

Wounded in Action: - S/Sgt., 1st. Inf.

Wounded in Action, 9 Sept. 1943, at Salerno, Italy

Admitted to 12th. General Hospital, 14 Sept. 1943, from Ship

Died, 19 Sept. 1943, of gas gangrene, due to his wounds.

This 27 year old soldier was wounded in the right thigh and calf by shell fragments in the Salerno landing; producing a compound fracture of the distal third of the femur. He was apparently given his initial surgery on shipboard and on way back to Africa, gas was diagnosed and additional incisions made in the thigh on 13 Sept. He arrived at 12th. Gen. Hosp., in poor condition, with marked swelling of entire right thigh and thick, dark, oddly smelling pus draining from the wounds. Dressings were changed, intravenous fluids were administered and sulfadiazine started intravenously. Ten hours later the condition worsened, the pulse was high and bounding, and there was then no question as to the presence of gas gangrene. At operation, (high thigh amputation) much necrotic muscle was found in the thigh and a high amputation was performed, the deep muscles being found involved with gas; patently above the site of separation of the limb. Although there was some immediate improvement in the patient's condition in the ensuing 24 hours, the situation deteriorated rapidly, extreme toxemia with rapid pulse, fever of 102 degrees F., in a perfectly lurid patient. Sixty thousand units of gas antitoxin delivered intravenously, may have caused a momentary betterment. The patient died, lucid to the last, early on the third post operative day. Organisms having the morphology of the clostridium group were recovered on direct smear and *Cl. welchii*, was grown on anaerobic cultures.

The salient features of the postmortem examination follow:

"Crepitus is present on palpation over the right stump, right buttock, right latissimus dorsi, and right chest, up to and including the right supraclavicular fossa. The entire right side of the body is somewhat swollen as compared with the left.

The abdomen is markedly distended, but the belly wall is soft. No masses are palpable. There is gas in the right external oblique. The genitalia are those of an adult male, and are normal save for marked gaseous distension of the scrotum to approximately five times estimated normal size.

Save for cyanosis of the nail beds, all extremities are normal, except that only a small portion of the right thigh remains, amputation having recently been performed. The musculature of the stump is discolored, necrotic, and has a nauseous stench. The skin of the thigh is swollen, crackles on pressure, and shows early gangrenous change of the moist variety. Repeated section of the stump, including the muscle groups, reveals much frothy, gas-filled fluid with a foul odor.

The spleen is enlarged to twice normal size. The pulp is pale rose-pink, diffluent, and the follicles are numerous and blurred.

The liver weighs an estimated 1500 grams, and the parenchyma on section has a boiled appearance. The organ is anemic. A feature of note during the dissection is the marked tendency of the blood to clot rapidly. Postmortem clots are found in nearly every vessel. The common duct is patent.

Heart (2 blks; 2 sec): In both sections there is a marked parenchymatous degeneration. The smaller vessels contain numerous polynuclears, including juveniles and myelocytes. In one section there is a small endocardial area of fibrosis in which Aschoff bodies are visible. In the same section there is another area of soft tissue proliferation, with typical large mononuclear cells visible. I do not feel that these represent a rheumatic endocarditis, but rather have the same significance as the Aschoff complexes occasionally found in fatal cases of pneumonia; a mesenchymal response to overwhelming toxicity.

Liver (2 blks; 2 sec): There is a terrific degree of cloudy swelling. All Kupffer cells are prominent. There is an early acute passive congestion about the central veins.

Kidney (2blks; 2 sec): There is marked cloudy swelling of the convoluted tubules. Some of the distal convoluted tubules and the collecting tubules contain pigmented casts which presumably are acid hematin. There is a strong tendency towards hemolysis in severe cases of gas gangrene, and the changes in the sinusoids in the liver and spleen support this origin for the hemolysis evident in this patient.

Skeletal muscle from leg stump (3 blks; 3 sec): The skeletal muscle fibres are uniformly without striation and a stain a rather characteristic bright pink. The gas has caused terrific disruption of the individual fibres, and the sarcolemmal sheathes are uniformly widely separated from the muscle elements. The fibres are actually necrotic, but inflammatory response is lacking, due to interruption of blood supply to the affected area by the tension exerted on the smaller vessels by the accumulated gas. I have seen sections from the limbs of non-fatal cases of gas gangrene in which there was a terrific pyogenic reaction to the necrotic muscle, but in those instances the sections were taken from the involved muscle early in the course of the disease. These sections are from tissue terminally involved by the spreading process, which explains the difference in the histologic picture. It depends entirely on the presence or absence of an adequate blood supply,

Clinical Diagnoses:

- (1) Fracture, compound, comminuted, femur right, severe, due to enemy shell fragment.
- (2) Wound penetrating, right leg.
- (3) Gas gangrene, involving right thigh, right buttock and right side of trunk.

Pathologic Diagnoses:

CARDIOVASCULAR SYSTEM: Acute parenchymatous degeneration of the myocardium.

RESPIRATORY SYSTEM: Left hydrothorax; pulmonary edema; early atelectasis, left lower lobe.

SPLEEN & HEMATOPOIETIC TISSUES: Acute splenitis; marked secondary anemia; marked left leukocytic shift.

LIVER: Acute parenchymatous degeneration; proliferation of the Kupffer cells; acute passive congestion.

GENITOURINARY SYSTEM: Acute parenchymatous degeneration of the kidneys; acute passive congestion; acid hematin casts in collecting tubules.

BONES & JOINTS: None, save the right high thigh amputation, recent.

MISCELLANEOUS: Gas gangrene of right leg stump, right buttock, and entire right side of trunk. (*B. welchii* recovered on culture).