PUERPERAL SEPTICAEMIA DUE TO PS. PYOCYANEA: FAILURE WITH STREPTOMYCIN

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Infections of the urinary tract with *Pseudomonas pyocyanea* have in many instances been successfully treated with streptomycin (Alexander, 1946; Hamre *et al.*, 1946; Keefer *et al.*, 1946). In the case described below, in which both the blood and the urine were infected with the organism, the patient died despite the sterilization of the blood and the urine with this chemotherapeutic agent.

Case Report

A female aged 28 was admitted to the Farouk I University Hospital on Jan. 26, 1947, complaining of excessive bleeding from the vagina for 28 days and backache. She was syphilitic, and had had an early abortion five months before admission, with amenorrhoea two months before the onset of her illness. She gave a history of recurrent attacks of salpingitis for seven years, for which she had had 60 administrations of short-wave therapy. Severe aplastic anaemia with marked leucopenia and gingivitis persisted till death—after 36 days in hospital. Blood examination: Hb 40% (Sahli); R.B.C. 2,000,000 per c.mm.; leucocytes 1,000 per c.mm. (polymorphs, 20%; lymphocytes, 72%; monocytes, 8%); platelets 13,000 per c.mm.; bleeding time, nine minutes; coagulation time, one minute. The urine contained a trace of albumin and a few hyaline casts. A Friedman test three days after admission was negative.

A low-grade pyrexia developed the day after admission, but the temperature became normal after five days' treatment with a total of 20 g. sulphadiazine orally, and remained normal for four days. It then rose, and penicillin, 5,000,000 units, was given intramuscularly over 17 days. This had no effect on the pyrexia. Penicillin was stopped when a blood culture yielded *Ps. pyocyanea*, and streptomycin, 1 g. per day, was given intramuscularly every three hours until death seven days later. Penicillin was resorted to in addition to the streptomycin the day before death, because the patient was thought to have developed pneumonia. The temperature remained high until death.

Bimanually the uterus was felt to be retroverted and retroflexed and could not be corrected on account of tenderness and probable adhesions. It was rather enlarged. The os was closed and the lower segment slightly softened. On the right of the uterus a tender mass the size of a hen's egg was felt, with pulsating vessels on it.

Four days after admission the os was dilated one and a half finger-breadths; the uterine cavity was filled with blood clots, but no products of gestation were found. The patient had probably aborted the day before. There were signs of moderate localized pelvic peritonitis.

The severe anaemia was treated with iron, liver extract intramuscularly, and blood transfusion—11 litres (19.4 pints) of blood. For the marked leucopenia, which was accompanied by gingivitis (? agranulocytosis), the patient took pyridoxin every other day.

Bacteriological Examinations

The first blood culture, made 11 days before death while the patient was on penicillin, yielded *Ps. pyocyanea*, five colonies per ml. of blood. When the result was known blood cultures (eight) were made daily until death. The first showed no signs of growth (turbidity) before 48 hours. Surface pellicle developed in both the aerobic and the CO₂ tubes. The top centimetre in the CO₂ tube was tinged pale green. No pigment developed in

the aerobic tube. This phenomenon was observed in all subsequent positive blood cultures. Carbon dioxide seems to enhance pigment production (Khairat, 1940).

Ps. pyocyanea was grown from the first three blood cultures; the last two gave one colony per ml. of blood. The blood became sterile the third day after streptomycin had been started. *Bact. coli* was grown from the eighth (and last) blood culture, taken the day before death—presumably an ante-mortem invasion. (*Bact. coli* was grown in pure culture from the heart blood two hours after death.)

The patient's serum taken a week before death agglutinated a living suspension of the first blood culture strain (washed off an agar slope) to a titre 1 : 320. A suspension killed by heat (60° C. for 30 mins.) failed to agglutinate even in low serum dilutions. (Final serum dilutions from 1 : 5 to 1 : 1,280 were put up.) Agglutination of the living suspension took place at 55° C. (water bath) after 18 but not four hours.

A throat swab taken six days before death was negative for *Ps. pyocyanea*, and negative also for haemolytic streptococci. A *pyocyanea* bacillus was grown from the stools in small numbers seven days before death. Four urine cultures, taken aseptically by catheter, were made every other day the week before death. The first, taken the day streptomycin was started, yielded *Ps. pyocyanea*, eight colonies per loopful of the thoroughly shaken urine, and also *Bact. coli*, six colonies per loopful (on blood agar; the loopful was approximately 1/150 ml.). The two urine cultures which followed were sterile, probably because of the streptomycin. From the last urine culture, taken the day before death, both organisms were grown. *Ps. pyocyanea* and *Bact. coli* in equal numbers were grown from three cultures from the cervix uteri taken 7, 5, and 2 days before death.

Necropsy

The uterus was retroverted and surrounded by fibrous adhesions that fixed it. It was almost completely involuted. On the right side there was a tubo-ovarian mass. The right ovary was cystic and contained thick sanguineous fluid. The small intestines showed septicaemic petechiae along the whole mucosa. The lower part of the ileum close to the ileo-caecal junction was markedly congested and almost gangrenous in appearance, but the loop was free in the abdomen and had no adhesions. (The patient passed no motions for four days before death.) The heart valves were free. The pericardium contained much straw-coloured clear fluid.

Post-mortem cultures were made two hours after death from the heart blood, pericardial fluid, cut-surface of lung, cervix, uterine cavity, and from the thick sanguineous fluid in the cystic right ovary. *Bact. coli* was obtained in pure culture from all these sites; the pericardial fluid and the cut surface of the lung also yielded *Ps. pyocyanea*. The three blood-culture *pyocyanea* strains, the three cervical ones, the strains from the stools and the urine, and the two post-mortem strains were all agglutinated to the same titre (1 : 320) by the patient's serum. Pooled normal human sera did not agglutinate any of them.

Summary

Penicillin had no effect on *Ps. pyocyanea* bacteraemia or bacilluria. Streptomycin, 1 g. daily, sterilized the blood and the urine by the third day, but did not save the patient, who died probably of paralytic ileus or from agranulocytosis.

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The National Under Fourteens' Council has issued an illustrated pamphlet entitled "Junk Playgrounds" describing how bombed sites and other derelict places may be made into suitable playgrounds for children to give them the opportunity of making small huts or gardens. This scheme has been very successful in Copenhagen, where it is claimed that juvenile delinquency has been eradicated by such measures. The Council is appealing for funds, and those interested should write to the Organizing Secretary at the Mary Ward Settlement, Tavistock Place, London, W.C.1.