SUMMARY

In twenty-two of the twenty-five hay-fever cases tested the blood was deficient in its lytic action on the granules of *Phleum pratense* pollen, as compared with normal and other non-hay-fever bloods. This lytic property originates in the serum, as the chiastic counts demonstrate deficient lysis of the granules with hay-fever serum, irrespective of the source of the leucocytes. One non-hay-fever patient (24***) was found to have a high phagocytic index—3.5. This patient presented herself for treatment of recurrent boils of the ears, and was found to be suffering from chronic nephritis, and with a history of cholecystitis. Skin tests to *Phleum*, *Dactylis*, and *Holcus* were negative. It is of interest that this patient stated she is the mother of a hay-fever sufferer; there is no evidence of hay fever or allergy in her family history or in that of her husband.

My thanks are due to Dr. John Freeman, Director, Department of Clinical Bacteriology, St. Mary's Hospital, and other members of the staff for valuable help and criticism during this investigation.

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RECOVERY FROM PNEUMOCOCCAL MENINGITIS

NOTES ON A CASE TREATED BY FELTON'S SERUM

BY

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It is generally believed that recovery from pneumococcal meningitis is rare; in fact, doubt is usually thrown on the diagnosis if recovery results. Evidence, however, is now accumulating that recovery does occur in primary infections of the meninges with the pneumococcus.¹ That early diagnosis and the institution of prompt treatment are the all-important factors is well borne out by the investigations of Kolmer,² who states that "in so far as the treatment of experimental streptococcal and pneumococcal meningitis is concerned, it has been impossible for me to save any animal, when the infection has had more than a forty-eight hours' start, with diffuse purulent meningitis." Good results are reported from the use of Felton's anti-pneumococcal serum when used experimentally by Kolmer, Amano, and Rule,³ and in cases given by Stoessiger.¹ The case we mention below is the third of three cases of recovery from meningitis occurring recently in the general practice of one of us. The present case, however, seems to us to be particularly worthy of record owing to the fact that we have good evidence for considering it to be one of pneumococcal meningitis.

CASE RECORD

The patient, a male aged 27, came under observation on October 21st, 1932, having felt unwell for about five days previously. He complained of pain in the lumbar region. His previous history was negative, except for a football injury to the sternum at the age of 16 years. His family history was good. He stated that his trouble began with backache, which was worse in bed, and he was sleeping badly, but he continued his usual duties up to the date of first seeking medical advice. Examination revealed tenderness of the muscles of the lumbar region and tenderness in the muscles of both thighs. The tongue was furred and the patient was constipated. The temperature and pulse rate were normal.

His condition remained much the same until October 25th, when he complained of weakness. His face was slightly swollen, his tongue was furred, and he complained of a slight headache. Temperature and pulse were still normal. He was sleeping badly, but there were no other symptoms. During all this period he was not confined to bed. On October 26th there was a striking change in his condition. He was lying helpless in bed, the face was swollen, the head markedly retracted. He was drowsy, with a thick and sluggish speech, and complained of pains down the spine and in his legs. He had double vision, severe headaches, sickness, and vomiting. There was some conjunctivitis and tache cérébrale was present. The abdomen was retracted and abdominal reflexes were absent. Knee-jerks were absent and plantar reflexes could not be elicited. Kernig's and Brudzinski's signs were strongly positive. Temperature and pulse were normal. There was no evidence of a lesion of the ears, nose, or throat, nor of any infection of the lungs.

A lumbar puncture was performed and a specimen of cerebro-spinal fluid, which was under considerable pressure, was sent by messenger to Dr. Cronin Lowe of Southport for his opinion. The remainder was retained and tested by one of us immediately. The following is Dr. Cronin Lowe's report.

Cells, 18 per c.mm. Polymorphs, 82 per cent.; small lymphocytes, 12 per cent.; large lymphocytes, 6 per cent. Cultures sterile. Smear: Gram-positive diplococci (probably pneumococci).

Two or three contaminatory organisms of coliform type were reported present, but these were also found by us in this and in subsequent specimens, in addition to Gram-positive diplococci. Great care was observed to avoid contamination.

On October 27th the patient's condition was unaltered except that now the disks were injected. Treatment with Felton's anti-pneumococcal serum, Types I and II, was commenced. A first injection of 10,000 units was given intravenously. Two hours later 10,000 units were injected and followed by 20,000 units at eight-hour intervals. As there was no improvement in the general symptoms on October 28th the serum was continued until 140,000 units in all had been given in a period of fifty hours. The first improvement was noticed on October 29th. The patient seemed more alert to his surroundings and the double vision had disappeared. The cerebro-spinal fluid still contained polymorphs, Gram-positive diplococci, and Gram-negative bacilli. The urine showed a heavy infection with coliform bacilli. White cells amounted to 7,600 per c.mm., 75 per cent. being polymorphonuclear. On October 30th the improvement was maintained, except for retention of urine, ptosis of the right eyelid, and slurring speech.

On November 1st Dr. Cronin Lowe's report on the cerebro-spinal fluid was as follows.

Protein, 200 mg. per cent.; globulin, ++; sugar, 0.072 per cent.; non-protein nitrogen, 25 mg. per cent.; total cells, 3 per c.mm. Cultures remained sterile.

On November 2nd improvement was more noticeable. The patient could see more clearly, there was no headache, and the pains in the legs had disappeared. The optic disks were now clearer. By November 20th the symptoms of meningitis had completely subsided and the patient appeared to be well on the road to recovery.

DISCUSSION

We are here dealing with a case of meningitis which could, from the clinical findings, fall under one of the three following types: (1) serous meningitis; (2) meningococcal meningitis; (3) pneumococcal meningitis.

With regard to the first type, our case differs markedly from those described by Braithwaite and Mitchell Innes.⁴ There was no evidence of concomitant influenza or bronchopneumonia, and lumbar puncture failed to relieve the symptoms. Furthermore, the cerebro-spinal fluid was of entirely different composition. The opinion of the bacteriologist weighs heavily against our case being of the meningococcal type—no Gram-negative diplococci were found on repeated search. On the other hand, we have here an infective meningitis, presenting early severe symptoms, in which organisms resembling pneumococci were found by two observers, and we believe that we have correctly placed our case in the latter class, even though

the cultures remained sterile. It was the finding of these Gram-positive diplococci which suggested the use of Felton's serum, and the intravenous method of injection was selected as the safest. We do not think that the intracarotid method, which is recommended by Kolmer as being both easy and safe, is likely to appeal to the general practitioner. We feel unable to explain the presence of Gram-negative bacilli in the cerebro-spinal fluid on two separate occasions, as every care was taken to avoid contamination.

CONCLUSIONS

We do not presume to draw any decisive conclusions from our experience with one case, but it appears to us that a primary pneumococcal meningitis should be amenable to treatment with a specific anti-pneumococcal serum, whereas cases with a septic focus in the ears or accessory nasal sinuses are unlikely to be benefited by this treatment alone.

The immediate use of Felton's serum by the intravenous method seems to us to be a safe and valuable aid in the treatment of this condition. Early and repeated lumbar puncture appears also to be of the greatest importance.

Finally, we hope that our experience with this case may prove of some interest and help to professional colleagues.

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SEGMENTAL HYPERALGESIA ASSOCIATED WITH HAEMOPTYSIS *

BY

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In 1929¹ I showed that in diseases of the chest the existence of segmental hyperalgesia, or Head's zones, in the majority of my cases was definitely associated with haemoptysis. In this reference I should like briefly to present the following case.

A woman, aged 51, was admitted to the Ray Brook Hospital, New York State, on October 17th, 1930. The definite onset of her illness occurred with a series of small haemoptyses on June 12th, 14th, 16th, and 19th, the total amount of blood being about an ounce. She had been treated by complete rest in bed for four weeks, and modified bed rest until her admission. For the first two months in hospital she was afebrile and practically free from symptoms; she had only a slight cough and half a drachm of sputum daily, which was negative for tubercle bacilli by direct smear and guinea-pig inoculation. On physical and x-ray examination she was found to have a minimal lesion in the left upper lobe; latent rales were heard in circumscribed areas over the left upper lobe, both anteriorly and posteriorly. The right lung was clear. She was a well-nourished woman, intelligent, and somewhat highly strung, but Libman's sign (which is elicited by exerting moderate pressure over the styloid process, and may be used in estimating roughly the patient's threshold for painful stimuli) was negative.

On December 22nd the sputum was found to be slightly tinged with blood. This staining of the sputum continued for four days, and on the evening of December 26th she complained of a sudden sharp pain over the second left rib near the sternum; almost immediately afterwards she raised a drachm of bright red blood. Within half an hour of the haemoptysis she developed a dull pain in the left chest, which she described as "going right through the chest from back to front." She also said that there was a feeling of soreness in the back and front of the chest, and she volunteered the

information that, when she had had the recurrent haemoptysis in June, she had experienced a similar pain and soreness of the chest wall on the left side.

On examination it was found that she had well-marked areas of tenderness on slight pressure, as shown in the diagram. There was no definite hyperalgesia of the skin, such as I have found in about forty other cases of recent haemoptysis. These areas are segmental in type, and correspond to part of the cutaneous distribution of the third dorsal segment. It is not likely that they are due to underlying pleurisy, because there was no evidence of pleural involvement; further, it is not probable that the pleura would be inflamed in two widely separated and localized areas. I think there is very little doubt that these areas are topographically determined by the distribution of nerves, and are segmental in type. The patient had no further haemoptysis, and the tender areas could be elicited for six days, after which the dull pain and tenderness gradually disappeared. Since then she has had no more haemorrhage, and has not complained of any further pain in the chest.

It is an interesting fact that, in this case, there was no evidence of cavitation, either on physical or on x-ray examination. In the series of cases previously referred to where there was evidence that the blood was coming from a tuberculous cavity, no areas of segmental hyperalgesia were observed. This fits in with Head's observation²

Chest diagrams showing the situations of the anterior and posterior areas of hyperalgesia.

that, in what he calls the excavation type of phthisis, no hyperalgesia is found, and he offers the explanation that the nerve endings are destroyed, together with the lung tissue, and the first component of the reflex arc is abolished. In a few of my cases, however, a single localized patch of cutaneous hyperalgesia, sometimes with deep tenderness, was found on the anterior aspect of the chest wall directly over the cavity, and not necessarily associated with haemoptysis. I regard this single localized area as an example of the direct or pleural type of hyperalgesia due to the presence over the cavity of pleural adhesions setting up a localized or subacute inflammation of the parietal pleura.

But in the cases where the bleeding comes from a bronchiectatic cavity, segmental hyperalgesia is frequently found, presumably because the cavitation is due to the dilatation of a bronchus without destruction of the nerve endings. In these cases also, when the bleeding originates in the lower lobe, the hyperalgesia is found to involve lower dorsal segments, usually the fifth, sixth, and seventh, and occasionally the eighth. No areas of segmental hyperalgesia were found in those cases in which it could reasonably be assumed that the haemoptysis was due to congestion of the lungs, such as in mitral stenosis and other cardiac conditions; in pressure on the bases of the lungs, as, for example, in the later stages of pregnancy; in neoplasm of the lung, and in chronic pulmonary tuberculosis, in which localized congestion may occur owing to pressure on the pulmonary veins and venules by the contraction of fibrous tissue.

After some years of study of these cases I have come to regard the presence of segmental hyperalgesia in association with recent haemoptysis, and even in the absence

* Read before the Saranac Lake Medical Society, April, 1931.