NOTES ON A CASE OF GAS EMBOLISM, OCCURRING FROM GRENADE ACCIDENT.

BY CAPTAIN A. B. PORTEUS
Royal Army Medical Corps.
Specialist Bacteriologist in the Colchester District.

The following case may prove of interest, being one in which a man died from gas in the heart. This gas originated, as far as the evidence showed, from the Bacillus perfringens, gaining entry into the wound in the leg, caused by a bursting grenade.

The following are notes from his clinical history sheet and post-mortem report:

History.—Admitted to Military Hospital, Colchester, on the afternoon of May 24, 1917, suffering from a compound fracture of right thigh, the result of an accident during bombing practice. On admission the limb was fixed with temporary splints, he was in considerable pain. There was a large wound just above the knee on the inner side, the size of a florin, a small wound an inch lower on the outer side. A piece of bomb-casing was found in his trousers near the wound of exit. After splinting the limb, the man was quite comfortable and at 11 p.m. on the 25th inst., he suddenly became collapsed and cyanosed, dying at 1 a.m. on the 26th inst.

Post-mortem.—(Twelve hours after death). External marks: Patient was a large muscular man, wounds were present on the right thigh as mentioned above, the whole limb was very much swollen, and there was marked emphysema spreading upwards from the wound as far as the groin, and almost down to the ankle.

Larynx, Trachea and Cæsophagus.—Normal.

Thorax.—Heart: Weight 15½ ounces. There was considerable dilatation of the right auricle and ventricle as well as of the pulmonary artery. On puncturing the right ventricle under water a considerable quantity of gas escaped. On opening the right auricle this cavity was found to contain frothy blood. There was also some ante-mortem clot in the right auricular appendix. The tricuspid valve was dilated and there was also frothy blood in the ventricle. The pulmonary valve was also dilated. The left auricle and ventricle were normal. Aortic valve normal.

Lungs: There were adhesions of old standing over the outer surface and base of the right lung. There was an area of uncollapsed lung in the right upper lobe due possibly to an early embolic infarction. Elsewhere both lungs were congested but otherwise normal. Brain: Brain appeared normal except for a few petechial haemorrhages in the cortex. Weight of brain 49½ ounces.


Remarks.—Death was due to gas embolism, the gas produced obstructing the circulation through the right side of the heart. The origin of this gas was, in my opinion, an organism in the wound which also produced the emphysema of the limb.

On examination of the pus from the wound taken at the time of the post-mortem, there were found in the film a large number of organisms, but noticeable
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amongst them the long non-motile Gram-positive bacillus resembling B. perfringens. A few sub-terminal spores were present. There was also present a number of short Gram-negative spore-bearing organisms with a central spore in the fresh film. The pus was cultured in various media. It rapidly liquefied gelatine. Cultures made on slightly alkaline bullock’s heart medium, prepared according to the directions of Miss Muriel Robertson, produced in two or three days a considerable growth of B. perfringens. There was a sour smell produced in the medium, but no odour of putrefaction and none of the blackening which is almost characteristic of the presence of the bacillus of malignant oedema. The Gram-negative spore-bearer was apparently completely lost in this medium.

The points of interest in this case, apart from the fact that it occurred in a camp in this country, appear to be that the fatal issue was very rapid and that it was not till after death, twenty-four hours after the wound was inflicted, that any crepitation or other sign of gas forming organism was present in the limb. After death, however, the extension of crepitation up the limb was very rapid. There were no signs of gas in the liver or other organs, which I believe is unusual, and is possibly accounted for by the fact that the gas was carried almost direct to the heart, killing the patient before there was time for it to develop elsewhere.

I believe several cases have been described as occurring in France.

My thanks are due to Lieutenant Young, R.A.M.C., for clinical notes on this case.

Lecture.

“ON THE CIRCULATORY CHANGES ASSOCIATED WITH EXERCISE.”

By ERNEST H. STARLING, C.M.G., M.D., Sc.D., F.R.S.

When I was invited to take part in a series of lectures on the physiology of the soldier, it was suggested that I might take as theme for my discourse the causation of "D.A.H." Though incompetent to deal with this subject directly without a much greater experience of these cases than I possess, it seemed to me that a discussion of its physiological aspect, viz., the effective action of the heart under all the conditions of stress to which a soldier may be exposed, was a necessary preliminary to any consideration of the problems presented by defective action of this organ. Our knowledge of the circulatory reactions during muscular exercise has made considerable progress during the last decade, and indeed has not stood still even during the years of war, and no chapter in physiology can be regarded as transcending this in importance as regards the medical care of the soldier. All the training of brain, eye and hand involved in the education of the soldier is thrown away unless he is a fit animal, able to march, carry weights, endure stress, and exert, if necessary for a considerable time, all his powers, perhaps under the most adverse conditions, without breaking down temporarily or permanently. We are accustomed to associate a man’s