Summary

In a series of 185 cases of gas gangrene in the C.M.F. reported on Army Form I 1241 the case-fatality rate has been examined in relation to the treatment given. The combined method of treatment with surgical measures, intravenous antitoxin, and bacteriostatic drugs, when given as recommended, was highly effective in reducing the death rate in cases with gas gangrene of the leg or arm. The death rate in cases of gangrene of the thigh, buttock, or shoulder region was approximately 40% in spite of such treatment, even among those who received penicillin systemically. The findings suggest that the specific treatment was generally effective in controlling the clostridial infection, but that in cases in which surgical excision of the affected tissue is limited in extent some factor associated with the local damage to muscle may be contributing to the severity of the disease.

Thanks are due to the Director-General, A.M.S., for access to the reports. I am also indebted to Dr. E. Lewis-Fanning for his criticism and the verification of the statistical significance, and to Sir Claude Frankau, Mr. B. W. Williams, and Prof. McIntosh for their comments on various case reports.

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STAPHYLOCOCCAL PYOPERICARDIUM (COMPLICATING TYPHOID FEVER) TREATED WITH PENICILLIN

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Because penicillin has been scarce, and because repeated injections are exceedingly trying to a debilitated patient, it is the rule that local application, whenever this will suffice, should be used in place of systemic treatment. It is recognized, too, that the use of penicillin does not in any sense replace surgical drainage, and that when pus is formed in any quantity it must be evacuated. In the case here described a staphylococcal infection of the pericardium supervened in the course of a very severe typhoid infection. The ensuing pyopericardium was successfully treated by the repeated aspiration of pus and the instillation of sodium penicillin into the pericardial sac.

Case History

An officer cadet, aged 26, was admitted to a military hospital on May 25, 1944, complaining of malaise, nausea, abdominal pain, and constipation for three days. On admission the temperature was 104° and the pulse rate 96. Apart from slight abdominal distension, no definitely abnormal physical signs were present. The urine was normal, and the white cells numbered 4,500 per c.mm. with a normal differential count. Health in the past had been unexceptionable. The most recent immunization with T.A.B. vaccine was in March, 1944.

The patient remained acutely ill, with high sustained fever. The abdominal distension became more marked and a troublesome cough developed. On May 29 *B. typhosus* was isolated from the blood in pure culture. About the same time a scanty macular rose-spot rash appeared on the abdomen. During the next few days his condition still further deteriorated. Constipation gave way to a persistent diarrhoea, with which vomiting was associated. The patient became stuporous and delirious. By June 4 serious dehydration was apparent, and three litres of normal saline were given by intravenous drip. Abdominal distension was pronounced, and there was considerable basal congestion of both lungs. But the fluid was well tolerated, and its administration was followed by a great improvement in condition.

By June 14 the temperature had practically settled, only a negligible evening rise persisting. Progress at this time appeared very satisfactory, but, disappointingly enough, four days later the patient again became seriously ill. The temperature was now 102°, and the pulse, weak and irregular, was 128. The physical signs were typical of a pericardial effusion, there being a definite paradoxical pulse and a positive Ewing's sign. On June 24 the pericardium was needled in the fifth intercostal space, half an inch inside the area of cardiac dullness; 50 c.cm. of thin pus was aspirated. This pus gave a pure growth of *Staph. aureus* on culture. The next day

surgical drainage of the pericardium was attempted. A trephine hole was made through the sternum at the level of the fourth cartilage, but pus was not found in the pericardial sac. It was thought that this was due to the aspiration of the pericardium on the previous day.

On June 26 it was decided to needle the left pleura. Pus was not found, and the physical signs at the base of the left lung were those of collapse. The white cell count was 26,600 per c.mm., with an excess of polymorphs. The haemoglobin was 64%. The next day the pericardium was again explored through the trephine hole, and on this occasion pus was found and 4 oz. was evacuated. One pint of fresh blood was given by intravenous transfusion.

The pathologist had now reported the sensitivity of the *Staph. aureus* isolated from the pus withdrawn from the pericardium as being approximately the same as that of the standard "Oxford" *Staph. aureus*—i.e., zones of inhibition around cups containing one Oxford unit of penicillin per c.cm. were as follows: (1) patient's staphylococcus, 19 mm.; (2) Oxford staphylococcus, 28 mm. On June 28, therefore, penicillin therapy was inaugurated, 50,000 units of sodium penicillin being injected direct into the pericardial sac by means of a No. 5 rubber catheter. The superficial part of the operation wound had become secondarily infected, culture giving a profuse growth of *Ps. pyocyanea*. Before catheterization, therefore, the wound was filled with 1/1000 perchloride of mercury for a few minutes and then swabbed dry. This technique was found satisfactory, and there was no difficulty in the repeated passage of the catheter. The penicillin was introduced after aspiration of as much pus as possible and the wound subsequently packed to prevent leakage. The injection of 50,000 units was repeated on five further occasions, giving a total dosage of 300,000 units. The first three injections were given on successive days, and the last three on alternate days. After the third dose of penicillin the pus withdrawn from the pericardial sac was reported as sterile on culture.

On July 1 there was considerable improvement in the clinical condition. This improvement was maintained in spite of a sharp attack of diarrhoea, which responded satisfactorily to sulphaguanidine therapy. By July 10 the temperature was once again normal. On this day a further pint of blood was transfused. The haemoglobin prior to transfusion was 70% and the white cell count 14,500 per c.mm.

On July 17, however, there was a renewal of the fever, with the temperature rising to 102°. Some abdominal distension was still present and the pulse was again markedly paradoxical. The spleen was felt "two fingers" below the costal margin, tenderness and rigidity were noted over the right upper abdomen, and there were physical signs of a considerable effusion in the right chest. It was clear that fluid had once again accumulated in the pericardium, and 20 c.cm. of thin sterile pus was aspirated from it. Eighteen ounces of clear yellow fluid, sterile on culture, was also withdrawn from the right pleura. Some improvement followed this, but in view of increasing dyspnoea it once again became necessary to aspirate both pleura and pericardium, 15 oz. being withdrawn from the former and 15 c.cm. from the latter.

By Aug. 2 there was still an evening rise of temperature to about 100°. Signs were now apparent of fluid in the left chest, and 12 oz. of sterile heavily blood-stained fluid was aspirated. The spleen could still be felt and the liver was palpable one inch below the right costal margin. Slight oedema of the ankles was noted. Further exploration of the right chest produced only 3 c.cm. of fluid. No more could be obtained.

On Aug. 17 the patient was again transfused. In view of the persistent pyrexia a course of systemic penicillin was given, 15,000 units being injected every three hours for three days. This produced no improvement in the clinical picture, and it was abandoned, as it was proving very exhausting. At this time another 14 oz. of blood-stained fluid was withdrawn from the left chest. The white cell count had dropped to 10,000 per c.mm., the haemoglobin was 75%, and the red blood cells 3,650,000 per c.mm. The general condition had improved. The blood pressure was 110/75, with no paradoxical pulse or evidence of cardiac tamponade. The liver and spleen were no longer palpable, nor was there reaccumulation of the pleural exudates.

The evening rise of temperature still persisted, and there now developed a very tender swelling over the lower left costal cartilages. A diagnosis of typhoid periostitis was made, and on Sept. 7 operation was performed under local analgesia, a transverse incision being made over the costochondral junction. Thickened inflamed tissues were found with a small quantity of pus beneath the periosteum. The bone was curetted and drained and the wound packed with vaselined gauze. Thereafter convalescence was slow but consistent. By Oct. 10 the patient was well enough for repatriation to the United Kingdom by hospital ship.

Comment

The occurrence of a staphylococcal pyopericardium in the case of a soldier already gravely ill with typhoid fever is

recorded. The successful treatment of this complication by penicillin instillation and repeated aspiration is described. The therapeutic result in the local treatment with penicillin depends upon whether it proves possible to maintain permeation with an adequate concentration of the drug. There are special difficulties in dealing with the infected pericardium. It is difficult to be certain that, when aspiration is done, adequate drainage in fact has been achieved. With extensive infection of the superficial wound of the chest wall it is hard to ensure that the pericardial sac is not contaminated with secondary invading organisms which are penicillin-resistant.

In the case of empyema thoracis similarly treated it is common to get a residual grossly thickened pleura and a rigid chest wall. Rib resection may be necessary to remove extensive fibrinous deposits from the empyema cavity. The end-results in pyopericardium, in which the scope of surgery is more limited, are likely to be less satisfactory. Attention is particularly directed to the long period during which the reaccumulation of sterile pus in the pericardium persisted.

Medical Memoranda

Impacted Foreign Body in the Bronchus of an Infant, causing Collapse and Obstructive Emphysema

The case here recorded is thought worthy of publication because of the occurrence of both collapse and obstructive emphysema in the same lung after impaction of a foreign body in the bronchus of an infant. The obstruction was successfully removed by bronchoscopy.

CASE REPORT

A male child aged 1 year attended the out-patient department of Belgrave Hospital for Children on Nov. 17, 1944, with a history of wheeziness and cough following a choking fit after eating some nut chocolate five days previously. On examination he was found to be healthy-looking and well nourished. There was diminished air entry with an impaired percussion note, as well as much diminution of breath sounds below the right clavicle over an area corresponding to the right upper lobe. The percussion note was hyperresonant over the lower part of the right side. There was some mediastinal displacement towards the right. The left side showed no signs. No abnormal physical signs were found in any other system. His temperature was 99°, pulse 154, respirations 48. He was admitted to the wards. A radiograph taken on admission showed complete collapse of the right upper lobe, with mediastinal displacement to the right and very well marked emphysema of the right middle and lower lobes. On Nov. 20 a radiograph showed increased collapse of the right upper lobe and increased emphysema of the right middle and lower lobes. He was transferred to the London Chest Hospital and bronchoscoped the same day by L. G. C.

Bronchoscopy Report.—Foreign body seen in the right main bronchus projecting into and completely blocking the right upper lobe bronchus but only partially obstructing the main stem bronchus. The foreign body was removed; it appeared to be a piece of nut.

A radiograph taken on Nov. 21 showed that the collapse of the right upper lobe had almost completely cleared, the mediastinum was nearly central, and there was no emphysema in the remainder of the right lung. On Nov. 23 the patient returned to Belgrave Hospital, where he made an uneventful recovery except for an attack of tonsillitis. On Dec. 28 radiographs showed that both lung fields were normal in appearance and the mediastinum central. He was discharged on Jan. 3, 1945, without any physical signs; pulse, temperature, and respiration were normal.

We wish to thank Dr. Norman Hill and Mr. V. C. Thompson for permission to publish this case.

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A Case of Aberrant Suprahyoid Thyroid Tumour

Aberrant thyroid tumours are recorded from time to time, but the occurrence of two separate tumours, one lying above the hyoid and the other just below the left cornua of the hyoid, is unusual.

CASE REPORT

A spinster aged 30 attended the out-patient department and was found to have a solid tumour, the size of a small hen's egg, lying in the midline between the mandible and the hyoid bone. She was a nervous, mentally deficient but pleasant young woman, who weighed

over 9 st. and had a large fat face with prominent eyes. The fat was found chiefly on the trunk and face, and the legs and arms were thin in proportion to the rest of the body. She was of rather short stature, and her skin was dry, soft, and smooth. Menstruation was normal. Radiographs of the thorax did not reveal the presence of any thoracic tumour. A provisional diagnosis of a subfascial lipoma was made and the patient was admitted to hospital for operation.

Operation.—Under local analgesia a plum-coloured tumour was exposed and easily removed. It lay entirely above the hyoid, deep to the mylohyoid muscles, and there were no connexions which suggested remnants of the thyroglossal duct. About one inch from the left lower border, at the level of the superior cornu of the thyroid cartilage, there was a separate tumour the size of a small walnut, which appeared to be normal thyroid tissue. As the rings of the trachea could be easily palpated, and no thyroid gland could be felt, the second tumour was left alone. The patient was discharged seven days later.

The specimen had the appearance of a cystadenoma, into which haemorrhage had occurred. The pathological report, from Dr. Popjak, was as follows: "Atypical epithelial hyperplasia in ectopic thyroid. The tissue consists of solid masses of polygonal or cuboidal epithelial cells, having a pale-staining slightly granular cytoplasm and round nucleus, or small acini free of colloid. The latter are lined by a high columnar epithelium. At the periphery of the specimen there is a good deal of fibrosis and at the centre hyaline degeneration. There was no definite evidence of malignancy."

Post-operative History.—The patient was seen at intervals, and in a year lost 8 lb. in weight. The remaining tumour has enlarged and is now the size of a plum. Its consistence suggests cystic changes, and its removal may be necessary.

Moritz and Bayless (1932) state that the large majority of aberrant thyroid tumours are found in females in the third decade, and this case conforms with their findings. Lazarus and Rosenthal (1933) believe that 75% of aberrant thyroid is neoplastic, while Ward (1940) found 9 out of 12 of his cases to be malignant. Probstein and Agress (1936) consider that median tumours are usually simple and the laterally placed tumours malignant.

The photograph shows the situation of the present tumour, and the facies and distribution of fat.

I wish to thank Dr. Popjak for his report, and Mr. de Rynck for his kindness in taking the photograph.

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