Acute Respiratory Pneumonia - its Pathology and Treatment

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Acute Bacterial Pneumonia which forms the subject of this thesis is a disease familiar enough to those outside our profession from its widespread ravages and from the tragic swiftness with which it cuts off many useful and energetic individuals in the prime of life. To the practitioners of medicine it is always a source of the greatest anxiety and he will not infrequently find his most skillful and constant efforts fail in warding off a fatal result. The disease therefore is worthy of careful study and in this paper I desire to refer more particularly to its etiology and to the various methods of treatment which have been brought forward to combat it.

The older writers used the term Peripneumonia and held it to consist of one form in which the inflammation was situated in the substance of the organ and another form where the inflammatory condition affected the covering of the lung - a Pleuritis. In fact, we are concerned with the first form although it is always accompanied by a limited Pleuritis, and we recognize it under the names Acute Bacterial, Suppurring or Fibrinous Pneumonia.

Amongst the physicians of last century
Who were without our knowledge of the part played by germs in the causation of disease, exposure to cold or chill when the surface of the body was damp, was recognised as the main factor in producing acute pneumonia. At the present time we cannot ignore the effect of a chill as the starting point of the disease, but the investigations of many observers with improved means of working, have proved beyond reasonable doubt that the essential factor in its production is a microorganism, namely the Diploceccus Renecratio Pneumonie (Hänkel and Italovon coccos)

Oller in his Practice of Medicine places Acute Pneumonia not among the simple inflammatory affections, but along with other infectious diseases such as Dysentery and Scarlet Fever and we may adopt his definition of the ailment as meeting the modern views on the subject. He writes -

"Acute Corpus Pneumonia is an acute infectious disease characterised by inflammation of the lungs or lungs, toxaemia of varying intensity and a fever that ends abruptly by crisis."

The inflammation generally attacks the base of one lung and it tends to spread upwards.
In severe cases it may involve the whole of the organ, back and front, and post mortem examination shows that the process is not in the same stage in the different portions affected. Thus the base if first attacked may be in the condition of grey hepatization, which will be described later, and the upper lobe or the apex in the stage of red hepatization. A case of my own seems to bear this out. The patient a male adult recently under observation, had dullness on percussion over the left base; four days later, this had extended all over the lung posteriorly and also in front over the apex and upper lobe. Again, the trouble may begin in the apex and travel downwards and this type occurs most frequently in children. The root of the lung may also be first attacked and when the inflammation is in this position, it is difficult to detect, on account of being so deeply situated. The right lung is said to be most frequently affected but looking over my own cases of pneumonia I find this is not my experience, as within the last five months, of four cases of the disease, all were right sided. Both lungs may be inflamed at the same time.
or the disease may on subsiding on one side pass to the other lung. I have seen this happen, but never had a case of the former.

It is usual to describe pneumonia as divided into three stages. The first - that of active congestion or engorgement of the part attacked, passing into the next stage of Red Hepatisation, in which there is a fibrinous corpuscular exudation into the alveoli, sometimes including the smaller bronchioles and forming a film over the inflamed surface of the organ. The exudation coagulates in situ, fixes the lung in a state of immovable expansion, more densely solidified that it could be by any artificial injection with coagulable fluid. When the third stage of Grey Hepatisation is reached, instead of a firm exudation in the alveoli, we find them filled with a mass of crowded leucocytes and the term Pusulent Infiltration is employed to denote this condition. When extreme, Mr. Tagge is of opinion that when this last state is present, recovery is no longer possible and Sir Samuel Wilks also holds that death is inevitable in such a case.

Rye Smith has contributed a very able article on Acute Pneumonia in Clifford Allenburto System.
of medicine and he believes that even
purulent infiltration is capable of resolution.

Bacteriology of the disease.

A study of the bacteriology of pneumonia goes far
to explain the course which it follows and to
interpret as well many of the symptoms which
are otherwise so confusing and perplexing. Although
as we shall see, a chill must not be ignored in
the causation of the disease, the prime agent
in the diplococcus of Hauser discovered in 1884
and also described by Leloir and others.
The researches of the late Dr. Wadsworth and Dr.
Dyre in this country and of many continental
investigators have thrown much light on the habits
and mode of action of this organism and I am
indebted to their work for much information in the
subject. The diplococcus as its
name implies is lance shaped and is arranged
generally in pairs, each with an oval gelatinous
capsule. It is found in the sputum of healthy
persons who have never had pneumonia and better
of France, in experiments obtained it in 20% of
all cases examined by him. It also probably
exists in the lungs and other organs without doing
harm so we are led to infer that the soil must
be conspicuous before its characteristic effects follow.

In a case of Acute Tubar Pneumonia however we find other organisms as the Pneumococcus of Friedlander occasionally, and the Streptococcus Pyogenes and also Staphylococcus Pyogenes Aureus. Friedlander at first claimed this bacillus as the irremovable cause of Tubar Pneumonia but that view is not now accepted although probably in the formation of Tubar Pneumonia it plays an important part. Suppose the coccus of Frankel enters the lung by the usual channel - inhalation - it may traverse the organ without setting up Pneumonia and may arrive at the Pleura, giving rise to a Primary Pleurisy if the local conditions are favourable to its growth. But let it be arrested in the lung and the local conditions favourable, and we have the characteristic lesion following.

In comparatively mild cases of the disease, the cocci are limited to the lung and give rise to an acute inflammation with abundant exudation of fibrin, the overlying pleura being also involved.

In very severe cases of Pneumonic Infection the cocci get into the circulation and produce what is really Septicaemia and we may also get
Meningitis, Pericarditis, nephritis, otitis media.

Conditions of Growth of the Diplococcus.

Dr. Smyth states it requires a temperature of about blood heat - 35°C. to 37.5°C. for its free development and that it is extremely susceptible to variations of temperature. The range of temperature enjoyed by the coccius is limited to about 14°C. from 28°C. to 42°C. beyond latter point, no growth takes place. The optimum temperature is 37.5°C. and the thermal death point is 52°C. 10 minutes of which causes death of the coccius. Occasionally cocci of low virulence are found which will grow at 18°C. When cultures are made in artificial media the diplococcus grows best if oxygen be freely supplied but it also thrives in vacuo or in an atmosphere from which oxygen is removed or even in hydrogen alone.

The typical coccius will not grow at all in acid media; media must be alkaline. Cultures are rendered or destroyed by direct sunlight especially, and by diffused daylight, but dried pneumonic sputum will resist direct sunlight for 12 hours and diffused daylight for weeks. Carbolic acid, peroxide of mercury and other antiseptics in varying strengths
Kill the cultures.

Types using blood agar media noted that in 18 to 24 hours, the cocci were innumerable; the organisms had attained their maximum development; at the end of 30 hours there was a decline, the number of cocci barely exceeding the original number, and in 48 hours none living could be demonstrated.

These details are all of interest and have a practical bearing on the proper understanding of staphylococcus pyogenes. Ketterman advances the following arguments in support of the coccius of Frankel being concerned with pneumonia:

1. The diplococci have the power of forming fibrin.
2. Diplococci are found in the alveoli in the bronchi leading to them, in the blood vessels of the alveolar walls, generally in rust-colored sputum.
3. Diplococci are present in all stages of pneumonia.
4. Acute staphylococcus pneumonia is limited in duration, has a sharp termination, by crisis from 7th to 11th day. The virulence of the coccius is limited and in cultures in solid media, does not last beyond 7 days as a rule. After the inoculation in animals gives no reaction. In liquid media virulence lasts for a longer period.
Saliva taken from a patient suffering from Acute Pneumonia if inoculated into an animal will produce Pneumonia but not after the crisis.

This is the case although the organism is not dead and may regain its virulence up to 3 weeks. This loss of virulence is due—

1. To the exhaustion of the nutritive media.
2. Production of poisons secreted by the coccius.
3. The action of high temperature.

Speaking generally when an organism has been living and growing for any length of time in a nutritive media, whether in vitro or in vivo, the media becomes not only exhausted but saturated with the products of metabolism, and under such unfavourable conditions, the organism undergoes changes and dies eventually. (Euph)

The media, as has been found, becomes acid in reaction, and this is incompatible with the growth of the coccius. Prolonged high temperature—above 42°C—prevents growth.

5. Diplococcus is found in the Pneumonic focus with a constancy almost absolute.

6. Diplococcus is found in the extra pulmonary complications—e.g., Pleurisy, Meningitis &c.

7. Diplococcus is especially found in the saliva
of persons who once had Pneumonia and remains there long after it is destroyed in the lung. I think better succeeds in making his assertion very clear, and Hyde's experiments on rabbits also add to the evidence in favour of the part played by the cocci of Stäubel.

The latter investigator found rabbits and mice very susceptible to inoculation with the diploeeoccus, while pigeons and fowls were absolutely immune. When a highly virulent type of coccius was inoculated into the rabbit, acute septicaemia and death was the result, and the blood was seen to be teaming with the cocci.

If the virus was much attenuated the animal died from anaemia and mortality due to the action of toxins and there were no cocci in the blood, or it might survive. At the site of the inoculation (subcutaneous injection) there was an opaque exudation consisting of fibrin or pus was formed. The lungs were normal. In man, the inflammatory process in the lung may be looked upon as an attempt to shut off the cocci from the circulation; otherwise we would more frequently have occurrence of meningitis.
But granting the activity of the cocci in the production of Pneumonia we must here an exciting cause for we have already shown that they may exist in the saliva of healthy persons without evil results. Thus any circumstance, it may be a chill, a traumatism of the inhalation of irritating substances, all of which lower the patient's vitality and so lessen the powers of resistance, will render the soil suitable for the development of the organism and its characteristic lesion in the lung.

Chronic Alcoholic, Influenza are well known and potent agents in this direction. A chill applied to the surface of the body when the individual is fatigued and exhausted after violent exercise, gives rise to the necessary condition of the soil by reflex action through the nervous system.

The infectious nature of Pneumonia is not very pronounced but Hector Macleod writing on this point quotes the following instance. The patient was a clergyman attended by a nurse who in 7 days also contracted the disease. She was replaced by a sister of the patient and she was attacked by Pneumonia in turn as was also a
brother who succeeded her in the sick room.

As bearing on this property of the disease I remember an experience of my own not very long ago. I was called to see a boy about 10 years old and upon examination found him suffering from Acute Tubar Pneumonia. The consolidation and tubular breathing being well marked at one base. His brother and half-fellow 12 years of age at the time of my visit was up and running about but his mother had noticed him not looking well for some time and she asked me to sound him also. I discovered he had a large pleural Effusion which yielded to treatment by aspiration, and I believe the agent in both these cases was the Diplococcus and that the elder brother infectedantom the younger.

Pneumonia may rage as an epidemic as occurred in 1885 at Middlesborough, when over 1000 cases were treated from 20th January to 14th June with 369 deaths. This is a very high mortality but it is generally true that epidemic Pneumonia is of a most severe type and is associated with overcrowding and defective sanitary arrangements.
In our own country we get most cases of pneumonia in the spring months - from January to May when the weather is cold, moist and changeable. In the autumn and winter we meet with a considerable number but less than in the spring. Better gives an instance of one of his patients who always had Franklin's coccus in the cheeks, and when the pneumonia death rate was high the cocci were more virulent.

We may now allude to the signs and symptoms of acute Roa's pneumonia and as they are well known, recapitulation in full is hardly necessary. The disease is seldom long overlooked if a careful and thorough examination be made but there are several pitfalls for the unwary. Dr. Cullen, a noted physician of last century defines the disease and its signs thus, "Pyrexia, dolor in quodam thoraco parte, dyspncea, tussis."

Generally we get the history of a rigor coming on abruptly, along with severe headache, sometimes vomiting, and pain often of a very excruciating kind on the affected side. There is at first a dry cough, which aggravates
The pain and which the patient tries to control.

He is flushed in the face, pulse is full
ounding and quickened. Breathing is short
shallow and more frequent and painful.
The ratio between the respirations and the pulse
may be 1 to 2 or 3, a disproportion rarely
seen in any other disease. Occasionally at
the onset there is a small haemorrhage from
the lungs or a severe dyspnoea, but the case
need not be any more grave on this account.

The eruption is characteristic in Pneumonia
generally rusty and very tenacious and tough.
Sometimes when thin it is said to resemble prune
juice and this is a sign of bad omen. In the
majority of cases in hectic eruption appears
on the lips or at the alae of the nose and some
observers predict a more favourable course for the
disease when it is present. I do not think it
is of much importance in diagnosis or prognoses.

The temperature very soon rises it may be to
103°F or higher especially in children and robust
full blooded subjects, and it remains fairly
constant, sometimes rising further just before the
Crisis. Hyperpyrexia occasionally develops but
not so often as in acute Rheumatism.
The nervous system suffers and in alcoholic patients delirium is common and convulsions occur in young children as well as other signs which may suggest meningitis. The urine often shows presence of albumen and is scanty, high coloured very acid and deficient in inorganic salts particularly chlorides. The albuminuria is generally due to the pyrexia or to the toxins in the blood and disappears during convalescence.

The pain in Phthisis is in some cases referred to the abdomen near the umbilicus or lower down in the iliac region and when accompanied by vomiting may lead to a mistaken diagnosis of Appendicitis.

Physical signs. On examination soon after the initial rigor, percussion over the part affected is less clear and flatter than normal and the breath sounds are not so pure and apparent. Gradually the dulness on percussion increases and on auscultation the breathing is Bronchial or Tubular. But just before this stage, and along with inspiration as a rule only, we obtain a very fine crepitation (Raemore's crepitate note) which disappears during complete consolidation to be heard again during reabsorption.
Along with tubular breathing, there is increased vocal fremitus and on auscultation we get bronchophony or even ronkforaly.

Terminations of Pneumonia.

Even in the worst cases, death does not often happen before the 2nd day; the symptoms generally lasting until the 5th – 7th days and in many persons who ultimately make a good recovery until the 9th or 10th days. When the disease continues longer than this, we should suspect some complication as Empyema, Abscess of the Lung, Gangrene of Lung, Pericarditis etc.

Also in those cases when first one side is attacked and then the other, the disease may go on for 12 or 14 days.

Prognosis depends upon various circumstances. The age of the patient, social condition, habit of body, existence of disease already in the lung or in other organs such as Chronic Bright's disease, Diabetes, all have to be considered in our estimate of the risks. Alcoholic subjects are especially prone to be attacked by Pneumonia and the disease then runs a very dangerous course and a fatal result is common. Also after Influenza the type of Pneumonia is severe and when a complication like Pericarditis is present.
the termination is often in death.

Dr. Hector MacKenzie states that 5 – 6% of all deaths of both sexes and all ages included, are due to acute pneumonia. In males between the ages of 25 and 65 years, 8% of all deaths and in females between the same ages, 5% of all deaths are caused by pneumonia. Of 1392 cases of the disease treated in St. Thomas' Hospital, London, there were 273 deaths equal to a mortality of 19.6%. Under 20 years only 5% died, but over that age the rate was as high as 31.4%. Other in the Johns Hopkins Hospital had a mortality of 25% amongst the white races and as high as 30% in colored subjects. Acute pneumonia does not often occur in infants under 2 years, but when it does, the mortality is heavy as it is also at the other extreme of life.

The factor of leucopenia has to be kept in mind in considering the prognosis and it may be stated that a very slight or complete absence of leucopenia is an unfavourable sign. Death is mostly due to failure of the heart from the tetrademia, continued high temperature or overdistention of the right chamber. Death from direct interference with respiratory function is not common unless in double pneumonia.
Treatment of Acute Fatal Pneumonia.

We may begin by saying that we have no specific at our command as we have in Syphilis or in Malaria and we must treat each case on its merits remembering the fact that if our patient can be kept alive for about 10 days, recovery is probable. Pneumonia is a fever of comparatively brief duration and though it cannot be aborted, we can by appropriate means often make the battle easier for the patient and succeed in obtaining a favourable result. In the very earliest stages before consolidation can be made out, Professor H.A. Howe recommends liniment of beef tallow in 3 minims doses every quarter of an hour, until 3 or 4 doses have been given either with or without small doses of soda's powder, and he claims by this method the disease is shortened and lessened in severity.

Dr. Keen again in his Harveian lectures of last year, holds that by the free use of ice bags to the inflamed lung, the disease is cut short if the remedy be applied at earliest stage. We seldom see Pneumonia in the very earliest condition and I have no favourable experience of either of these methods.

In reading the medical journals we are confronted with a multitude of drugs advocated keenly by some observers and uniformly condemned.
by others and it is difficult to reconcile these conflicting views. The day of indiscriminate bleeding is past, but at the present time there seems to be a tendency to revive resection for certain definite purposes which will be described later.

The old school of practitioners attributed the inflammation of the lung to the effects of a chill, and having no knowledge of the action of germs, they tried to cut short the ailment by heroic measures. Until the middle of the century repeated bleedings combined with doses internally of Antimony and Mercury was the routine practice. Resection was carried far enough to relieve the symptoms while the blood was flowing or occasioned a tendency to Syncope.

It cannot be doubted that the bleeding and the Antimony in small doses reduced the full bounding pulse of the patient, promoted expectoration and acted beneficially on the skin and that many recovered under this antiphlogistic treatment. Hughes Bennett of Edinburgh about 1860 discarded this method as unnecessary and obtained quite as good results from following an Expectant line of treatment. This consisted in usually giving a simple saline fever mixture and attending to any special symptoms calling for treatment.
It will be convenient here to make extracts from the experience of Dr. Hermann Lobes, who began the practice of medicine when so-called heroic measures were in vogue. Lobes was attached to the Clinic of the University of Bonn, and for 3 years (1846-1849) he mentions that all cases of Hemorrhagia which was then epidemic in the district, were treated by extraction and nitrate of Potash with or without small doses of Antimony to be given in a strong robust individual of 18-45 years, with high fever and great dyspnoea, 8-16 0/4. of blood was removed by resection.

In children under 5 years, if of faint, strong and dyspnoea urgent, bleeding was by means of 3 to 6 doses. If the subject was very weakly, no bleeding was done; but Antimony was given internally. Under this line of treatment, the mortality was 12%.

In the year 1849, in the same district, the treatment adopted was the administration of large doses of Antimony, 4-10 grains to a child and as much as 20-40 grains to an adult. This caused a good deal of gastric and intestinal troubles and convalescence was very protracted. The mortality under this method was rather higher, namely about 17%.
When this method was discontinued, the cases of pneumonia were first upon chloroform in doses of 14 grains 4 times daily for adults but it was not very satisfactory and the mortality was still about 17%.

After coming to London, in the years 1854-1861, Weber followed the expectant and good nursing treatment, with a mortality of 13%, and for 14 years after this he prescribed for his cases, small doses of Antimony with a little of Anemonia to facilitate expectoration and Chloroform when necessary for sleeplessness. He considered with the latter system that the death rate was reduced and the patients made more comfortable than under any other plan. Weber, from his experience says—"The prejudice against the use of small doses of Antimony and bleeding in moderation in suitable cases, is unfounded. Both need judiciously, not as routine, are of benefit." Sir William Gaskell, who was at the Old Royal Infirmary in Edinburgh, when the antiphlogistic measures held sway, is against drastic and exhausting therapeutics and active treatments followed as a routine, but he has not entirely lost faith in small doses of Antimony in suitable cases, the drug to be withdrawn when the fever is checked or vomiting occurs.
Serum Therapy.

From what we know of the aetiology of the disease we would naturally look for good results in the use of a serum, but this method is still in the experimental stage. Although I believe that from further investigations along this line, we will obtain an efficient weapon in combating pneumonia.

Animals generally horses are rendered immune to the disease by the introduction of the pathogenic organism in doses of increasing strength till this immunity is attained. Then the serum of such an animal can be injected into the serum or tissues of a patient suffering from pneumonia.

The late Dr. Washbrown worked at this subject and he declares the serum is not antitoxic but is anti-venomous. Amongst those who have employed the serum in treatment is Dr. Ponce of Naples and he claims to have had successful results, but Banti and others ("in Sperimentale") conclude from a large number of observations that the serum has no beneficial influence on the disease. Washbrown says it may be used in the same way as antitoxin; the serum in doses of 10-20 cc. three or twice daily during the attack until the constitutional symptoms subside. It may produce cutaneous eruptions.
I will now give an outline of the management of an ordinary uncomplicated case of acute pneumonia in a young healthy adult and will later discuss the treatment of special symptoms which may need attention. We usually see the patient after a rigor and find him in bed flushed, breathing quickly, and complaining of pain in the side. In the best country amongst the working class, the bed is often nothing more than a cot, and if we are to do our best for the patient, we must remove him to an open bed in a well ventilated room. He should be lightly covered with blankets and probably we will have to remove a variety of shawls and wraps which only tend to increase his distress. It is well to give at the beginning a mild opium such as 3 grains of calomel and on this operating on the bowels, nothing further of the same kind may be necessary during the illness. The diet will be as for a fever case and may consist of milk diluted with soda water, beef juice, pork meat soups and jelly. Bengis food and manna milk are valuable and three or four switched eggs in the 24 hours can usually be taken.

While seeing that the patient takes a sufficiency of nourishment we must not err in pouring into
the stomach, excessive quantities of fluids or
there will arise troublesome flatulences with
impairment of the heart's action and increase in the
dyspnea. Nourishment may be given every
2 hours and 3 or 4 points of milk in the 24 hours
should be quite enough. Cold water in
moderation need not be withheld from the patient
as he suffers much from thirst and the water
will exercise some diuretic action.
Alcoholic stimulants are not often required but
usually after three or four days of the illness I order
Brandy or old Whiskey in tablespoonful doses every
4 hours. Of course in drunkards and in age
and debilitated we require to use alcohol freely.
For relief of the fever in the side I frequently give
1/2 or 1 grain of Morphia hypodermically if case is not
obtained from hot fomentations mustard poultices and
some cases I have applied 3 or 4 clove oil with benefit.
It is most important that the patient gets enough
sleep from the very beginning and the Morphia or
10 grains of Doric powder is useful in this
direction. The patient is changed two
or three times daily with cold or tepid water and
after the first few days I discontinue poulticing
and apply ice cold cloths over the chest.
As regards drugs, a simple fever mixture containing Acetate of Ammonia and Potash is readily taken and it helps the action of the skin and kidneys. To procure sleep without being thirsty, I give 20-40 gr. of Chloral hydrate in 2 or 3 doses during the night and along with it some infusion of Digitalis. The temperature is not often so high as to cause danger, and the application of ice cold cloths over cheeks and changed every half hour, generally controls it.

Dr. Squire in his Essays on Pneumonia strongly advises a stimulating line of treatment and he gives 5 gr. of Carbonate of Ammonia in mix every 4 hours together with Digitalis or Stephania. I find this method serviceable and sometimes give 5 gr. of Fox's powder with the Ammonia with benefit to the patient. Squire prescribes alcoholic but is guided by the individual peculiarities of each case and he has given as much as 30 oz. Brandy in one period of 24 hours to a man who suffered from Double Pneumonia.

Dr. Julius Morgenfeld also thinks highly of Ammonia and Digitalis in cases occurring in the aged and in feeble or alcoholic subjects.
In an article published in the Edinburgh Medical Journal of November 1891, Dr. C. W. Beighton, advocates warmly the treatment of Acute Pneumonia by administration of Glucose Hydrate and Digitalis, and in cases of my own, mostly young subjects. While I have used this method, the patients were made more comfortable and the severity of the symptoms Considerably abated. He says two conditions are supposed to be especially injurious to the heart - excessive rise of temperature and extensive consolidation of the lung. The latter, as an obstacle to the circulation and throwing a strain on the right heart, he does not consider important, because as soon as the temperature falls at the crisis, convalescence proceeds uninterruptedly, the heart making no account of the apparent obstacle. Again the pyrexia is generally moderate. Digitalis is a cardiac tonic and has antispasmatic action also, thus it will help in bringing about an early crisis, when used in moderate doses. Other distressing symptoms calling for attention are Sleeplessness, Pain, and Cough. The two latter, frequently causing the former, and Glucose Hydrate is the drug giving most relief in such conditions. When persistent insomnia threatens exhaustion,
it is absolutely necessary to secure sleep, and 40 grains of Choral Hydrate given at once and if necessary still, 40 grains every half hour until 120 grains have been given, produces refreshing sleep. Choral is stated to act sympathetic, it slows the heart by paralysing the cardiac ganglia and dilates the arterioles by paralysing the vasomotor centres. It is further an excellent hypnotic, and diminishes and ultimately abolishes all reflexes. He always prescribes Kahlriehel's Choral, giving to an adult for a first dose 20 grains in half an ounce of Infusion of Digitalis, the subsequent dose of the Choral is 10 grains with some quantity of Digitalis to be taken every 4 hours till the temperature falls to normal. The pain and cough cease, patient does all day and sleeps sound during the night, the rusty sputum either ceases entirely or becomes changed to a scanty mucous phlegm easily expectorated. The pulse drops, temperature falls, the disease is arrested and the patient gradually recovers. I have some hesitation using Choral throughout the illness in any but young subjects but it certainly is of great value and comfort in many cases.
In the Harveian Lectures of Dr. Keen delivered last winter, he draws a graphic picture of acute pneumonia and pleads very eloquently in support of bleeding in the treatment, and also of the good effect of ice bags applied to the site of the inflammation.

I have often used one or two ice bags over the heart and have found them of use in steadying and slowing the heart's action, but caution is required in the aged, and their use should not be continued.

Keen arguing from the knowledge of the habits of the ephelis, claims that the reduction of temperature by ice applications is such that the activity of the ephelis is diminished or stopped. Failure of the heart, which is the great danger in the disease, is due most commonly to over-distention of the right chamber and when this is made out by percussion in the 4th right intercostal space, Keen advises bleeding.

Leeches to the number of 10 or 12 should be applied over the lower ribs or 10 or 12 oz. of blood removed by incision. If matters are very serious and extensive pulmonary consolidation as much as 20 oz. of blood may be removed, and by this means the patient may often be tided over the
Much of critical phase of this illness.

I have not seen any cases which seemed to me to demand such vigorous measures, but I quite believe that they may be necessary to give our patients a chance of recovery.

Sir William Broadbent, speaking of bleeding in Pneumonie, says: "Pneumocoele has rightly been banished from treatment except in the early stage of the attack, when division of the lung is supposed that the right ventricle is unable to cope with the sudden resistance in the pulmonary circulation, and is paralyzed by overdistention. The patient will be cyanosed, perhaps unable to speak, scarcely able to breathe or cough, veins of the neck turgid, skin bathed in perspiration. The heart is beating violently, but at the same time the pulse will be small and short (arterial anemia). Here the right side is enormously distended and the blood is drained back in the lungs, so that it reaches the left ventricle in very inadequate amount."

In this condition, he advises a pneumocoele to remove 16 to 20 oz. of blood, and speedy relief soon follows. At a later stage of the disease when of course dilatation may still be present but anemia is also a prominent symptom, the same benefit is not to be expected.
I have seen a woman dying from Pulmonary Embolism with symptoms similar to those just described by Sir William, but in her case relief by bleeding was out of the question.

Quite a number of authorities are agreed on the benefit obtained from fenestration when the right heart becomes overdistended. Helen Fagg Dearthfield, Sir Joyce Duckworth, Pye-Smith are among those who recommend it for the specific purpose mentioned. Others also believe it of service but they recognize that toxemia is a contributory cause of the heart's weakness and he would therefore at the same time prescribe ammonium carbonate, Digitalis, Strophemin and other powerful tonics.

After fenestration, it is sometimes a good plan to inject one or two pints of warm saline solution into the cellular tissue. If the blood pressure remains very high in cases which are not bled, we have in nitroglycerine a remedy which by dilating the capillaries, lessens the resistance the heart has to fight against and also permits Strophemin to act with better effect.

Digitalis does not give as good results in Acute Pneumonia as in purely heart cases due probably to the toxaemia according to
the investigations of Sander Brunton and Cash. But by hydrotherapeutic means we may reduce the high fever and so permit digitals to act with greater advantage. However, Dr. Petreascu of Bucharest has had remarkable success from digitals presented in the form of an infusion (37 of powdered leaves in 24 hours) and continued for 3 or 4 days. He observed no toxic effects from the drug and noted that the temperature fell and the pulse became slower. In the Military Hospital of Bucharest where this treatment was carried out, the mortality was only 1-2%.

A. Fränkel is another writer who tried digitals but in smaller doses and he was of opinion that Pneumonia so treated ran a milder course. Upon the whole, the majority of observers do not agree with Petreascu but believe the drug in the presence of pyrexia cannot produce its tonic action on the heart. For the relief of the dyspnoea so intense at times, the same remedies recommended for failure of the heart should be employed but in addition, the inhalation of Oxygen gas is frequently of the highest service.
Oxygen is easily obtained from the manufacturer here and is supplied in iron cylinders under great pressure. I have seen cyanosis disappear when the gas was inhaled and supplemented by Stylamine and alcoholic stimulants, it keeps in keeping many patients alive over the crisis.

Of late the value of oxygen has been questioned by Forrest Smith and others, but personally my opinion is in its favour. Sleeplessness, delirium and other disturbances of the nervous system, we must make sure that the pneumonic patient obtains sufficient sleep or his chances of recovery are very much lessened. I frequently give 20 or 30 grains of Chloral Hydrate in the evening for this purpose, the dose to be repeated in a few hours if required. Many writers warn against this drug for its depressing action but it is ordered by Jurgensen in as large doses as 75 to 120 grains if smaller quantity fails, and Balfour, as mentioned before is a firm believer in its efficacy. Paraldehyde in doses of 2 or 3 especially in persons who are drunkards is very useful and safe and along with
the drug, cold shivering and cold clothes to the head should be employed.

On the subject of Opium there is a mass of contradictory opinion. Sir William
Quintin speaks strongly against it in Pneumonia considering it to be very dangerous,
and particularly so, even in the most moderate doses about the period when the crisis is expected.
Every one is aware of the danger of paralysis of the Respiratory Centre by the rash administration of
Opium at this stage but there are occasions when it is of great value and its use quite
justifiable.
Sir Samuel Breckin has the greatest faith in Opium controlling or arresting inflammatory
action and he cites Sir William Chell as sharing in his views.
Dr. Rye Smith
agrees that it may be given where the danger is
not directly from suffocation, but rather, from the
effects of a continued high temperature on the
heart, the impending weakness of the respiratory
muscles and the exhaustion of the reflex activity of
the nerve centres. In such cases he advises
"Some Opium 15-20 mg or Digitalis powder 2 grains."
He also says an additional warrant for the use
Of Opiun is dilatation of the pupils and the presence of albumen in the urine if only of supravital origin is not a contraindication.

It should not be given if the patient is the subject of Chronic Bronchitis complicating the Pneumonia or where the consolidation is very extensive or where there is Chronic Bright's Disease of the kidneys. In such cases the risk of paralysing the Respiratory centre is serious.

Dr. R. W. Philp also defends the use of Opiun and states that the objection to it on the score of interfering with expectoration lacks pathological support. It should be used for definite reasons and in moderation for harassing useless cough which distresses the patient's rest and leads to circulatory embarrassment. In any case only a comparatively small portion of the fibrinous exudate comes to the surface as expectoration.

Duckworth. Leeds.

Dreschfeld, Broadway, all agree that it may be given in suitable cases and I am inclined to follow Pyle Smith in this suggestion.
Temperature. As a rule the fever does not demand very particular attention and in my own experience is not a source of great danger. Pye Smith however says the temperature is always or almost always high and hyperpyrexia frequently met with in Pneumonia. A temperature of 104°F needs to be dealt with when occurring in adults but in children it does not in itself require interference. As means for its reduction Antipyretics are nearly all condemned as their action is transient or ineffectual and they may give rise to serious collapse or dangerous depression of the heart's action. Quinine however has many supporters and the broth uses it in 2 or 3 grain doses every 6 hours and decreased in 5-10 grain doses twice in the 24 hours. Pye Smith only employs it in persons who have suffered from Malaria and Salicylates when Pneumonia occurs as a complication of Rheumatism.

Cold sponging, Leitus tubes to the head, ice bags applied between the patient's legs or in the armpits are often quite effective without the administration of any special drugs.
In America and on the Continent, Hydrotherapy is greatly valued in treating cases of Pneumonia because of its powerful stimulating effect upon the nerve centres when poisoned by toxins. When the disturbed right heart threatens to kill in Pneumonia, stimulants alone such as the hypodermic injection of Strychnine, and alcohol, are often inadequate and Inouyeen for this condition recommended very cold baths with friction and preceded by stimulants. Baruch, who has an instructive article in Hare's Therapeutics, believes that the Cool full bath combined with friction meets all indications, which are to deepen and slow the respirations, reduce the temperature, invigorate the heart, stimulate the nerve centres and dilate the cutaneous vessels by continuous friction. He advises baths of 90°F reduced to 80°F in Pneumonia occurring in children and in adults with a temperature over 103°F. They should be given in a tub near the patient but for 15 or 20 minutes and he should be rapidly dried. He quotes Flamel of Bâle who obtained a reduction of 9.6% in mortality of Pneumonia in 200 cases by the treatment with betho.
But the most useful procedure is a cold compress made of 3 folds of old linen stitched together and with slits under the axillae, to envelope the entire chest. This compress is wrung out of water at 60°F for adults, 65° to 70°F for children, wrapped round the entire thorax and covered by a piece of flannel similarly cut and then secured with pins. It should be renewed every half hour or every hour and when the patient’s temperature is above 103°F, the compress should only be partly wrung out and when it falls, it should be more thoroughly pressed.

Barnes has found this method as effective as the cold or cool bath and less disturbing. It deepens inspiration, increases the contractility of the cutaneous vessels, thus strengthening the heart. It also arouses the brain at each application, and counteracts the toxæmia. In this country, the bath treatment is rather reserved for urticaria cases, in which it is credited with largely reducing the mortality.

In Pneumonia I have no experience of the cold bath method, but I think very highly of the good effect of the cold compress and find my patients rarely object to it.
A very formidable complication in Pneumonia is Pericarditis and it is especially found to occur in double Pneumonia with well marked Pleurisy. It is to be recognised by an increase in the dyspnoea and ethrophoena and the pulse becoming smaller and irregular and is found at the height of the fever. I have never seen it in any of my cases and the treatment recommended consists in the application of an ice bag over the precordial region or a blister may be used though the latter is not generally considered suface in Pneumonia. Should puncture with a hypodermic syringe show the presence of fluid if serious aspiration must be done, if purulent, incise and drain as in Empyema. Pneumonia of the Apex is said to be often associated with delirium and may be induced by a patch of Tubercle. Presence of which is not detected until the surrounding inflammation subsides. In many cases however it follows an ordinary course and is not more severe than Pneumonia elsewhere.

I recollect only one case of Acute Rarer Pneumonia of the Apex and it occurred in a woman of about 30 years who had a good family history and unusual freedom from any
previous illness. It began with a rigor, there was
shock developed at the 3rd and now and after
pursuing a mild course, the crisis occurred on
the 6th day. There was delay in resolution
of the part affected and ultimately Tubercular
mischief developed and the patient had the
characteristic signs of Phthisis. She was sent
to Quarry’s Homes for Consumptives and improved
considerably under suitable regimen.

I have notes of another case of Acute Acinar
Pneumonia of the base followed by Tuberculario
of the lung. Patient was a youth of 22
of age, well built and athletic and the disease
for a time ran the ordinary course of Pneumonia
but there was no real crisis and examination
of the sputum some weeks after the initial rigor
which ushered in his illness showed the presence
of tubercle bacilli. He eventually died from Phthisis
after being ill for about eighteen months.

Dr. R.W. Philips on the question of Acute
Pneumonia determining the establishment of
Pulmonary Tuberculosis, says it is actually only a
rare antecedent and that out of 1000 cases of
Phthisis Pulmonary only 5% gave a close sequence
of Tubercle on Pneumonia.
Philip inclines to the opinion that in those cases of delayed clearing up of a lung affected by Pneumonia and consequent Tuberculosis, the Tubercle already existed. He also states that Pulmonary Phthisis may not uncommonly be complicated by an attack of Acute Tubar Pneumonia which will run the ordinary course unless the Tubercular disease is far advanced and active.

In this paper, I have written of Acute Idiopathic Pneumonia but Pneumonia also occurs as a complication of other diseases. This Secondary Pneumonia is often the last stage of the patient’s illness in Chronic Bright’s Disease, Entereic Fever, and Perforal Septesemia. Many cases of Plague now evident in the Imperial were at first diagnosed as Pneumonia, the true nature of the disease being overlooked and all the symptoms attributed to the pulmonary condition. Secondary Pneumonia is always highly dangerous as the subjects of it are already exhausted by the primary disease.

Should the crisis in Acute Tubar Pneumonia be delayed beyond the 10th or 12th day we should suspect some of the sequelae occasionally met with after an attack. These are
Empyema, Yaws, and the Lung. Abcess of the Lung and Tuberculosis. The three foregoing must be treated on surgical principles and recovery may take place. I think Empyema is most frequently seen than any of the others but at present I have under my care a girl of 21 years who suffers from Abcess of the Lung which has been treated by the surgeon by operation. This case did not come under my charge at the beginning of the illness but was treated by the practitioner attending as one of Tubercular Pneumonia, the pain being referred to a point low down in the abdomen. On percussion of the chest I made out dulness over left side and suspecting the presence of an Empyema I aspirated and drew off a large quantity of foetid pus. On operation under chloroform, the surgeon discovered there was a Pulmonary abcess which may have followed an acute Pneumonia not recognized at the time.

I have treated the subject of my Thesis from the standpoint of a General practitioner, well aware that a much fuller and more elaborate treatment of the
malady is meted. Much progress has still to be made in our methods of fighting it, but we have in our hands many remedies which will mitigate its severity when applied with discrimination and judgment.

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