THE EFFECT OF CORTISONE ON EXPERIMENTAL INTRAPERITONEAL SILICOTIC NODULES.

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WE have shown in a previous paper (Magarey and Gough, 1952) that cortisone in large doses reduces to some extent the formation of fibrous tissue provoked by finely powdered quartz in the peritoneal cavity of rabbits.

The experiments described in the present paper were undertaken to determine whether cortisone has any effect upon the fibrous connective tissue of established silicotic nodules.

METHODS.

Silicotic nodules were produced in the peritoneal cavity of rabbits by injecting —without anaesthetic—2 ml. of a 10 per cent suspension of quartz powder in normal saline. The quartz powder was similar to that used in our previous experiments, and consisted of a Belgian sand (Snowit II) ground to a particle size of less than 2μ diameter. The saline suspension was autoclaved and shaken with glass beads in a Kahn shaker for an hour immediately before use to break up any aggregations of particles.

After a period of 70 days the animals were anaesthetised and the peritoneum examined by means of a rather wide-bore (about 10 mm.) human urethrascope inserted through a lateral abdominal incision. Any well-developed silicotic nodules on the peritoneal surface of the anterior abdominal wall were immediately recorded by coloured drawings. Six animals were selected and matched in pairs according to the pictures of the nodules.

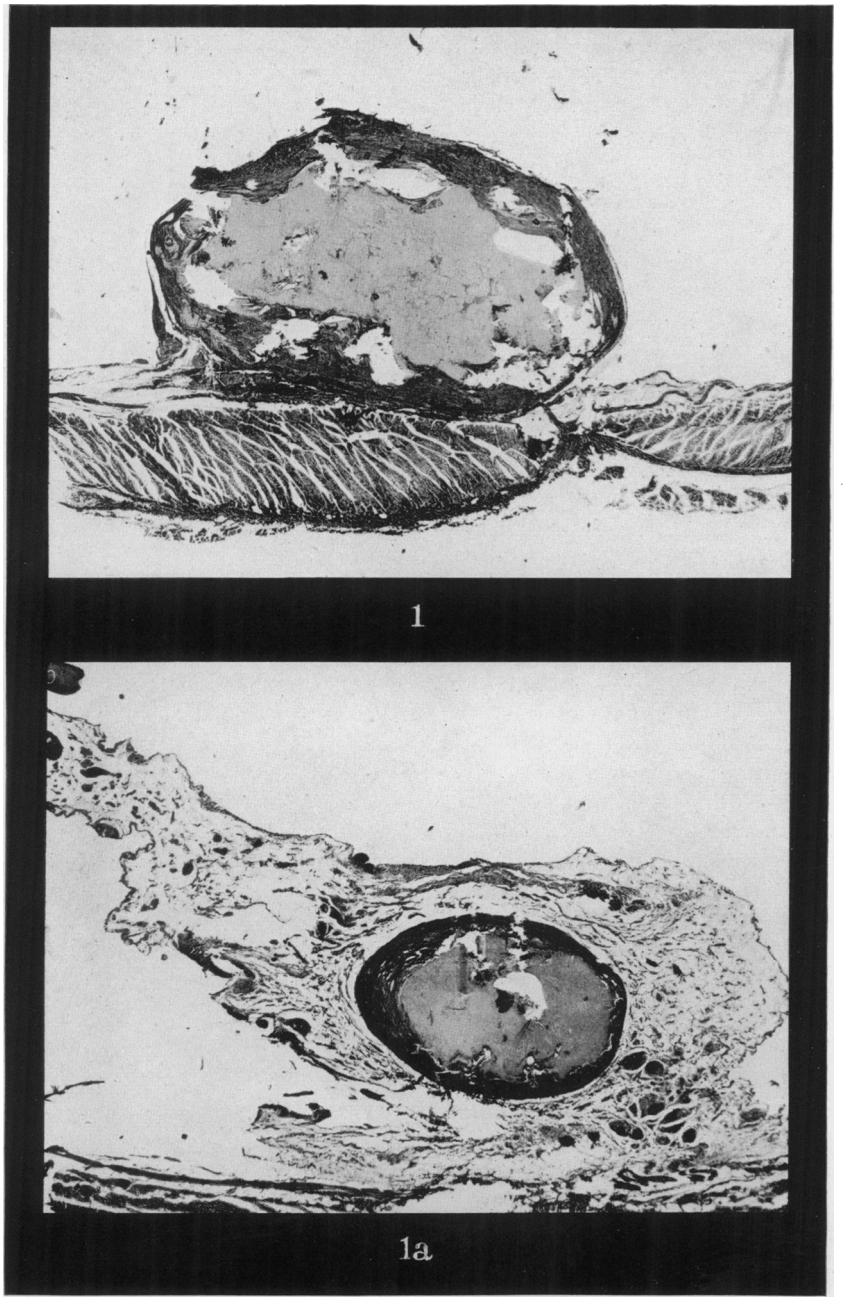
DESCRIPTION OF PLATES.

FIG. 1.—Silicotic nodule from control animal. The central collection of quartz powder is surrounded by a dense collagenous capsule. Haemalum and Van Gieson, × 9.

FIG. 1*a*.—Silicotic nodule from a cortisone-treated animal. The collagenous capsule is surrounded by new delicate, rather vascular connective tissue. Haemalum and Van Gieson, × 9.

FIG. 2.—From control animal. On the left can be seen a broad cellular fringe outside the dense layer of compact collagen. Haemalum and Van Gieson, × 80.

FIG. 2*a*.—From the cortisone-treated animal. Instead of the cellular fringe there is a diffuse delicate connective-tissue reaction consisting of loosely knit fibres and thin-walled blood vessels. Haemalum and Van Gieson. × 80.



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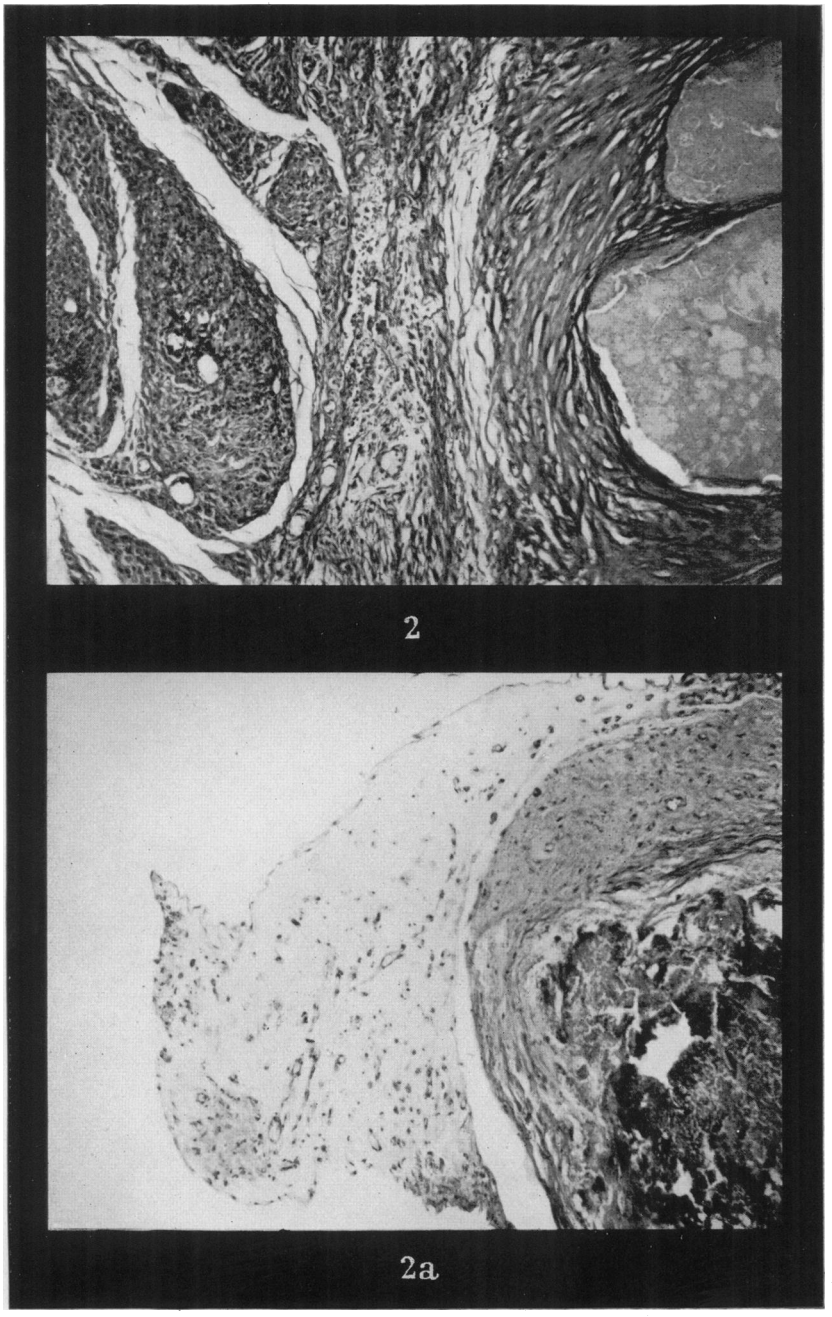

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2a

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After allowing two weeks for the complete healing of the laparotomy wound, one of each pair of rabbits was given 20 mg. cortisone acetate daily, the other being kept as a control. At intervals of 22, 36 and 84 days after the commencement of the cortisone intraperitoneal examination of a pair was made, the lesions re-drawn and the animals then killed.

RESULTS.

When the drawings of the nodules before and after cortisone were compared no change could be seen. Likewise there was no essential macroscopic difference between the nodules in the cortisone-treated rabbits and those in the controls.

Histologically in the control animals the nodules consisted of a central accumulation of quartz surrounded by a dense layer of compact collagen (Fig. 1), and outside this a cellular fringe in which the presence of many fibroblasts suggested that active fibrosis was still progressing (Fig. 2).

In the cortisone-treated animals the nodules were similar (Fig. 1*a*) except that there was no cellular fringe (Fig. 2*a*), but a different form of reaction in which a diffuse delicate connective tissue, consisting of loosely knit fibres and thin-walled blood-vessels, surrounded the silicotic nodules. This redundant vascular tissue corresponds to that seen in similar experiments previously described (Magarey and Gough), and probably also to the diffuse fibrosis noted by Curran (1952), who reported on the effects of silica in the peritoneal cavities of mice. It appears to be a special effect of cortisone in the presence of silica.

DISCUSSION.

Following our previous finding that cortisone could modify the formation of fibrous tissue provoked by quartz powder, we have investigated whether it could also cause any change in silicotic fibrous tissue already formed.

This problem assumes some importance on two counts: Firstly cortisone is widely reported as having a beneficial effect on certain chronic conditions characterised by long-standing fibrosis such as scleroderma and keloid scarring. Secondly there has been a report of appreciable clinical improvement in a case of pulmonary silicosis treated with adrenocorticotrophic hormone (Kennedy *et al.*, 1951).

Curran showed that cortisone had no effect upon established intraperitoneal silicotic lesions in mice. We have likewise been unable to show any reduction of collagen even with large doses of cortisone on established intraperitoneal silicotic nodules in rabbits. The absence of a cellular outer fringe in the nodules in cortisone-treated animals, however, suggests that during the administration of the cortisone there was the effect that further fibroblastic proliferation was retarded.

It would therefore seem justifiable to suggest that cortisone would not be expected to have any lasting beneficial effect upon the collagen in human silicosis, although it might well arrest progression of the lesions during the period of administration.

SUMMARY.

Intraperitoneal silicotic nodules were established in rabbits and the effect of cortisone on these lesions determined. The pre-existing dense collagenous tissue remained unchanged. There was however retardation of further concentric

fibrosis during the administration of the cortisone, its place being taken by a diffuse connective tissue and vascular proliferation.

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