

### GAS CYST OF THIGH FROM FOREIGN BODY RETAINED AFTER SHELL WOUND.

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THIS account of a patient, wounded by shell explosion, owes its interest to the presence and activity in the tissues of the thigh, beneath a superficially healed wound, of a foreign body; through the agency of which gas was generated under pressure, resulting in the formation of a cyst possessed of a definite capsule. An extended, if not exhaustive, search has failed to discover a corresponding case in medical literature.

The patient, a Canadian private, age 20, wounded Aug. 27, 1918, on the Arras front, was on the same date admitted to a casualty clearing station, where the following notes were made on the field medical card: "Shell wounds multiple: left groin, multiple small wounds, B.I.P.P. dressing; two fingers off right hand." At a base hospital two days later a more complete description of his injuries reads: "Multiple shell wounds: right and left leg below knee, left groin, left arm near elbow, left shoulder and below clavicle, right shoulder, right chest, right arm over biceps, right wrist; first and second fingers right hand off, third somewhat shattered; wounds in good condition; wounds sutured after excision, packed, improving, no sign of gas infection; transfer to England."

No further records are available up to the time of his arrival at the Granville Canadian Special Hospital, Buxton, on Dec. 13, 1918, when with his wounds all healed he was admitted for treatment of his damaged hand, the chief and apparently the only disability resulting from the catalogue of injuries above cited.

On examination, our attention was drawn to a visible swelling, the size of a hen's egg, in the left groin immediately below the anterior superior iliac spine (*Fig. 268*). This lump, he stated, had been first noticed a few days after injury, at which time a sutured wound just above was still discharging. The wound healed shortly after, but the swelling persisted. Diagnosed as an abscess, it was fomented for a long time but remained unaffected, and, as there was no associated tenderness or discomfort, treatment was eventually discontinued. Since then the lump had not appreciably altered in size, no gurgling had been noticed, he had not been constipated; in fact, he was conscious of no inconvenience whatever arising from its presence.

The mass on palpation was smooth and rounded in contour, apparently lying immediately beneath the skin, and dipping deeply into the muscle planes to the lateral side of the sartorius at its proximal three inches. It was tense, and gave an impression of semi-fluctuation, suggesting a colloid content. To our surprise it was found to be markedly tympanitic and clearly translucent. There was no bruit. A hernia, possibly of Meckel's diverticulum, was suspected, but no evidence could be obtained of any connection with the abdominal cavity.

Skiagrams, taken by Major W. H. Eagar and Captain R. Proctor, C.A.M.C., proved to be of great assistance. These revealed the presence of a rod-shaped foreign body about 3 cm. long, surrounded by a well-defined rarefied area, obviously a gas-containing cavity, the size of a goose-egg. The shadow of the foreign body was less dense than the ordinary

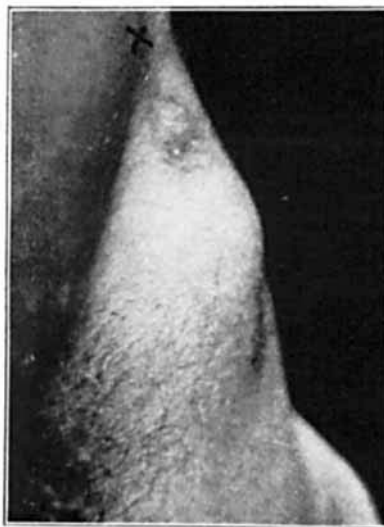


FIG. 268.—Photograph of the left hip from in front, showing the relation of the tumour to Poupart's ligament and the anterior superior spine (X). The scar of the entrance wound is visible above the tumour.

metallic finding, and suggested aluminium or B.I.P.P. (*Fig. 269*). Further skiagrams and screenings taken at intervals after a barium meal excluded any possibility of communication with the bowel.

The diagnosis was accordingly made of a gas cyst due to the presence of a foreign body, probably aluminium, and operation for its excision proposed. There was some thought of aspirating the cyst in the hope of collecting the gas for analysis, but this was decided against, chiefly in order to simplify the removal of the mass *in toto*.

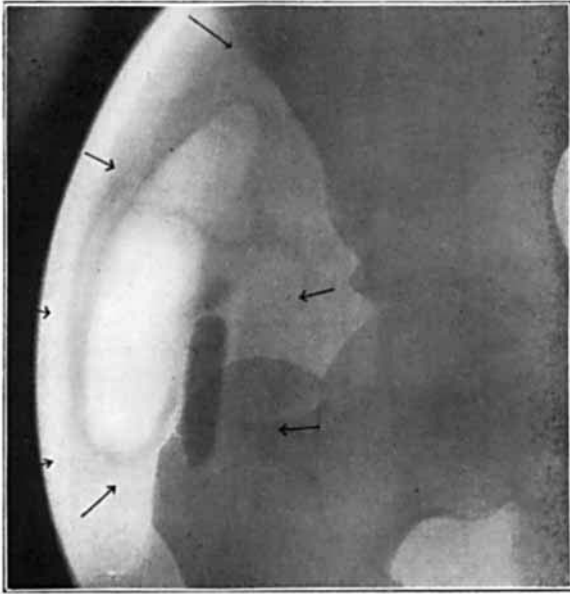


FIG. 269.—Anteroposterior skiagram of the left hip as viewed from behind, showing the outline of the cyst and the contained foreign body.

sartorius, rectus femoris, and tensor fasciæ latæ, to all of which it was closely adherent. In extirpating the sac some fibres of the sartorius were removed to avoid injury to the capsule. During the manipulation, although no apparent damage was done to the cyst wall, the gas continued to escape, and no analysis was possible. Forty-eight-hour dependent drainage was employed through a small counter-incision on the lateral aspect of the thigh, as the deep cavity remaining after the mass was removed could not be obliterated by suture or pressure. The deep fascia and skin were closed and the thigh splinted. The wound healed without incident, and within a month the patient took most active participation in a dance given at the hospital.

The cyst after removal (*Fig. 270*) measured 7.5 cm. in its greatest length and 4.2 cm. in its greatest width, inside measurements. It comprised a main sac and two diverticula, one at the upper pole communicating through a constricted neck, the other below to the medial side and posteriorly. In this latter cavity the foreign body was found lying free. A few drops of serous fluid were contained, cultures of which were negative. A small crescentic calcified body projected into the main cavity near the neck of the lower diverticulum. The lining wall was smooth and glistening, and on section was found to be composed of a compressed fibrous-tissue stroma. There was no evidence of a lining membrane.

On Feb. 27, 1919, operation under ether anaesthesia was undertaken. With the thigh flexed to relax the muscles, an incision was made through the skin and superficial fascia over the most prominent part of the tumour, excising the scar of entrance immediately above. Fine bubbles of gas were seen to escape through the deep fascia before any pressure was put on the cyst, showing the gas to have been contained under tension. On dividing the deep fascia, part of the sartorius was found to be spread in a thin sheet over the medial two-thirds of the mass. This was freed by sharp and blunt dissection and retracted. The cyst lay in a cavity bounded by the



FIGS. 270, 271.—Photograph of the cyst after hardening, and of the foreign body. The scale is marked in inches.

The rod-shaped foreign body (*Fig. 271*) measured 3 cm. in length by 0.7 cm. at its greatest diameter, weighed 2.1 grms., and had a specific gravity of 1.8. It was much corroded from chemical action, and was covered with a whitish deposit on which numerous small dark-grey flakes were to be seen, some loosely attached. A small slice was removed from one end, revealing a silvery metallic core. On analysis the metal proved to be aluminium, apparently pure.

The exact chemical reaction which occurred may be difficult to trace. It is common knowledge that aluminium is acted upon by the alkalies, sodium hydrate for example, with the liberation of hydrogen. It seems reasonable to suppose that the action of the alkaline tissue juices at body temperature could slowly produce the same result.

This mode of cyst formation appears not to have been described heretofore, using the term 'cyst' in the sense of a tumour having a fluid (including gas) content and a definite capsule.

Facilities are not at present available to confirm the findings experimentally, but this can be easily undertaken, and it is hoped to make a further report when opportunities permit.

A practical point in connection with these findings has a bearing on the use of aluminium in the fixation of fractures. Sir Robert Jones reminds me that when aluminium first came into common use and was employed for fractures, it was noticed and reported that a small area of rarefaction occurred about the wire. It is possible that the present case helps to explain the phenomena noted, and emphasizes the unsuitability of aluminium for such purposes.