for about three weeks, during which time the abdomen very slowly enlarged.

At the beginning of the fourth week a nodulated tumor appeared in the epigastrium, occupying a right median position. It was somewhat tender to the touch, and could be plainly seen. The abdomen was now very much distended, showing enlarged veins. There was no pain, and no tenderness on pressure except over tumor. The renal region was resonant and the abdomen also in spots, but generally dull on percussion. The diaphragm and thoracic organs were pushed up, and the apex beat of the heart was an inch above the nipple line. There was emaciation, but no decided hectic nor sweating. Appetite was absent, and there was frequent complaint of nausea after taking food. The abdomen presented a uniform enlargement, which was not elastic nor oedematous. Fluctuation was not clear, nor was there a marked line of flatness anywhere.

She was now seen by Dr. H. O. Marcy, of Boston, in consultation, and it was decided to aspirate. The needle, introduced above the pubes, drew off more than a pint of pure, creamy, odorless pus. Dr. Marcy kindly examined and reported upon this matter, which he found to contain multitudes of micrococci, pus corpuscles often disintegrated, fine granules, a little free fat, and fine oil globules. "The micrococci very active, which reproduced in pairs, not chains."

There was temporary relief to the general symptoms, and ten days afterwards, precisely six weeks from the onset of the disease, with the valuable aid of Dr. Marcy, and of Drs. Smith and Bigelow, of Framingham, I made a section two inches long and above the umbilicus as far as the tumor already described in the epigastrium. This tumor was then about as large as a silver dollar, nodulated, flattened, and fluctuating in the middle, slightly blushed, and sensitive to the touch. The condition of the child was as follows: Respiration of the costal type; thoracic viscera pushed upwards; apex beat of heart one inch above the nipple line; emaciation marked over the ribs; large veins prominent on each side of the abdomen; umbilicus prominent; face dusky and anæmic; no jaundice; thrilling in jugulars; countenance not expressive of pain; abdomen not tender; color of skin somewhat dusky; no oedema; urine normal. Pulse 140; temperature 101° F.

A careful section was made through the skin and subcutaneous layers, and the peritonæum was opened with the usual precautions. A quantity of odorless, creamy pus, estimated to amount to considerably more than a quart, flowed out, together with some blood-clots and masses of fibrinous material, as soon as the peritoneal cavity was opened. The peritonæum appeared thickened, deep red in color, and bled wherever touched. Firm bands of adhesion were found, especially on the right side. The nodulated tumor had no deep origin or connection, and proved to be only inflammatory thickening of the peritonæum itself and the subcutaneous cellular tissue; evidently an effort of nature to get rid of the pus. At my request Dr. Marcy gave me his valuable aid in exploring the

cavity, and confirmed my observations. The peritoneal cavity was then thoroughly irrigated with hot water (1 — 200 carbolic), further examination or interference being prevented by the condition of the patient. Collapse from shock and the withdrawal of so large an amount of fluid pressure from the intestinal tract, obliged us to stop and resort to artificial respiration, and to close the wound as rapidly as possible. This was done with two deep sutures, taking in the peritonæum and fine superficial suture of the skin.

Immediately after the operation the temperature fell to normal, and the pulse to 104, and so remained for four days. There was no pain, she slept well, and had a good appetite; urine normal.

On the fourth day after operation the temperature dropped to 97° F., and there was appearance of exhaustion, with loss of appetite; pulse 120, and an evening rise of temperature to 102° F. The temper became restless and capricious, and the abdomen showed evident signs of reaccumulation of fluid. The wound was healthy. Some tympanites developed. The superficial sutures were removed on account of the stretching.

Fifth day. Abdomen very tense. Deep stitches were removed in hope of giving exit to pus, but union had taken place and only a few drops appeared at the points of suture. Morning temperature normal, evening 102° F. to 103° F. No chills, sweating, nor headache. The bowels moved with discharge of gas and some relief to distention. Urine normal.

Seventh day. Union of abdominal wound complete. Some tympanites. Considerable distention and uneasiness. On the eighth, ninth, and tenth the evening temperature rose to 103° F., and in the morning fell to subnormal, — 97.5° F.

Twelfth day. Abdomen tense, twenty-two inches. A spontaneous opening occurred over the tumor in epigastrium with free discharge of a thin purulent matter, and relief to all the symptoms. The temperature fell to 96.5° F. and remained subnormal for four days. On the fourteenth day the discharge ceased, and there was occasional vomiting. The abdomen was soft, and measured eighteen inches. Appetite fair. Pulse feeble (104) and intermittent. Urine scanty. Slight discharge of pus from epigastric opening in the evening.

Sixteenth day. Temperature rose to 102° F. between noon and three P. M., and remained high until eight P. M. After passing large quantities of flatus and some fæces by use of injections, the temperature slowly fell, and a slight discharge took place from the opening. The child was drowsy all day.

After this date all discharge ceased. The nodulated tumor in the epigastrium softened and disappeared. On the thirtieth day the heart had completely returned to its normal situation. The child regained appetite and color. During all this time the bowels were kept free by daily injections, usually of simple warm water, but occasionally turpentine or oil was added.

The pus seemed to gravitate towards the region of the spleen, and thence to the left iliac region, where there still remains some dullness. Two or three times at considerable intervals there have been sharp attacks of colic pain during this convalescence; once apparently caused by a blow upon the stomach, and once by some error in diet. During these colic attacks the abdomen balloons out over the site of the epigastric tumor and that of the incision made at the operation. Ordinarily there is nothing remarkable about the ab-

domen except, perhaps, that it is somewhat fuller than usual along the median line. There is no tenderness and no tympany or dullness anywhere. Color of skin normal. The bowels move without pain; are seldom constipated; urine normal; and the child has grown an inch and a half in height, and has gained nearly ten pounds in weight in about three months.

### THE PATHOLOGY OF BRONCHO-PNEUMONIA.<sup>1</sup>

BY FRANCIS DELAFIELD, M. D.,

*Professor of Pathology and Practical Medicine in the College of Physicians and Surgeons, New York.*

I SHALL offer for your consideration, this evening, some observations on the subject of broncho-pneumonia. I venture to do this for the reason that I believe that this particular lesion suffers from the effects of tradition, from having been called catarrhal pneumonia, and from its relations to pulmonary phthisis. It is also doubtful whether the profession appreciate what a common lesion it is.

I do not mean that the real lesions and symptoms of the disease have not been described. They have been described by different observers; but their descriptions have been, for the most part, fragmentary, and have failed to give a picture of the disease.

The current notions concerning the disease have remained somewhat obscure and indefinite. The prevailing ideas concerning broncho-pneumonia may be stated as follows:—

That the terms broncho-pneumonia, lobular pneumonia, catarrhal pneumonia, and capillary bronchitis may all be used to designate the same lesion: although it is customary to use the words broncho-pneumonia and lobular pneumonia when the disease occurs in children; capillary bronchitis when it occurs in adults; and catarrhal pneumonia when it is believed to be a form of phthisis.

That the inflammation begins in the bronchi, extends to the small and capillary tubes, and then to the groups of air vesicles which belong to these bronchi, and that for this reason the hepatization assumes a lobular form.

That obstruction of the bronchi with inflammatory products frequently produces areas of atelectasis.

That the catarrh may become chronic, the products of inflammation in the air vesicles undergo cheesy degeneration, interstitial changes be developed in the framework of the lung and so a form of pulmonary phthisis be produced.

This, I think, is a fair enough example of the ordinary accounts of broncho-pneumonia — accounts which fail to bring out the essential features of the disease.

Let us, then, turn to the conditions themselves — to the clinical symptoms and the lesions of broncho-pneumonia as we all can see them for ourselves.

To approach the subject properly, we must consider the symptoms and lesions of acute bronchitis as well as those of broncho-pneumonia.

First, then, of *acute catarrhal bronchitis*. This is a disease of very common occurrence, especially in children, but one which seldom proves fatal. Our knowledge of its lesions is derived from exceptionally severe

<sup>1</sup> Read before the Pathological Society of Philadelphia, October 23, 1884.

cases, from cases which are complicated by other diseases, and from the symptoms which we observe during life.

The inflammation involves regularly the trachea and the larger bronchi; less frequently the smaller bronchi also. As a rule the bronchi in both lungs are equally affected.

The first change seems to consist in a congestion and swelling of the mucous membrane of the bronchi with an arrest of the functions of their mucous glands. This is attended with pain over the chest, a feeling of oppression, rapid or asthmatic breathing, and a dry cough.

Fever and prostration are present in a degree corresponding to the extent and severity of the inflammation and to the age of the patient.

After this the mucous glands resume their functions with increased activity, the congestion and swelling diminish, there is a more rapid desquamation of the superficial epithelial cells, an increased growth of the deeper epithelial cells, and a moderate emigration of white blood cells. Sometimes the red blood cells also escape from the vessels.

The patient now has less pain and oppression, the cough is accompanied with an expectoration of mucus, mixed with epithelium, pus, and sometimes blood. After death the only lesions visible are the increased quantity of mucus, the growth of new epithelium, a few pus cells infiltrating the stroma of the mucous membrane, and sometimes a general congestion. If the smaller bronchi are involved they contain pus cells.

In a moderate number of cases, especially in very young children, certain accessory lesions are added. There may be a general congestion of the parenchyma of the lung, and even a filling of some of the air vesicles with inflammatory products. Still further, the filling of the small bronchi may lead to the collapse of the groups of air vesicles to which they lead, and thus are produced areas of atelectasis, which may be further changed by inflammatory processes.

In acute catarrhal bronchitis, then, the inflammation involves regularly only the mucous membrane of the bronchi; and in this mucous membrane the only changes are: congestion, swelling, changes in the epithelial cells, and in the functions of the mucous glands.

As complicating conditions, we may find atelectasis, congestion of the parenchyma, and areas of diffuse pneumonia.

Now let us consider the lesions and symptoms of broncho-pneumonia.

This disease is of common occurrence in children as an idiopathic inflammation, and as a complication of measles, whooping-cough, scarlet fever, and diphtheria. In adults it occurs less frequently, but in them also it may be idiopathic, may complicate the infectious diseases, and may follow injuries of the brain and spinal cord. Constitutional syphilis also may give rise to broncho-pneumonia, and in pulmonary phthisis this same inflammation constitutes an important part of the lesions.

In children, while the inflammation always presents the same essential characters, yet there is considerable diversity, both in the symptoms and in the lesions, in different cases. Thus, in infants a few weeks old, often the only symptoms are rapid breathing, a febrile movement, prostration, and death.

In older children there are well-marked constitu-