adduced to indicate that the parenteral administration of strychnine leads to any improvement in the general condition of the patient.

I should like to express my indebtedness to Prof. Noah Morris for his help, and to the Medical Research Council for a grant towards expenses.

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Medical Memoranda

Mechanical-lung Treatment of Pneumonia complicating Acute Poliomyelitis

The following case is reported because of the excellent results obtained by using the mechanical lung in the treatment of pneumonia in a patient who was almost moribund.

CASE HISTORY

The patient was admitted to hospital on Aug. 22, 1943, as a transfer from another hospital. His history up to that time is described from the notes which accompanied him and from his own observations.

On the morning of Aug. 20 the patient, a warrant officer aged 25, reported sick with a severe headache. By evening his headache was very bad, he had developed pains in the back, and he felt feverish. On admission to hospital he was found to have coarse rhonchi in the left base of the chest and also a few rales; there was no dullness. He was ordered sulphapyridine 2 g., four hours later 2 g., and then 1 g. four-hourly. The next morning he complained of pain in the back, pains down the front of his thighs, and weakness. His eyes were suffused. By evening the signs in his chest had subsided and he was taken off sulphapyridine, having received 8 g. Headache was slight at the time and he had no bodily pains. In the afternoon he had attempted to get out of bed, but found he could not do so, although he could sit up. Next morning he could neither sit up nor move his lower limbs. Knee- and ankle-jerks and superficial abdominal reflexes were absent. He was transferred to this hospital as a case of acute anterior poliomyelitis.

Aug. 22.—Examination showed a young man of anxious expression and very apprehensive, well nourished, and well developed; his face was a little cyanosed. At 2 p.m. his temperature was 101°, pulse 60, and respirations 26; breathing was entirely diaphragmatic. Abnormalities in muscle power and reflexes were: left and right triceps and right serratus magnus flaccid; deltoids moderately strong; pectorals and biceps strong; biceps reflexes brisk; intercostals and abdominal muscles flaccid; superficial abdominal reflexes absent; back and buttock muscles flaccid; thighs flaccid; knee-jerks absent; slight power in left gastrocnemius, right flaccid; ankle-jerks absent; moderate power in left tibialis anticus and peronei; slight power in right anticus and peronei; plantar reflexes flexor. Muscles were not tender, and there were no abnormalities of sensation. Paresis of the bladder was present, and the sphincters were continent. His white cell count was 10,800 per c.mm.—polymorphonuclears 82%. The cerebrospinal fluid contained increased globulin, 15 cells per c.mm.—polymorphs—and was sterile. The only other finding was diminished breath sounds at the right base, posteriorly.

Aug. 23.—T. at 6 a.m. 101.6°. Catheterized twice; vomited twice.

Aug. 24.—T. 99.4°, P. 70, R. 24 at 10 a.m. Was more cyanosed. Percussion note dull at right base posteriorly and V.F. increased. Breath sounds faint over right posterior lower third of chest; no adventitious sounds. Apex beat not displaced. Partial collapse of right lower lobe—liver's interference with diaphragmatic action considered the probable cause. The head of the bed was raised.

Aug. 25.—T. 102.8°, P. 86, R. 36 at 6 a.m. Further cyanosed. Chest signs unchanged. Radiograph of chest showed opacity of irregular density of right lower third, with some mottling of middle third and increased right hilar shadows. Lobar pneumonia, right lower lobe, diagnosed. Fowler position adopted and 2 g. of sulphathiazole given, to be followed by 1 g. four-hourly.

Aug. 26.—T. 99°, P. 100, R. 36 at 6 a.m. At 6 p.m. his general condition was worse and he looked a bad colour. Bubbling rales could be heard at some distance and he was unable to cough. Some viscid sputum from time to time collected at the back of his throat and was swabbed out of his mouth. When passing through the larynx it caused considerable respiratory distress, and on two occasions he vomited, bringing up sputum. Respirations 46, shallow and jerky. Oxygen given by nasal catheter. At 11 p.m. was mildly delirious and looked gravely ill.

Aug. 27.—At 2 a.m. he was delirious and ashen in colour. There were loud bubbling rales, and a rattle in his throat. P. 140, R. 44. He was placed in the mechanical lung, head end raised on 9-in. blocks. (The respirator had been completed by the Military Engineering Service only three hours earlier, they having done the job in a

day.) At 5 a.m. there was a dramatic improvement. Cyanosis was slight, pulse 92, and orientation normal, though the patient was apprehensive of the lung and wanted to be taken out. Breathing was quiet and no rales could be heard. The lung was working at 25 respirations a minute and at pressures of -14 cm. H₂O, +4 cm. H₂O. At 8 a.m. the patient was removed from the lung to be catheterized and made comfortable. R. 36, P. 116 after 10 minutes, and cyanosis returning. Replaced in lung after half an hour, and pulse soon settled to 96 a minute.

From this time on he made good progress and finally left the mechanical lung on Sept. 8. On Oct. 1 his paralysis remained much as on admission, except that the upper-arm muscles were much weaker. His bladder function returned on Sept. 1.

The striking effect of the mechanical lung was the change it produced in the chest—from a "bubbling cauldron" to quiet breathing; for no rales were audible after 8 a.m. on Aug. 27.

I am indebted to Col. C. H. N. Baker, Officer Commanding, for permission to publish this case.

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Tuberculous Infection of an Extrapleural Pneumothorax complicated by *Cl. welchii* Infection

It may be of interest to record a case of pulmonary tuberculosis in which a tuberculous effusion in an extrapleural pneumothorax was sterilized by the use of "azo-T." Subsequent infection by *Cl. welchii* was successfully treated by azo-T lavage and sulphathiazole instillations.

CASE HISTORY

A woman aged 35 had been treated for bilateral pulmonary tuberculosis since June, 1939, by extrapleural pneumothorax on the right and intrapleural pneumothorax on the left, the latter being abandoned in Feb., 1942. The right extrapleural pneumothorax was satisfactory until Oct., 1941, when fluid first appeared. In Dec., 1941, the fluid was thin, straw-coloured, and lymphocytic, and contained scanty tubercle bacilli. In Nov., 1942, the character of the fluid had changed; it was then muco-purulent, polymorphic, and there were numerous tubercle bacilli.

Out-patient treatment by aspiration and injection of azochloramide and sodium-tetradecyl sulphate on the lines recommended by Petroff (*Amer. Rev. Tuberc.*, 1941, 44, 738) was instituted on Jan. 19, 1943. Aspirations were at first carried out on alternate days and later twice weekly. The fluid gradually became thinner, and the number of tubercle bacilli decreased until on Feb. 22 no bacilli were present. The fluid remained thin for the next three weeks, but pus cells were persistent. On March 16 the presence of fungal hyphae was noted, and culture of the fluid gave a moderate growth of *Penicillium glaucum*. This persisted in the next two specimens. On March 22 the patient complained of pain in the right side of the chest, and her temperature was 100° F. Her general condition was quite good, but in view of her symptoms she was admitted to hospital. Aspiration was performed on the same day, and next day the bacteriologist reported the presence of *Cl. welchii* in large numbers. *Cl. welchii* serum was administered at once, 40,000 units being given intravenously and 60,000 units intramuscularly. Sulphapyridine was given by mouth, but was replaced by sulphathiazole on March 25, owing to extreme nausea. A further aspiration was performed on March 24, and the bacillus was still present in large numbers.

On March 25, following consultation with Mr. Fatti, treatment by injection of sodium sulphathiazole into the extrapleural cavity was started. The exudate was first removed as completely as possible and lavage of the cavity with azo-T solution performed. Sodium sulphathiazole 8 g., dissolved in 100 c.cm. of normal saline, was then injected. The process was repeated on March 29 and 31. The fluid on both these occasions was negative for *Cl. welchii* and for tubercle bacilli. On March 29 the sulphathiazole content of the clear fluid obtained after autoclaving was 10 mg. per 100 ml., and on March 31, 17 mg. per 100 ml.

The patient's general condition remained surprisingly good and, apart from the extreme nausea caused by the oral chemotherapy, she had no complaints. Her temperature became normal on March 26, and remained so for the rest of her stay in hospital. The white cell count was not affected by the infection or the treatment, the total counts remaining between 7,600 and 8,200 per c.mm., and the differential counts being within normal limits. Fluid gradually reaccumulated in the extrapleural space, and aspiration was again performed on May 4, when the resulting thin, slightly blood-stained, straw-coloured fluid contained only degenerate polymorphs, but no organisms.

The patient was discharged from hospital on May 8, 1943, and has since attended for two further aspirations—in June and July. On both occasions the fluid was thin and sterile.

My acknowledgments are due to Dr. J. N. Deacon, Medical Director, Redhill County Hospital, for permission to publish this paper, and to Dr. A. S. Hall and Mr. L. Fatti for advice on treatment.

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