SOME PNEUMOCOCCAL INFECTIONS IN CHILDREN

WITH SPECIAL REFERENCE TO AN EPIDEMIC.

During the time I have been House Surgeon at the Children's Hospital, Bradford, several cases of Pneumococcal infection have come under my notice. I have been impressed with their importance from a clinical standpoint, and this has led me to take this subject up for special study. I include cases of ordinary Lobar Pneumonia as they show the important variations that occur in children, and also help to elucidate the mode of infection in other cases of a general infection.

I have a series of nineteen cases which I wish to consider in order. In seventeen of these the Pneumococcus was demonstrated by film preparations stained with methylene blue and also by Gram's method. In one or two of the most important cases, I have had my own observations confirmed by Dr. Eurich at the Local Public Health Laboratory, as I did not have any appliances here for growing cultures myself. The two cases which I wish to include in the series, and where I was not able to demonstrate the pneumococcus, are two cases which presented the typical signs and symptoms of pneumonia viz:- Intense apathy, flushed face, rapid breathing, quick
pulse, short restrained cough, dullness on percussion, tubular breathing, and fine crepitation, associated with a rise in temperature. I was unable to obtain sputum in these cases for examination purposes. It is always difficult to obtain sputum in children, as they require training before they will expectorate.

A Summary of the Cases.

Six cases were typical Lobar Pneumonias.

Two cases of Empyema following a history of pneumonia.

One case of Otitis Media with secondary Mastoiditis.

Two cases of diffuse Cellulitis.

One case of Septic Periostitis of the Femur.

Seven cases of an epidemic where the primary symptom was a slight Tonsillitis and Pharyngitis followed by a glandular swelling in the neck.

The cases will be treated from a clinical stand-point only, the important features of the cases being mentioned, and then the most important points as regards symptoms, treatment, prognosis, mode of infection etc., will be discussed.

Cases of Lobar Pneumonia.

Case I

Boy aged five years was admitted with a history of two days illness. The primary symptom complained of was abdominal pain. Then restlessness and feverishness. On admission the child was found
### Clinical Chart of Temperature &c.

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#### Remarks

- Observations taken at 6 A.M. and 6 P.M.
- For Memoranda of Treatment, see back of Chart.

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to have a pneumonia affecting the lower lobe of the right lung.

The temperature range was between 102\(^\circ\) and 103\(^\circ\) Far. It fell by crisis on the eighth day. The highest temperature was recorded just before the crisis occurred and it was then 103.2\(^\circ\). Recovery was rapid resolution being completed by the 14th day.

Case 11
Boy aged seven was admitted with a six day's history of illhealth. The chief symptoms being pain in the right side and headache. Physical signs of pneumonia were present over the lower lobe of the right lung. Temperature on admission was 103\(^\circ\) Far. It fell that night to 98.8\(^\circ\) but rose again to 104.4 soon afterwards. It then slowly fell by lysis five days elapsing before the normal line was reached. Resolution was not complete till the 22nd day. The child was not in a robust state of health previous to the attack
Case III

A boy aged ten years was admitted into the wards with a history of four days previous illhealth. Primary symptoms were vomiting and shivering. Physical signs of pneumonia were present over the lower lobe of the right lung. Temperature was 104.6° on admission and fell to 102° F. next morning. It remained at that level for about 36 hours and then fell suddenly down below the normal line. Resolution was complete in 14 days.
A girl aged 1 year was admitted with a history of restlessness and feverishness. The child seemed much neglected and starved. There were sores on the upper lip and on each hip. The physical signs of pneumonia were present over the right base. Temperature on admission was 101 °F and ranged for seven days between 101 and 102 °F. It then rose to 103 °F and at night fell by crisis to 97.8 °F. It remained low after that. Resolution was complete in 22 days.
Case V

A boy aged 3$\frac{1}{2}$ years was admitted with a 5 day's history of illhealth. The initial symptom had been abdominal pain. The following morning the boy had had two fits and also complained of some pain and difficulty on swallowing. The temperature on admission was 101° F. It rose next morning to 102° F and then slowly fell by lysis. The normal line being reached six days later. Physical signs of pneumonia were present at both bases but the right side seemed to be the most affected. Convalescence was slow.

22 days after admission the boy's nose began to discharge freely. He was restless and there was a slight rise of temperature. Next day there was a purulent discharge from the left ear. A fortnight later a small abscess was formed on the left buttock.
The boy had adenoids. Pneumococci were present in the pus from the nose, ear and buttock.

Case VI

A boy aged 3$\frac{1}{2}$ years was admitted to the wards with the following history. Six days ago the mother noticed a few spots on the child's back. The child complained of pain in his stomach which was slightly swollen. The pain disappeared three days ago and since then the abdomen had got very much distended. The bowels had moved well in spite of the boy having had cakes and sweets etc., to eat. He had had no difficulty in passing urine. A short dry cough had been present during the last day or two. On admission his temperature was 104 F. The abdomen was markedly
distended, the skin being shining and the cutaneous veins very prominent. The percussion note was tympanitic all over the abdomen. The spleen was not enlarged. There was no pain or tenderness.

Examination per rectum was negative. The respirations were rapid and suppressed and the child was most apathetic. On examining the chest a lobar pneumonia was found in the lower lobe on the right side.

Turpentine enemas were used with marked benefit for the abdominal distention. The temperature fell by lysis. Convalescence was slow and the abdominal distention tended to recur for some days after the acute stage was over.
It would seem from Holts statistics as quoted by Osler that pneumonia is of frequent occurrence in children under six years of age, and that the frequency decreases from the 6th to the 15th year, and then increasing with each decade of life. From this it would seem that a considerable number of cases of pneumonia ought to be admitted to the wards of a children's Hospital. Our average number of inpatients in a year is 450, yet in ten months I have only admitted six typical cases of pneumonia to the wards. This is low when compared with the numbers for former years. This may be partially explained by the fact that the ten months cover the summer and autumn periods when the incidence of pneumonia is at its lowest. But as during this same time several cases of aberant pneumococcal infection have also been admitted, it seems to me that some other factor is concerned in the decrease in numbers. From figures kindly given me by the Medical Officer of health for Bradford it would seem as if this decrease had been general throughout the town. Perhaps the abnormal atmospheric conditions of 1903 may have had something to do with this, and this may be the unexplained other factor.

Important features of these cases.

(1) The primary symptom of pneumonia in children seems to be abdominal pain frequently associated with vomiting. This seems to occur in the majority of cases. This was the case in four of the six cases described. The Honorary Medical Officers of this
Hospital tell me that they find this symptom in the majority of cases that come under their notice and this is borne out by the case records of former years. It would seem to be a point over looked in many cases. Osler lays very little importance on this point. Ashby and Wright however describe a special abdominal type in children which may simulate typhoid fever or the occurrence of some abdominal crisis. This is borne out by the last case which was described where the history and majority of the symptoms pointed to typhoid fever. It would therefore seem of the utmost importance in all doubtful cases to make a very careful examination of the chest.

(2) Another important point is the great apathy of the patients, who submit themselves to examination without any inclination to cry or other wise object to it. It would seem as if all their attention was taken up with their own respirations. This seems to be of importance in all serious chest conditions and it is a fairly safe rule to go by that if a child cries much there is no serious lung disease.

(3) Nothing remarkable occurred in regard to the temperature curves but the general tendency seems to be that in those cases who were in good general health at the onset of the attack the temperature fell by crisis, while in those who were not so robust it tended to fall by lysis. A fall by lysis is however of more frequent occurrence in children than it is in adults.

(4) The relation between the pulse rate and the respiration rate was \( 2\frac{1}{2} \) to 1. The average pulse rate being between 130 to 150 per minute and the
respirations ranged between 50 and 60.

(5) Sputum in small quantities was obtained in four cases, thanks to the care exercised by the nurses in charge of the cases. It consisted of mucoid material without any blood tingeing or rusty discoloration about it. Pneumococci could be easily demonstrated by film preparations.

(6) It is interesting to note in relation to the age incidence of the disease that four out of the six cases were under six years of age.

(7) No special line of treatment was taken up unless the symptoms called for treatment. Stimulants being given when there was a tendency to cyanosis or if either the pulse or the respiration became irregular. Strychinne however was given just about the time the crisis was expected. After this had occurred stimulant expectorants were given for about a week and then some general tonic.

(8) The prognosis is favourable in acute cases. The only case in which complications occurred being one who had both lungs affected and who also had adenoids, Otitis Media and abscess formation occurred in this case. Otitis Media it would seem is one of the most frequent complications of pneumonia.

Cases of Empyema

Case 1

A boy aged 10 years was admitted with a history of having had an attack of pneumonia commencing six weeks ago. The initial symptom in this case had also been abdominal pain with sickness and vomiting. The pneumonia had been on the left side. Temperature had fallen by crisis and had remained low for about
one week. It then rose again and swung up and down in a hectic fashion. Child had gradually lost flesh and become anaemic.

On admission the temperature was normal. Respirations were shallow and rapid. The pulse was quick and irregular. On examination of the chest it was noticed that the left side did not expand equally with the right. The percussion note was impaired all over in front. Behind there was absolute dullness up to the angle of the scapula. The heart was displaced over towards the right side. Breath sounds were absent. There was marked tenderness on pressure over the area of dullness. An exploring syringe was used and thick pus was found to be present. Operation was immediately performed with resection of a piece of rib. The pleura was found to be much thickened and when this was incised several ounces of pus poured out. The pus contained pneumococci Streptococci and Staphylococci. The temperature kept normal for over a week and then began to swing. The discharge lessened very rapidly but a large cavity seemed present. The cavity was washed out with 1-5000 perchloride of Mercury Solution and the temperature regained the normal line. In took in all about seven weeks before the wound healed. He was sent to a Convalescent Home for three weeks, but on presenting himself here after returning it was found that an abscess had formed round the scar of the old wound. This was opened and found to contain pneumococci in almost pure culture. This healed up in about three weeks. There has been no recurrence since then.
Case 11

A girl aged 10 years. This patient had an attack of pneumonia four weeks before admission. The temperature had fallen by crisis and remained low for about a week. It had then begun to swing in a hectic fashion. The child was very restless and sweated a good deal. On admission the temperature was 101.6° F. The respirations were shallow and rapid. The pulse was quick and irregular. The base was dull on percussion, and the breath sounds were absent. There was marked tenderness on pressure all over the area of dullness. Examination with an exploring syringe was negative. Empyema however was diagnosed and operation was done. A piece of rib was removed and a small quantity of thick pus escaped, when the pleura was incised. The temperature remained somewhat erratic for a week and then the child made an uninterrupted recovery. Pneumococci alone were found on examination of the pus.

The symptoms and physical signs in both these cases were in accordance with text book descriptions. A sign of great importance and one that textbooks do not seem to lay any great stress on is the tenderness over the area of dullness. This sign was present in both cases, and indeed in the last case described by Mr. F. E. Meade under whose care the patient was, was chiefly led to his diagnosis by the tenderness present. He told me that it was present in every case of acute Empyema he had seen. One would naturally expect it to be present if an Empyema is looked on as an acute abscess. This sign was absent in a case of Tuberculous Empyema which came into the Ward soon
afterwards and it would not be expected to be present as tuberculous abscesses are usually free from tenderness. It would therefore seem that the recognition of this is of the utmost importance in the diagnosis of Empyema, and in the differential diagnosis, between Empyema, pleurisy with effusion, thickened pleura, delayed resolution of a pneumonia and tumour growth in the lung. It is also useful in differentiating between Empyemas due to Septic organisms and those due to the Tubercle Bacillus. It is hardly sufficient to judge from one case only and to lay down a definite rule yet the last case seems to show that if this marked tenderness is present and yet the exploring needle proves negative which may often occur, one is justified in diagnosing Empyema and operating at once.

In regard to the method of operation it seems to me although many hold differently to be the correct thing to remove a portion of one or more ribs so as to allow for free drainage. In children the space between the ribs is so small and the movement of the thorax relatively so much more than in adults that a tube must often get blocked, and free drainage prevented. A simple drainage tube seems quite efficient and this was left out as soon as possible and the wound allowed to close leaving what amount of pneumothorax may be present to be absorbed.

This is the plan suggested by Professor Wyllie and was adopted successfully in both these cases.

Prognosis is favourable in empyemas following on pneumonias. It has been generally found that cases
in which only the pneumococcus is found in the pus do better than those where a mixed infection is present. This is shown by the after history of the two cases mentioned. It is stated that empyemas in which the pneumococcus is the only active agent will heal up after aspiration only has been done. This would not have been the case in the second case as the pus was too thick to have passed along even the largest sized aspirator needle.

On looking up the old case records one finds that the experience here is that empyema follows far more frequently on left sided pneumonias than on right sided pneumonias.

_A case of Otitis Media with secondary Mastoid-itas_

A girl aged one year and nine months who had been an inpatient some weeks before for diarrhoea and vomiting was re-admitted with the following history.

A week before admission the mother noticed that discharge was coming from the left ear and that a swelling was slowly forming behind the ear. The child had been very restless and seemed to be in considerable pain.

On admission the child seemed a very small, puny poorly developed specimen. There was a mucopurulent discharge from the nose. Pus was discharging from the left ear. Behind the ear there was a tense red fluctuating swelling. It was recognised to be a mastoid abscess. Stacke's operation was done. A considerable amount of necrosed bone being removed. Enlarged glands which were present in the anterior
triangle of the neck were not touched as it was hoped they would settle down now that the source of irritation was removed. The child rallied well for some time but gradually became much worse. The enlargement of the glands had gone onto suppuration and a large abscess was present. This was freely opened and scraped although it had been suggested that the child would not survive the administration of an anaesthetic. However, the child began to pick up immediately afterwards, and did very well for some time. Then the wound behind the ear got red and inflamed looking again, and on exploring this a further sequestrum was removed. Another small sequestrum was removed a week later, and the wound then healed up and the child made a splendid recovery.

Films of the pus from the nose, ear and neck showed a pure culture of pneumococci.

Netters investigations into the primary infection by the pneumococcus showed that otitis media was by far the commonest infection. He concluded that infection in these cases is from the nasal cavities and this would have seemed to be the case in the patient whose history has just been described. It is probable that the previous diarrhoea and vomiting so devitalised the child that the pneumococcus was enabled to become virulent in suitable nidus formed by the nasal cavities and the adenoids tissue present in the nasopharynx. The child having nasal catarrh and adenoids. It is probable that the recurrence of the bone disease was due to reinfection, as the local condition was not treated. It seems to me to be most important to
treat the adenoid condition and to clean out the septic nasal cavities at the time one treats the more serious manifestations as this will enable the recovery to be more rapid and more certain, by removing the source of the original infection.

**Two Cases of Diffuse Cellulitis.**

**Case 1**

A boy aged 7 months according to the mother had always been a healthy baby, until she brought him to the hospital to be circumcised ten days before admission. The circumcision wound did well. A day or two before admission a puffy swelling was noticed on the back of the left hand. A large abscess formed in which numerous pneumococci were found. Three weeks later a large abscess formed on the left buttock. This was opened and the pus found to contain pneumococci also. The child had a chronic nasal catarrh the discharge from which contained pneumococci.

It is hardly likely that infection took place through the circumcision wound as in that case one would have looked for an abscess in the groin as the first indication of general infection. Infection probably took place from the nasopharynx where there was evidently abundant pneumococci. These became virulent owing to the lowering of vitality following immediately on the operation. In this case flushing of the nasal cavities with a weak solution of Chinosol was tried in addition to the local treatment of the abscesses and seemed beneficial.

**Case II**

Baby girl aged 7 months. She was admitted
with an abscess pointing on either side of the quadriceps extensor tendon just above the patella. The temperature was normal on admission. The history was that five weeks before the child had a cold. A week later the mother first noticed the swelling. It has gradually got bigger and as the mother was not satisfied with the progress of the child she brought it here. The abscess was opened immediately and as the child was rather collapsed no very careful examination was made as to its connections with the knee joint, but it seemed to be a collection of pus in the synovial prolongation which extends up under the quadriceps tendon. The general cavity of the knee joint however seemed free.

Two days later the temperature rose to 102.6° F. respirations were 60 to the minute pulse was 130. On examination of the chest both bases were found dull and fine crepitations and tubular breathing could be heard. The areas of dullness increased. Respiration became 100 per minute while the pulse rate was only 140. The child died on the morning of the fifth day. No necropsy was allowed, but the child had undoubtedly a double pneumonia.

Pneumococci were to be found in pure culture in the pus taken from the abscess.

Dr. E. J. Cave of Bath has called attention to the occurrence of Pneumococcal arthritis in association with pneumonia. This occurs chiefly in adults and is usually of very grave import. From what I have described as regards the seat of the abscess I think that I am justified in classifying this case as
similar to some of those collected by Dr Cave. The main interest lies in the occurrence of the lung symptoms after the local symptoms had been present for some time. Out of the 31 cases collected by Cave only two showed this sequence. The initial cold that the child had was probably the predisposing cause in this case.

A Case of Suppurative Periostitis of the Femur.

A boy aged 3½ years. The history as given by the mother is as follows. Seven weeks before admission the boy had had a bad cold, a sore throat, and a rash over the body. She thought he had had an attack of measles so did not call in a medical man. However as the child did not improve well she sent for a doctor who told her that the boy must have had scarlet fever. A fortnight before admission the left wrist got swollen up, and in a day or two an abscess burst. It has healed up. Five days ago the child's left knee became swollen and could not be bent. The swelling has increased in size and become very painful. On admission, Patient has a large tense fluctuating swelling in the lower part of the thigh. The knee joint did not seem to be implicated. On opening the abscess about ten ounces of thick greenish pus escaped. The back of the lower end of the femur was found to have been stripped of periosteum. The pus on examination was found to contain pneumococci. This was kindly confirmed for me at the local Public Health Laboratory. This child suffered from adenoids and had
a muco-purulent discharge from the nose. The leg wound was found not to be doing well as it was scraped out again. This took a long time to heal up. Before it did so I scraped out the adenoids and flushed the nose through with lotion. Very rapid improvement was noticed after this. The boy became bright and cheerful where formerly he had been dull and apathetic, and the rate of healing of the leg wound was much accelerated.

It is unfortunate that it is not definitely known which of the infectious diseases the boy had suffered from. It is however most likely to have been scarlet fever. It is rather uncommon to have multiple septic lesions following on scarlet fever, though they do occur occasionally and may have an interesting connection with the rheumatic condition, which is a common complication of scarlet fever. It is however possible that the child had had an attack of Rubella rather than one of scarlet, and is interesting in association with the next set of cases to be described.

An Epidemic apparently due to the Pneumococcus.

Seven of the children in the wards were affected. All the cases occurred within a week. Four boys and three girls were affected. The boys and girls wards are quite distinct from each other, except as regards the nursing arrangements at night when a junior nurse does probationer's duty for both wards. It so happened that the nurse detailed for this duty had an attack of Diptheria at the same time as the first case
showed itself

The first case had been in the wards for over two months with spinal caries. One morning her temperature went up to 100.4 F. and her body was covered with a rash somewhat resembling that of scarlet fever. There was a slight redness of the throat but the tongue had none of the characteristics of a scarlet tongue. It was diagnosed to be a rash due to digestive disturbances. The rash faded in two days. A persistent nasal discharge was present and the child seemed to have adenoids. Four days later there was swelling of the glands in the anterior triangle of the neck, and considerable discharge of pus from the left ear. Next day an intensive cellulitis had formed around the glands. This called for surgical interference but only a small quantity of pus was present. A swab taken from the throat proved negative when examined, for diphtheria. Two days later a boy began with the same symptoms of swelling in the neck and discharge from the ear and nose. The cellulitis was even more extensive than in the first case. No premonitory rash however was present nor was any rash noticed in any of the subsequent cases. In the other five cases the cellulitis round the glands was only slight and did not call for surgical interference as in the first two cases. In the last two cases there was no discharge from the ears, but in all there was a muco-purulent discharge from the nose. If I now tabulate the leading features of the cases a clearer clinical picture will be presented.
Common Symptoms in all Cases.

(1) General constitutional disturbance.

(2) Slight redness of the pharynx and tonsils.

(3) Rise of temperature.

(4) Swelling in the neck.

The situation of the swelling was in front of and beneath the sterno-mastoid muscle in the upper part of the anterior triangle of the neck. It was a glandular swelling and was at least the size of a goose's egg.

(5) A mucopurulent discharge from the nose.

(6) A tendency to constipation.

(7) The glands on the opposite side of the neck to the marked swelling could be felt enlarged some days later.

Special Symptoms.

(1) Four of the cases had discharge from the ear on the same side as the swelling.

(2) One case had discharge from the ear on the opposite side.

(3) In the first two cases an intense cellulitis occurred around the enlarged glands.

(4) The last two cases had no discharge from the ears.

(5) In three of the cases there was some enlargement of the spleen.

(6) In five cases the swelling was on the left side and in two on the right side.

(7) In one case there was a visible swell-
ing present on the opposite side after the original swelling had gone down.

On examining the pus from the nose, ears and necks where it was obtainable, it was found to contain a pure culture of pneumococci. This was confirmed by Dr. Eurich who made cultures etc., from the pus.

The question naturally arose as to what name this epidemic should be called, and if it answered to any already described species of disease.

On casual inspection the cases might seem to be examples of mumps, but on careful examination no trace of involvement of the Parotid gland could be made out. There was no difficulty in opening the mouth except in the first two cases. Then from what could be gathered concerning the incubation period was quite against mumps as was also the limiting of the infection and the fact that each successive case appeared less ill than the preceding one.

The fact that the nurse, whose duties took her between both wards and in contact with the patients there, developed diphtheria, about the same time, suggested that these cases might be ones of diphtheria. However repeated examinations of the throat swabs failed to reveal any diphtheria bacilli. None of the cases showed any trace of false membrane on the throat or any other manifestation of diphtheria such as one might expect to find out of a series of seven cases. This was sufficient in my opinion to prevent one coming to a diagnosis of diphtheria.
Seeing that in the first case a rash like that of scarlet fever had been noticed one had to eliminate this disease. In bad cases of septic scarlet fever considerable swelling of the cervical glands is present and suppuration may occur. Both sides of the neck are affected together and gives rise to the condition known as "Bull Neck". The throat symptoms in these cases however are very severe and quite different from the mild appearance I have described as occurring in my cases. There was therefore not much difficulty in deciding that the cases could not be ones of scarlet fever.

The cases might have been due to influenza as a glandular type has been described as sometimes occurring, but this is very unusual and other manifestations of influenza are present and some of the other types of this disease would have undoubtedly shown themselves in some of the adults in the Hospital.

The cases being undoubtedly infectious they were sent down to our Isolation ward, and special nurses engaged to nurse them there. One of these told me she had recently seen a similar case resembling the first one most closely in so much as a rash was first present, to be followed some days later by the glandular swelling and discharge from the ear. This case she said had been variously looked upon as one of Rubella and Ptomaine poisoning.

In the article on Rubella in Clifford Allbutt's system of medicine there is an interesting paragraph bearing on this. It reads as follows:-

"It is sometimes suggested that Rubella may
give evidence of its existence only by producing slight feverishness and some enlargement of the lymphatic glands. The suggestion is more worthy of note as in France where Rubella would appear to be very seldom observed some writers describe a "glandular fever in children which is apparently infectious."

From this it would appear that one cannot be certain that obscure cases of Rubella would not be the proper description for these cases, were it not for the definite association, the cases had with the pneumococcus. The term "glandular fever" however seems to me to be a very fitting description of the cases.

In the Lancet of Jan 9th 1904 Professor Byers of Belfast described an epidemic that occurred in Belfast and some parts of the North of Ireland at about much the same time as the epidemic occurred in this Hospital. He describes the cases as being examples of glandular fever. Many of his cases when first seen presented a well marked unilateral swelling of the neck while "others a swelling occurred on both sides of the neck. It would appear however that he came across no cases where the complications of otitis media and cellulitis occurred. His remarks on the ethology of the cases is interesting. He writes: "The poison of glandular fever is probably microbial and the present extraordinary atmospheric phenomena may have provided precisely the conditions necessary to the growth of the infective germ which causes the disease."
Olsers definition of glandular fever is:

"An infectious disease of children developing as a rule without premonitory signs and characterised by slight redness of the throat high fever swelling and tenderness of the lymph glands of the neck particularly those behind the sterno-mastoid muscle. The fever is of short duration while the enlargement of the glands may persist for from ten days to three weeks. Termination of the adenitis in suppuration is rare while complications of otitis media and retropharyngeal abscess have been reported. Prognosis is favourable."

In Clifford Allbutts system of medicine a very similar description is given, but special importance is placed on the swelling beginning on one side first, usually the left side, and then in a few days attacking the glands on the other side. Constipation is also said to be one of the important symptoms.

A detailed account of this disease is to be found in an article published by Dr Dawson Williams in the Lancet Vol.I Page 160 in 1897, and this agrees with what has already been quoted.

Although only in one case did any visible enlargement of the glands on the other side of the neck occur, yet a certain amount of enlargement was present, and as I attribute to the treatment employed, the fact that they did not become as large as on the other side, a result differing from what seems the rule, as Dawson Williams says that treatment has no effect in preventing the other glands from being.
affected I feel that I am justified in concluding that these were cases of glandular fever but with some unusual symptoms. Little seems to be known in regard to the etiology of the disease. To quote Dr Dawson Williams' article on this subject is instructive.

"As to the Pathology of the condition there is in the absence of any bacteriological investigation much room for difference of opinion. Comby suggests that it is due to an attenuated streptococcal infection of which the point of entrance is probably the surface of the tonsils. He would therefore appear to be opposed to the view that the condition should be considered an acute specific infection and this seems to be the view also of Ashby and Wright. Comby however relies I gather largely upon the observations of Neumann who found staphylococci in certain glands which suppurated and Comby also speaks of cases in which suppuration occurred. All other writers however comment upon the absence of suppuration as characteristic of the disease".

It would seem then that the cases which have come under the notice of Comby and Neumann must have been similar to those that I have described. In regard to the occurrence of suppuration I would like to suggest that it is only in the earliest cases of an epidemic that this occurs and is therefore apt to be overlooked and the infectious nature of the condition not recognised.

Koplick has suggested the cause might be a toxine absorbed from the intestine as constipation...
is a marked symptom of the disease. It seems to me that this is making the constipation the cause instead of a symptom and that the features of the cases are much better explained upon the theory of a microbic origin.

Comby's suggestion that it is due to a streptococcal infection through the tonsilar surface fits in very closely with what seemed to be the cause in my cases as the Pneumococcus may resemble an ordinary streptococcus very closely under certain circumstances.

I do not wish to claim the pneumococcus as the sole cause of glandular fever, but wish to show that the pneumococcus under certain circumstances can give rise to a glandular fever of an infectious nature. The point of entrance of the infection being in these cases through the surface of the tonsils.

One of the cases would point to the incubation period being a very short one. This case was admitted to the wards on a Tuesday afternoon and showed the characteristic swelling in the neck when I paid a ward visit on Thursday morning.

Treatment of the cases consisted of small doses of quinine and stimulants given internally. Hot compresses were applied to the glands. The nasal cavities were frequently flushed out with antiseptic lotions. Chinosol being used. It is to this last part of the treatment that I attribute the checking of the disease. This is really the most important point in the treatment of the cases.

In Muir and Ritchies Manual of Bacteriology it is stated in regard to the experimental inoculation
of the pneumococcus that it is Pathogenic to many animals but that the susceptibility of different species varies to a considerable degree. In the most susceptible animals the inoculation produces a septicemia which speedily proves fatal. In less susceptible animals it causes a serofibrinous exudation or on intrapulmonary injection it produces a typical pneumonia which is generally fatal. In those who possess a higher degree of immunity it causes a pneumonia which is seldom fatal. Man seems to occupy an intermediate position in the scale of immunity between these two.

In children a general infection seems more likely to occur than in adults but the occurrence in adults of this is more likely to prove fatal so that children seem to occupy a slightly different position than adults in relation to pneumococcal infections. Netters investigations into the seat of the primary infection by the pneumococcus show that local lung symptoms occur in 81% in adults and only 28% in children as a primary infection.

It is well known that the pneumococcus can be cultivated from the mouth and nasal cavities of healthy people and this is why the predisposing causes are of such importance in diseases due to the pneumococcus.

Predisposing Causes.

(1) Nasal Catarrh. This is very common in children in Bradford, and tends to make a suitable nidus for the growth of the pneumococcus.
The presence of adenoids and enlarged tonsils. This is of special importance in relation to general infections in children.

Eleven of my cases had adenoids and the only case of pneumonia in which complications occurred had adenoids.

Previous illness such as scarlet fever, measles, Rubella etc., are also very important.

Males are more susceptible than females.

Excessive dampness of climate is important, in relation to special general infections.

It would seem that the virulence of the pneumococcus varies with the state of the weather to a certain extent and that is why there may be so many different clinical manifestations of its presence as a disease causing agent. Deaths from lobar-pneumonia are much fewer in 1903 than in former years in Bradford. It is during this year also that special attention has been called to the great variety of lesions which may be traced to this organism.

Sudden chill has been long considered an important factor as a predisposing cause.

Modes of Infection.

That the same bacillus may cause different lung lesions such as lobar and lobular pneumonia is probably due to a difference in the mode of infection. The first being due to the organism being brought to the lungs by the blood stream, and the second to infection by inhalation.

Probably in all cases the pneumococcus first
multiplies in the oral and nasal cavities, from where it may be inhaled into the lungs in some cases, but in the majority of cases it gains entrance to the blood or lymphatic streams by the surface of the tonsils producing different symptoms according to the special predisposing cause and also according to the peculiar susceptibility of the individual infected.

It is known that epidemics of pneumonia may occur, but little is known as regards incubation period.

In the Lancet Vol II Page 1519 for 1900 a note is made of an interesting case, which helps along with glandular fever case I have mentioned to shed some light on this subject. This was a case of a woman who was nursing a case of pneumonia who developed a double otitis media on the fourth day of the patient's disease. The pus in this case contained only pneumococci. From this it would seem that the incubation is a short one and might be put down within the limits of one to four days.

**General Clinical Features of Pneumococcal Cases.**

There is in all cases a general systemic derangement such as one would expect in any septic infection. The local lesions of themselves are in no way characteristic. The pus however seems to have a peculiar greenish tinge, which catches one's attention after they have seen several cases. The most characteristic sign is one that the nurse in charge of the case usually calls your attention to. I refer to the chronic mucopurulent nasal discharge. This
was present in ten out of eleven cases described of general pneumococcal infection and was present in the case of pneumonia with complications. It is always associated with some adenoid growth. Another rather characteristic symptom is the comparative lowness of the temperature when compared with the acute nature of the local condition.

Prognosis of the cases is generally very good provided the nasal condition be treated and this is really the most important point to bear in mind when treating cases.

It is therefore very evident that the pneumococcus is a far more active agent in septic conditions than it has generally got the credit for. It would also seem that sufficient attention has not been paid to its infectious nature and my experience has been such as points to the treating of these conditions as one would in the case of scarlet fever by isolation and disinfection. It is important in regard to treating medical and surgical cases in the same children's ward and this may explain why so many surgical cases tend to go septic after every possible care has been taken to prevent infection of the wound at the time of operation. Strict attention should be paid to the oral and nasal cavities of all children, but especially in Institutions where many may be in close contact with each other as in the wards of a children's Hospital. This is a point on which no importance has been laid but it is one which is really useful as a preventive measure.
against these unsuspected pneumococcal infections.

References.


Ashby and Wright's Diseases of Children.

Clifford Allbutts System of Medicine.

