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AN

INAUGURAL DISSERTATION

ON

Acute Pneumonia

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BY

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To

C. K. Winston, M. D.

Prof. of Materia Medica & Therapeutics

In the Medical Department

Of the University of Nashville,

This Paper

Is respectfully Dedicated,

As a

Testimonial

Of

Respect for his virtues,

And

Admiration for his talents,

By

The Author.

Acute Pneumonia

Pneumonia is an inflammation of the proper substance of the lungs, and is habitually divided into three stages: each stage corresponding to the different conditions and periods of the inflammatory process. That of engorgement, of red hepatization and of gray (or suppurative) hepatization. And first of engorgement.— The substance of the lung becomes loaded or gorged with blood, or serum mixed with blood called bloody serum. The external surface of the lung assumes a darkish red hue, and when pressed upon the crepitation will be much less distinct than in the healthy lung. It feels as though there was more liquid than air in its cells. Its specific gravity is also greater than that of the healthy lung: its elasticity is lost, and when pressed upon it retains in some degree the indentation made by the finger. If we make a section of the portion

of lung which is engorged it will be found to be red, and there will escape from it not unfrequently a very great quantity of bloody serum, of a frothy character. Its cohesion is at the same time greatly lessened, and is capable of being more easily torn. It assumes in a great degree the structure and friability of the spleen; hence the term splenization has been applied to this stage of the disease. The mucous membrane of the small bronchial ramifications in this stage of the engorgement takes on a deep red appearance. Those portions of the lung most engorged, notwithstanding they are heavier than natural, will after all almost invariably swim upon water. We are very liable to be deceived in regard to this state of inflammatory engorgement. In a great number of bodies examined after death, there will be found to be engorgement in some degree at the posterior portion

of the lungs; I say the posterior portion, because of the patient most usually assuming the supine posture a few hours before death. In short, the portion most usually found to be engorged, is that which has been underneath during the last hours of life, or after death.
It is not an easy matter for us to distinguish these two kinds of engorgement from each other, solely by their anatomical phenomina. Andral at one time held, indeed, that if the engorged part were more friable more easily torn or broken down under pressure than natural, that was a sufficient evidence that inflammation had existed in the part; but he afterwards saw reason to alter his opinion. We judge (says Dr Watson) by the situation of the engorgement sometimes: if it be not in a depending portion of the lungs it is surely inflammatory. Continueing (he says) that we judge also by the antecedent symptoms; which in my humble opinion

is the only method by which we are enabled to discriminate between these two kinds of congestion.

I will now briefly notice the second stage, that of red hepatization. The inflammation continuing, there is wrought within the pulmonary tissue further alteration which is evinced by the following phenomena. The lung retains its redness both externally and within. Some authors that I have examined upon this subject, hold that the lung in the second stage does not present that dark red appearance externally that is discovered in the first stage, but all quadrate in respect to the appearance within the lung. No crepitation can be observed; the lung has acquired the weight and consistence of the liver; no air can penetrate its air cells, and its specific gravity is so great that it sinks in water. When cut, its surfaces frequently exhibit

a uniform red color, resembling very much the cut surfaces of the liver. Hence the term Hepatization. If the lung be cut, but a small quantity of fluid will escape; but by scraping the surface with a knife a small quntity of bloody serum may be forced out, which is somewhat more dense than in the first degree, and unmixed with froth.

Notwithstanding the lung is more dense and solid than in the first stage, it is ~~xxxxxx~~ capable of being more easily torn and broken down; this depending upon the decompadition of the areola tissue which unites and coaptates the part. If a portion of hepatized lung be torn and examined with a magnifying glass the pulmonary tissue will exhibit an innumerable amount of very minute, red granules, which are, in all in all probability, the air vesicles closed up, thickened and distended with a concrete albuminous secretion, and are made red by the inflammation. This granular

appearance however, is not constant. If the whole lung be involved in the inflammatory process there can no air enter, consequently, the thorax may be opened and the lung be exposed to the air without its collapsing. The lung is frequently so much engorged and distended that by pressing against the ribs, their indentations are very visible. The softening at this stage is to such an extent that the finger may be readily passed through its substance with but very little resistance. By taking a small portion of this lung and compressing it between the fingers it may be very readily reduced to a pulpy mass.

In the third stage, or that of gray (or suppurative) hepatization, the lung is found to be infiltrated with pus, And instead of its presenting that dark, red colour externally and within which is present in the second stage, it exhibits

a yellowish or grayish aspect. and if a portion of it be laid open with a knife, from its surfaces will flow a yellowish opagus fluid, resembling pus, and frequently impregnated with blood. The lung in this condition is much easier broken down than in the second stage, so much more that by taking a portion of it and pressing it between the fingers, it is almost completely reduced into a purulent fluid.

Having now briefly noticed the most important anatomical phenomena present after death, I propose just here to make some inquiry in regard to that portion or portions of the lung most usually the seat of the disorder. Both lungs may undergo the inflammatory process at the same time; this however, occurs but seldom. The inflammation may assail only a portion of one lung, or the whole of it may become involved; that is, the inflammation may be partial or general.

The right lung is by far the one most frequently inflamed; And why it does occur more frequently upon the right than upon the left side, no one has yet satisfactorially accounted for. It may be proper for me to introduce some Statistics in order to sustain my declaration. I find in Dr Watsons work on the practice of physic some statistical statements collected by Andral in respect to this point. Of one hundred and fifty-one cases of pneumonia noticed at La Charite, ninety were of the right side alone; seventeen of both sides at once; thirty-eight only of the left alone; and in six the situation was uncertain. He, (Andral,) was also at the pains, (says Dr. W.) of collecting the particulars of fifty-nine other examples of pneumonia from different authors, so fully described as to leave no doubt about the nature and situation of the disease. Among these, the inflammation existed in the

right lung alone in thirty-one patients; in the left alone in twenty; and both sides at once in eight. Taking both series of observations together, we have two hundred and ten cases of pneumonia; in which the right lung alone was the seat of the disease, one hundred and twenty-one times; fifty-eight in which the left; twenty-five in which the pneumonia was double; and six in which the disease was uncertain.

From a comparison of fourteen hundred and thirty cases (says Dr Wood) collected by M. Grisolle, it appears that the cases of double pneumonia were about 18 per cent. of the whole number, those of the left side about 30 per cent. and those of the right side about 52 per cent. So by these statistical accounts we see that pneumonia is by far more frequently situated in the right than in the left lung; and that it does not assail both lungs at once so often as once

in sight. Now with regard to that portion of the organ which is most subject to active idiopathic inflammation. By some statistics which I will presently give, we will see that the inferior lobe is the one most frequently the seat of the inflammation. Pneumonia, according to Laennec's statement, most usually begins in the lower lobe and spread upwards not unfrequently to the superior lobe. Of eighty-eight cases of pneumonia collected by Andral, he found the lower lobe affected forty-seven times, the superior lobe thirty, and the whole lung at once, eleven. The bronchi always become inflamed when the substance of the lung takes on inflammation, and the mucus membrane lining these tubes, both the large and small, presents a deep reddish hue. If the inflammation be confined to a single lobe the bronchi only, which are distributed to this lobe will present

this reddish appearance. In a great number of cases of pneumonia, there exists also inflammation in some degree of its investing membrane; the pleura: And by some writers this disease has been denominated pleuro-pneumonia. Nevertheless, pneumonia may and does exist without its investing membrane becoming involved.

I have now described the changes which are wrought in the lungs when the pulmonary texture has undergone the inflammatory process, and will next proceed to the enumeration of the rational and physical signs on which we are enabled to predicate a correct diagnosis.

And first, the rational signs. The invasion of the disease is usually marked by a chill, followed by heat, pain in the side, cough, oppressed breathing, and sometimes cephalgia and vomiting. Sometimes the disease creeps on more

slyly; without the antecedent chill. Not unfrequently the symptoms which characterize the disease are for some days preceded by general uneasiness, lassitude, loss of appetite and more or less fever. Sometimes the disease commences first, by the inflammation attacking the mucus membrane of the larger bronchi, and by degrees spreading from the larger to the smaller bronchi; finally reaching the air vesicles, and interstitial texture.

When the disease is fully developed, it is characterized in the majority of instances, by fever more or less severe, hurried breathing, pain in some portion of the chest, cough and and expectoration tinged with blood. The pain may either accompany, precede, or follow the commencement of the fever. The pain in pneumonia is at its commencement very acute and lancinating: this is thought to be owing to the participation of its lining membrane

in the inflammation. It seems that the pain is not so severe in those cases in which the pleura is not involved; but the compound disease denominated by some writers pleuro-pneumonia is the one we most usually meet with. The pain in this disease usually exists in the mammary region; on a level with, or a little below the breast, corresponding to the side affected. This I say is the point where the pain is most generally experienced, but it may be seated in almost any other portion of the chest. In a great number of instances there is no severe pain either at the beginning or during the course of the disease; and instead of the acute pain, the patient experiences a feeling of a dull, aching sensation, or a feeling of soreness, oppression, heat, weight or stricture on the affected side. The pain is sometimes referred

to the anterior part of the chest, and not unfrequently to the epigastrium. The pain is so obtuse in some instances as to require a full inspiration in order to render it any wise sensible to the patient; percussion may be necessary to produce it.

The breathing is invariably hurried; and when it becomes very much aggravated it may increase so much in frequency as to rise from its natural standard, which is from eighteen or twenty in a minute, to as high as thirty, forty, fifty and even sixty in a minute. The breathing differs very materially in different persons, although the amount of local disease may be the same. In some patients the breathing becomes so oppressive as to require their being placed in the erect posture, depriving them almost of speech; in others it is so slight that the patient is entirely unconscious of it, and

the physician, if he be not well versed in this symptom is liable to fail in detecting it. When the breathing, as I have before stated, becomes quickned and very difficult, the patient appears to be totally careless of what is going on around him; his face becomes red and is expressive of great anxiety; his nostrils become greatly dilated and in full play; the breathing is quick and short as though the air was capable of entering none but the primary divisions of the bronchi. But few patients recover from this state of extreme dispnoea: and there are many degrees between this and the slightest which will be met with in practice.

Cough in some degree almost invariably accompanies the disease throughout the whole course; however; Dr Wood says that he has known it entirely wanting for several days after the commencement of a very severe attack

involving the greater part of the left lung. In a great number of cases the cough is very severe and attended with a great deal of pain; in others again, it is very mild, attended with but little or no pain. If the disease be uncomplicated, for the first day or two it is hacking and dry, or it may be accompanied with a slight expectoration of mucus. In a few days however, there will be thrown up a viscid, semi-transparent matter which is from the commencement, or in a very short time after becomes tinged with blood. This matter expectorated is of a rusty appearance; sometimes inclined to yellow or green, depending upon the quantity of blood present. This mucus is is so tenacious, that if the vessel containing it be inverted, will not become detached from its sides or bottom. Of the rational signs

of pneumonia, this rusty colored expectoration is probably the most characteristic. The physical signs failing to perform their part in the diagnosis we are to be guided principally by the expectoration. It must not be taken for granted, that when this characteristic expectoration is absent, we have no pneumonia: but when present, it may be set down that we most undoubtedly have pneumonia. Rarely, the expectoration consists of almost pure blood, most usually, this blood is observed to be mingled with the viscid semi-transparent matter. The sputa in this disease, may be distinguished from that of bronchitis, by their not being streaked with blood, as that of bronchitis does. So long as this mass (says Dr Watson) flows readily along the sides of the vessel when tilted, so long have we reason to hope (judging from this

circumstance alone) that the inflammation of the lung does not pass its first degree. But if the sputa acquire an extraordinary degree of viscidity: so as no longer to separate themselves from the vessel when inverted: we are obliged to fear that the pneumonia reaches its second stage. If the chest be percussed when this rust-colored sputa is very viscid, the sound evolved is dull, the vesicular murmur is lost, and it is supplanted by the bronchial respiration. When this state of things obtain, pneumonia is said to be at its acme; the expectoration remaining for some time unchainged.
In some instances the inflammation retreats, and the expectoration becomes less tenacious and less rusty, assuming somewhat the character of the matter thrown up in catarrh. On the other hand, if the disease continues in severity, the rust-coloured sputa may

accompany the disease to the end. This state of things existing (that is, the disease increasing in severity,) most generally, the expectoration becomes less profuse, or it may be entirely wanting. This is owing to the extreme tenacity of the mucus, or to the feebleness of the patient, consequently, he can not throw it off. The sputa clog up the air passages, and the patent dies of suffocation. In some instances we see instead of the characteristic viscid sputa, a very copious expectoration of fluid like mucus, and in some degree tinged with blood; compared (by Andral) to liquorice water, or plum juice. This is to be regarded a fatal symptom. When the odour of the expectoration becomes very offensive, we may set it down as an almost sure sign that the lung has become gangrenous: this however, occurs but rarely. In some

instances during the progress of the third stage, the matter expectorated consists of pure pus. This characteristic expectoration of pneumonia is owing to the blending of blood with mucus.

In regard to the position assumed by the patient in pneumonia; it is most usually supine, with his head and shoulders somewhat elevated, sometimes the patient prefers lying on the sound side; this position however, obstructs the breathing in a greater degree than when he rests on the side affected.

Fever is almost always present during the progress of very violent cases; this with very quick and difficult breathing in some instances constitutes the only obvious affection.

In some instances the fever is so mild as to escape notice: in others, very intense and burning. Very frequently the cheeks are flushed,

with pain in the head, most usually in the forehead, of which the patient complains more, than of that in the chest. For the first few days in some instances, headache is the only symptom complained of. Delirium, not unfrequently occurs during the course of the disease, and may be regarded as a sign unfavorable. It shows that the arterialization of the blood is greatly embarrassed by the inflammatory process going on in the lungs. By the degree of delirium, we can pretty correctly judge of the amount of mischief going on in the lungs. The fever occasionally assumes a remittent form, the exacerbations occuring every day; most usually towards evening, accompanied with an increase bloody expectoration, pain, dispnoea and cough.

The pulse in this disease, is generally

full, strong and moderately accelerated. In some instances it is very frequent from the beginning, and may reach a hundred and forty, or even a hundred and sixty beats per minute, and in the most of delirious and fatal cases, is of much greater frequency than in those of recovery. The blood when drawn from the arm is almost, but not always buffed and cupped. This peculiar character of the blood is not always present at the commencement, but it will be but a short time before it acquires it. The skin is most usually hot and dry, though sometimes moist. The urine is most generally scanty and high-coloured. The appetite is in almost all cases entirely lost. Thirst for the most part is craving. The tongue is usually moist and covered with a white

fur; sometimes however, it becomes clammy or dry and red. Sometimes vomiting and diarrhoea occur during the course of the disease, the latter not coming on usually, until the disease is pretty far advanced. As a general rule, prostration is present from the very first of the attack: however, there are exceptions to this rule. In some instances the disease is so mild that the patient is able to go about for several days before being compelled to take his bed.

I have now described as correctly as possible, and perhaps as fully as may be necessary, the national signs of pneumonia, and will next proceed to the enumeration and description of the other signs, known as physical. These signs play a very conspicuous part in the diagnosis

of pneumonia. In the early part of the first stage of the disease, if we apply the ear to the chest, either with or without the intervention of the Stethoscope, a peculiar crepitating sound is emitted, called by Laennec crepitant ronchus. This sound resembles very much the crackling of salt on hot coals, or that when a piece of fine parchment is crumpled. Dr Williams says that we may obtain a pretty correct idea of this sound, by rubbing between the finger and thumb a lock of hair close to the ear. If the ear be applied early in the disease this sound is not entirely distinct; it being mingled with the healthy vesicular murmer. The crepitant greatly obscures the vesicular sound, but does not entirely destroy it; (however, as the disease progresses the crackling becomes more

and more distinct, until at last it entirely supplants it. When these sounds are mingled and the vesicular more distinct than the crepitant, we may regard the inflammation slight. But on the other hand, if the crackling should entirely cover the respiratory murmer, we may set it down as a sign not to be doubted, that the disease is advancing, and indicates that the disease tends to run into the second stage.
As the disease advances this sound becomes less and less distinct, until finally there is no sound heard at all; and it may be followed by several different changes. It may be supplanted by the natural vesicular breathing again. Should this obtain, it denotes the resolution of the inflammation. And again, this crackling may cease and no sound heard in its stead, or anoth-

er sound may be heard of a whiffing character, resembling that made by blowing through a quill. This sound is termed bronchial respiration. We do not hear this sound so long as the smaller bronchi and air-vesicles remain permeable to the air; but when these small tubes and vesicles are closed up, so as to prevent the admission of air it becomes audible. The lung in this condition is said to be hepatized, and the air is permitted to pass only into the larger bronchi which are still open. If a piece of it be taken and compressed between the fingers, crepitation will be found wanting. At the same time if the ear be applied to the chest and the patient be made to speak, the voice will descend into the pervious bronchi and be conducted to it through the solid lung much altered from that heard on the healthy

side: the words are indistinct and muttering, resembling those made by speaking through a tube. The sounds bronchophony and bronchial respiration are most distinctly heard when the upper or central portion portions of the lungs are involved; what are called the roots of the lungs. But when the lower portions alone are involved in the inflammation, or if the inflammation is but slight, they may be entirely absent. Also, should the lung be so much hepatized as to prevent the side affected from dilating, there will be no bronchial respiration in consequence of the air in the large bronchi being motionless. Notwithstanding, the incapability of the affected side to expand bronchophony may still remain. When bronchial respiration obtains, there will also be dullness on percussion, unless

there be interposed between the inflamed part and the parieties of the chest a portion of healthy lung: and in this case the resonance will not be natural. If there be no intervening healthy portion, the hepatized lung being in immediate contact with the walls of the chest, the sound elicited on percussion will be flat or dead. In those portions of lung which are not involved in the inflammation, or if the whole of one lung be involved, we will hear in the sound lung, or in the healthy portions of the one inflamed, puerile respiration; this indicating positively, that a portion of the respiratory apparatus is spoiled, and that the remaining healthy portion is labouring to amend the defect. At the period in pneumonia when no sound is heard but bronchial breathing during

respiration, it is impossible for us to tell whether the lung will return to its healthy condition, or whether it is passing into the third stage. The lung may and does revert to its natural state, even after this state and stage of the disease has existed. If the disease passes into the third stage; that of purulent infiltration, we hear no crackling, unless a portion of the structure of the lung becomes broken down and expectorated, leaving behind a cavity into which air finds its way, giving rise to large gurgling crepitation.

The causes of pneumonia are various; but the most common and frequent causes, are the vecissitudes of the weather. Cold stands first. If a person be very warm and perspiring, and suddenly expose the body to intense cold, is very apt to induce it. Hearing

damp clothes, sleeping in damp beds, wearing clothes too thin for the season, running, or other exercise calculated to accelerate the circulation very much through the lungs, in a sharp cold atmosphere. Heavy blows on the chest, poisonous inhalations, sudden arrest of habitual discharges, alcoholic drinks and sometimes it follows severe surgical operations. The disease prevails to a greater extent in cold climates, and in the colder seasons of the year. Some persons are strongly predisposed to the disease, and suffer from frequent attacks of it. Age and sex appear to have no very considerable influence over the frequency of the disease. More males than females suffer from it as the former are more exposed.

In relation to the prognosis; if the inflammation be seated only in a

portion of a single lung, and if the patient has a strong and vigorous constitution, we have reason to hope that the disease will terminate favourably. The first degree of the disease is not so dangerous as the second, nor the second as the third. When the lung becomes infiltrated with pus, the prognosis is undoubtedly unfavourable. There is more danger when the upper lobes are inflamed than when the lower. Considerable dispnoea, is always a very bad symptom. If with this dispnoea we have a weak feeble pulse, and after the first venesection it does not become more active and stronger, we may regard the inflammation intense; consequently our prognosis must be unfavourable. Delirium also, is an ugly symptom If the sputa be very viscid, and of a deep rusty colour

it denotes intense inflammation: If it reverts to the catarrhal quality, it announces that resolution has begun. A fluid expectoration resembling liquorice-water or plum-juice, indicates that the lung has suppurated in some portion, and are therefore very alarming symptoms.

In the treatment of pneumonia we rely almost exclusively upon the three great remedies: blood-letting, tartarized antimony, and mercury. Of these blood-letting stands first. There is no disease in which bleeding is borne better than in pneumonia, provided it be well developed and the patient of vigorous constitution. We bleed not only for the purpose of directly redressing the inflammation, but also for the purpose of lessening the labor which is imposed upon the lungs, and thereby set them somewhat at rest.

All the blood in the system is necessarially compelled to pass through the lungs after reaching the heart before it can again be distributed, and as a portion of the lungs are in a condition incapable of performing this task perfectly, an immense labor is imposed upon the remaining healthy portion, it being also unnaturally loaded with blood, the consequence is, that the breathing is quickened; and by diminishing the general quantity of blood we relieve the lung of a part of this labor. We are to be guided by no fixed rule as regards the amount of blood to be drawn, but we must be guided by the stage of the disease, state of the pulse and constitution of the patient. During the first stage, if the pulse be full and strong, and the constitution of the patient vigorous,

we must place him in the upright position, the blood to flow in a full stream from a large orifice, and continued until some sensible impression is made upon the system; until the pulse become softer, or if contracted and wiry, until it becomes fuller; until the constriction and weight about the chest is relieved and the diapnoea overcome; or until the patient shows some indication of syncope.

In addition to the general bleeding local abstraction of blood may be had recourse to. It quiets pain much more directly, and with more dexterity than venesection. This may be effected either by cupping or leeching, the former being most preferable. After the blood be drawn from the vein the cups may be applied immediately over the seat of pain, or in the vicinity,

and six or eight ounces may in this way be abstracted with propriety. In this stage we may hope to check the progress of the disease by such measures. In the course of from twelve to twenty-four hours if the symptoms be in no degree abated we must bleed again. So long as the pulse and other symptoms indicate, we must abstract blood; but the subsequent bleedings must be guided by the pulse and condition of the patient.

Cases occasionally occur in which the abstraction of blood is of absolute necessity, at the same time the pulse contraindicates its interference. The pulse is weak and feeble, but under the use of the lancet it becomes full, strong, and frequent, proving that the remedy has been rightly employed. But should the pulse become more feeble from the operation,

it must be withheld. In order for us to discriminate between this and true debility, an inquiry into the previous history and condition of the patient is necessary. If the debility has come on very suddenly, the patient being previously in good health, we are justified in bleeding, and will always almost be found to be the proper treatment.
The bowels should be thoroughly evacuated after the first bleeding, and to accomplish this, calomel and jalap should be given in combination. During the course of the disease it may be necessary to move the bowels once or twice during the day with some mild cathartic; castor oil, magnesia, or what is prefered by some, enemata. So soon as the bowels are emptied we may commence with the tartar emetic

in from one twelfth to quarter doses, repeated every hour or two hours during the day. In the course of a few days after the circulation has been properly subdued by the lancet, Dr Wood recomends the following pill to be given at night; a grain of ipecacuanha, opium one grain, and two or three grains of calomel; the tartar-emetic to be continued during the day. The advantages of this combination are, that it procures rest for the patient, obviates the injurious effects of the cough, directs action to the skin, and lays the foundation for a mercurial impression on the system, if this should subsequently be deemed advisable.

After the bleeding has been carried as far as may be prudent, and the physical signs indicating that the disease is still progressing, we must abstract blood by means of the

cups corresponding to the strength of the patient. Under such treatment the disease will frequently yield without further remedies and the patient recover. But should these remedies fail in checking its progress, the disease still advancing, it will be proper to continue the pill given before at night, through the day in smaller doses, repeated at short intervals until the mercurial impression is made. When the symptoms are very violent and we wish to make a speedy mercurial impression, it may be accomplished by giving three or four grains of calomel combined with half a grain or a grain of opium every three or four hours. The impression should be made as speedily as possible, when the symptoms will begin to improve. It is never necessary for us to salivate the patient profusely; and so soon as the gums

give evidence that the impression is made upon the system the medicine may be withheld for a time, or continued in very small doses, just barely to sustain the effect produced until all of the symptoms have subsided. There is no fixed rule laid down in relation to the time for us to commence making the mercurial impression, as it may be required earlier in some cases than in others, therefore it is left to the judgement and skill of the physician.

Blisters are found to be of service during the latter part of pneumonia, but in the earliest degrees they are inadvisable. After the fever has been checked in a measure, large blisters may be applied with benefit. When the lung becomes solidified and impermeable to the air, our treatment must be regulated more by the condition of the general symptoms,

than by the actual or presumed condition of the organ, and be guided more by the national than the physical signs.