Report on a Case of Staphylococcal Pneumonia with Staphylococcal Septicæmia

TREATED WITH PENICILLIN

By ALEXANDER JOHNSON, M.B., D.P.H.

PERSONAL HISTORY.

THE patient, a female, aged 10½ years, weighing 5 st. 6 lb., height 4 ft. 10 in., has a congenital heart lesion, recognised since birth and described below.

No disease in infancy.

Chicken-pox.

Measles and lobar pneumonia (consolidation both sides); all in sixth year.

Lobar pneumonia again at seven years.

Influenza age 8; nil since, apart from a mild catarrhal cold with no temperature, and only a few rhonchi in her chest for four to five weeks immediately prior to her present illness.

DETAILS OF THE CARDIAC LESION.

Electro-cardiograph (Dr. S. B. Boyd-Campbell) shows normal complexes (plate I). Age 6½ years. X-ray report (plate II), 11th April, 1944 :—"Heart not altered from usual outline."

SYMPTOMS.

A very loud blowing systolic murmur can be heard, with the point of maximum intensity at the sternal end of the third and fourth left intercostal spaces. The murmur is well conducted and can be heard over the entire upper two-thirds of chest, increasing in intensity as one approaches the third and fourth left interspaces in front, where a thrill can be felt on palpation. Murmur well heard up into carotids. On percussion, cardiac dulness appears to be normal. Her blood-pressure is 160/100, substantially the same as that recorded four years ago, when it was 160/90. The blood-pressure readings in either arm show a difference of 10 mm. Hg. (R. 150/100; L. 160/100).

Pulsation is visible in the interscapular region, indicating the presence of *coarctation of the aorta.*

The child leads a normal life, apart from playing no strenuous games, and at no time has shown any sign of decompensation either in health or illness.

PRESENT ILLNESS.

Began with a temperature of 104°F. There was nothing on clinical examination to account for it. Patient felt quite well and had no pain, headache, sore throat, or vomiting. During the next three days she had a total of 8 grm. sulphapyridine, but in the continued absence of any signs or symptoms by which a diagnosis could be arrived at, she was given sulphathiazole. Two and a half days later her

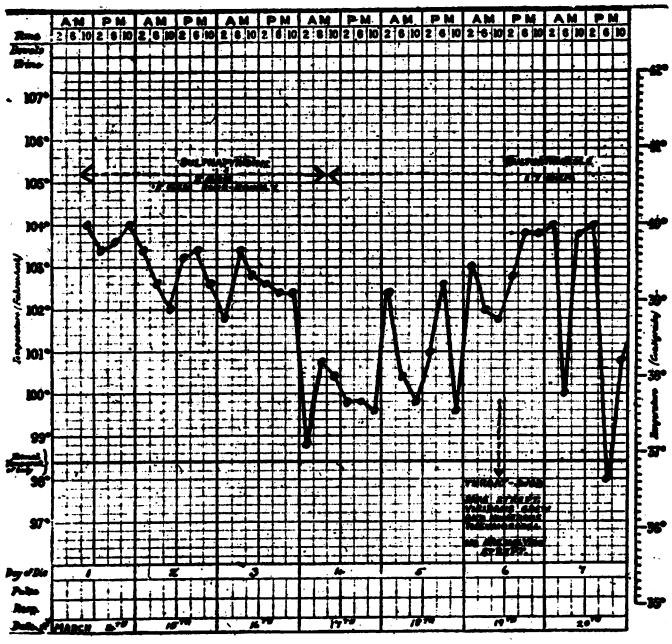

Fig. 1

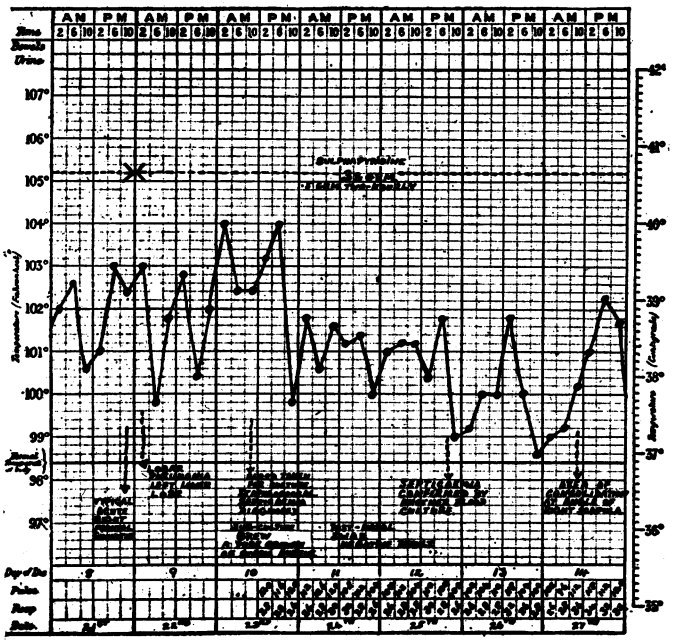

Fig. 2

condition remained unchanged, her throat swab revealed "no hæmolytic streptococci present, but quite a number of non-hæmolytic streptococci grew in company with pneumococci"; sulphathiazole treatment was continued. The first positive signs became evident two days later (eighth day of illness), when acute right frontal sinusitis developed (fig. 2), with severe frontal headache and photophobia; slight prominence of the eye, ptosis and tenderness over the supra-orbital ridge becoming evident the next day. Transillumination showed definite dulness in the sinus.

That evening (ninth day of illness), consolidation was found in the left base accompanied by a loud pleural rub. Sulphathiazole therapy was now discontinued —the total dosage given was 17 grm.—and sulphapyridine introduced again (0.5 grm. two-hourly).

Next day the pneumonia extended over the entire left lower lobe, and a blood culture was done (fig. 2). A profuse growth of staphylococcus aureus was obtained in both Hartley and Douglas media, and a pure growth of the staphylococcus aureus was found in sub-culture. There was a leucocytosis of 18,000—chiefly polymorphonuclears—no albuminuria. A post-nasal swab was sterile. No sputum could be obtained, as there was little or no cough. The diagnosis of staphylococcal septicæmia was confirmed by another positive blood culture two days later. No meningeal signs or symptoms were present, and although the temperature fell to a slightly lower plane, the patient became steadily more toxic in appearance, and dyspnœa more marked. The sinus infection, after its initial flare-up, began to recede, and in five days time had disappeared completely, there being no evidence of an inward spread to the cavernous sinus.

On the fourteenth day of illness a patch of consolidation appeared at the angle of the right scapula.

The only other signs of note at this stage were twitching of the limbs, hesitancy and confusion during speech, occasional lapse of memory, and cyanosis—all of which were probably due to the intensive sulphonamide therapy, as she had a total of 32 grm. sulphapyridine in seven days.

As the sulphonamides were not having the desired effect, there was a strong possibility of the congenital cardiac lesion becoming, if not already being, the focus of bacterial endocarditis.

The heart showed no signs of decompensation, although the condition of the patient was critical on admission to the Clark Children's Clinic on the fifteenth day of illness.

Penicillin was administered at once—initial dose 8,000 units intramuscularly (fig. 3), followed by 4,000 units three-hourly. The first sample of sputum was obtained the next morning, and grew a pure growth of staphylococcus aureus. Blood culture, taken after 56,000 units of Penicillin (fig. 3) had been given (thirty-six hours treatment) showed :—

First bottle clear—nil on sub-culture (blood agar).

Second bottle—staphylococcus aureus on direct examination and a good growth on sub-culture.

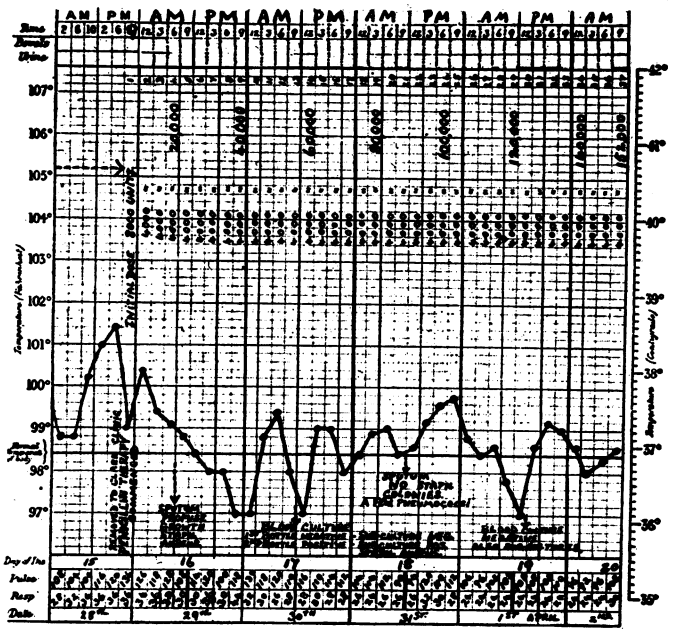

Fig. 3

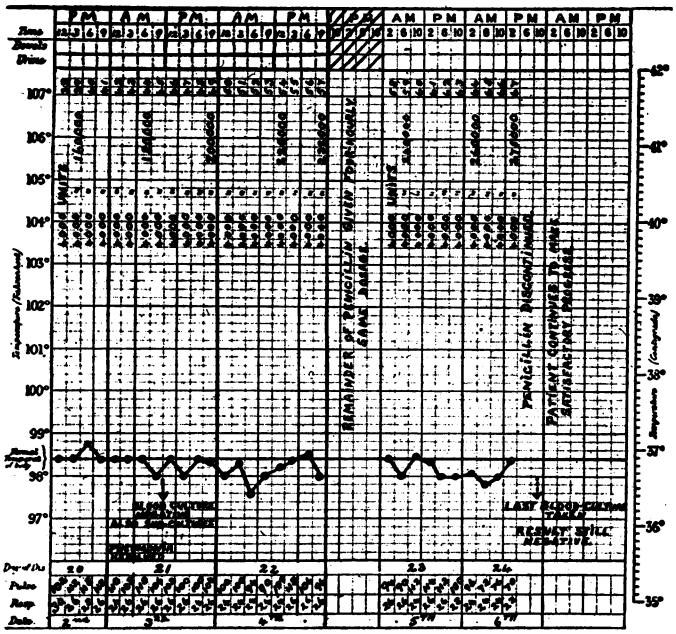

Fig. 4

On the third day of treatment—after 88,000 units of Penicillin—a sample of sputum showed *no staphylococcal colonies* (fig. 3), and patient's condition was improving rapidly.

On the fourth day—after 120,000 units of Penicillin—*blood culture was negative* and negative on sub-culture.

Two days later pneumonia disappeared from both sides (fig. 4), not by the gradual type of resolution by "lysis," but rapidly, as would be expected in "crisis" —the change over to normal breath sounds taking about twenty-four hours.

After six days' treatment—180,000 units—another negative result was obtained from blood culture.

When 232,000 units of Penicillin had been administered—eighth day of treatment—the last ten injections were given four-hourly, and concluded thirty-eight hours later—total of sixty-seven injections (fig. 4).

Eight hours after the last injection, another blood sample was cultured, and a negative result obtained.

Her total dosage was 300,000 units, although 275,000 is the figure given on diagram. The discrepancy is accounted for by the fact that in giving 1 c.c. per injection (100,000 units were dissolved in 25 c.c. sterile distilled water), a few extra minims were usually included.

Seconal $\frac{3}{4}$ gr. was given as a sedative eight-hourly during treatment and, together with ice-pack, was fairly effective in counteracting the pain which followed immediately after each injection, and in overcoming the restlessness associated with her toxæmia.

I am indebted to Dr. N. C. Graham of the Department of Bacteriology, Queen's University, Belfast, for the following investigations :—

Twenty-four hours after treatment with Penicillin was instituted, a sample of urine was tested by Fleming's "hole method" on an agar plate.

A dilution of urine 1 :100 inhibited staphylococci, and produced a ring 24 mm. in diameter.

The same sample caused complete inhibition in 1 : 640 when tested by serial dilution.

Other samples collected during treatment caused similar inhibition, even though the urine was more dilute, as patient was taking fluids in much more liberal quantities.

The first blood sample taken was thirty-six hours after treatment was commenced—56,000 units of Penicillin—and two and a quarter hours after the thirteenth injection. It was tested by the "slide cell" method in dilutions of 1 : 1 to 1 : 8. The result was a more marked inhibition of the staphylococci isolated from the patient's sputum than of a staphylococcus from a stock strain, but complete inhibition was not obtained in a dilution of 1 : 1 as compared with normal serum.

The second blood sample was obtained eighty-four hours after treatment was instituted—120,000 units of Penicillin—and one and a half hours after the twenty-ninth injection.

The result was almost complete inhibition of the staphylococcus strain.

Using the "hole method," no inhibition could be demonstrated by the patient's sputum or serum, as the test is probably not delicate enough.

X-ray report of antra and accessory air cells, 11th April, 1944 (five days after cessation of Penicillin treatment), shows nil abnormal.

X-ray chest (plate II), 11th April, 1944, report :—"Old infection of chest. Several heavily calcified foci on right side. Does not seem recently active."

The patient's progress is continuing satisfactorily.

I am indebted to Dr. J. A. Smith for the original diagnosis of staphylococcal septicæmia, and for the subsequent blood culture and sputum reports; and to Dr. N. C. Graham for his interest and reports; also to Dr. F. M. B. Allen for his supervision and advice during the patient's stay in the Clark Children's Clinic. No words of gratitude are adequate to the donors of the Penicillin, who must remain anonymous.

REVIEWS

AIDS TO CLINICAL PATHOLOGY. By David Haler, M.B., B.S., D.C.P. Pp. 358. Baillière, Tindall & Cox. 6s.

It seems a pity to begin such an ambitious little book with the statement that "The beginning of the study of medicine should be the consideration of the end of life." The whole trend of modern medical thought is precisely in the opposite direction.

The work is intended for "students and others interested in laboratory work," but by far the greater number of tests described are quite outside the province of a medical student's curriculum, and, on the other hand, the simple tests with all their possible fallacies, together with the accurate and strictly detailed technique necessary for their performance, are not explained with the clarity essential to the training of a student. Nevertheless, there is a great deal of valuable information contained in the pages of this small and very reasonably-priced book. It is too highly technical to make an appeal to the average clinician, but the young clinical pathologist will find a place for it on his shelves. He will probably not agree with all the author's statements and may dislike some of his terminology, certain obvious errors will catch his eye, but in the main the wide scope of the book will appeal to him, and he will feel that he has had very good value for his money. The book itself is well produced and compares very favourably with other war-time publications. E. M. H.

AIDS TO MATERIA MEDICA. By G. H. Newns, M.D., M.R.C.P. Third Edition. Pp. 211. Baillière, Tindall & Cox. 6s.

This is an excellent little book and can be confidently recommended to all medical students. It should also be of use to the average doctor, who is often glad to refresh his mind as to the action and doses of the less familiar drugs, and it would also enable him to keep his knowledge of the newer preparations up to date. Penicillin, however, has not been included in the text.

The book is well and clearly written, nowhere verbose, and never difficult to understand. The printing and spacing of paragraphs are remarkably good, making it an excellent volume for quick reference. The arrangement of the chapters appeals at once to common sense. It is much superior to the average war-time product and is very good value. E. M. H.

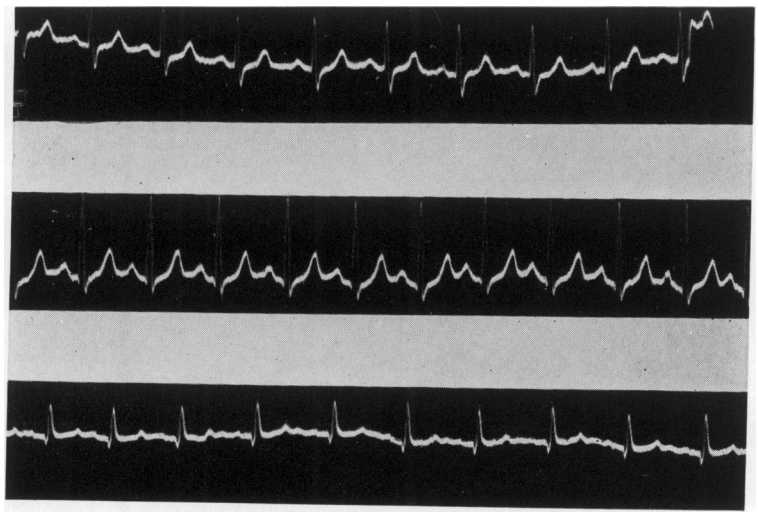

Plate I

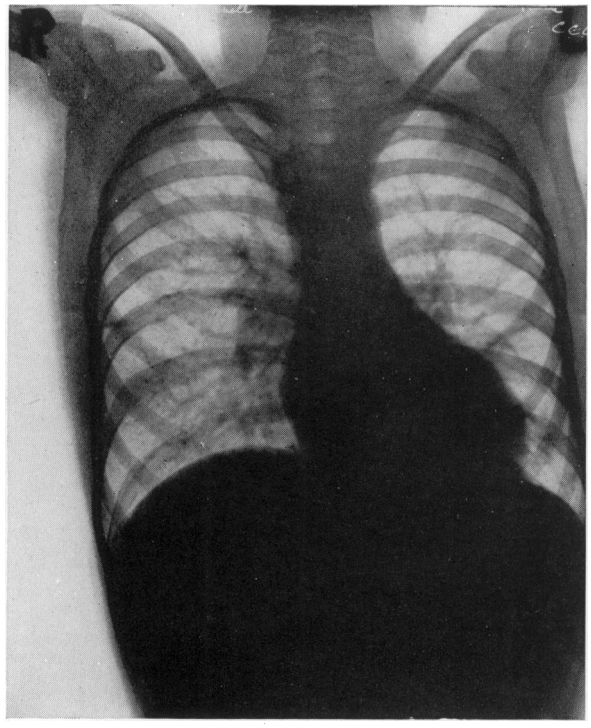

Plate II