The following case report is a good illustration of the problem and the treatment, particularly the early treatment initiated by the patient and continued immediately and more efficiently by the doctor, who had appreciated the need for this from a previous unhappy experience. The operation in hospital shows how difficult the problem is known to become after an interval, with sequestration of the grease and massive fibrous response and tethering of digital nerves. Fortunately amputation was not indicated here.

Case Report

The patient was a service-bay mechanic aged 36. While greasing a motor-car with a high-pressure grease-gun the nozzle slipped off a nipple and grease was injected into the palm of the left hand (placed close to greasing-point for steadiness). At once he squeezed out some of the grease, and went to his doctor, who opened up the wound immediately and expressed a further amount. The wound healed, but the swelling caused by the injury increased, with concomitant pain and limitation of finger movements.

Grease-gun injury, showing the thickening of finger and palm, with sinuses

He was aware of something fluctuant in the swelling. A few days before admission to hospital, one month after the injury, it became more tender and some "pus" exuded from one place.

Examination of the left hand showed a tense, tender, non-fluctuant swelling of the distal part of the palm particularly, including the

proximal part of the middle finger, which was stiff. At the base of the finger were two small sinuses, but nothing could be expressed from them (see Fig.). X-ray examination showed the soft-tissue swelling and no bone disease.

Before operation an inquiry was made of the manufacturers concerning the constituents and solvents of the grease. The reply stated that there were two main constituents—the fat portion, soluble in ether, and calcium, added as lime, and for the removal of which little could be suggested.

Operation.—With the use of a "bloodless field" technique, incisions were made using convenient skin creases of the palm and at the base of the middle finger, with an extension along the radial side of the proximal phalanx in front of the position of the neurovascular bundle. Flaps were turned back, and soon about 2 dr. (7 ml.) of unaltered golden grease escaped from a cavity in the extensive fibrous thickening of the palmar fascia. This thick layer of fibrous tissue was carefully pared away in piecemeal fashion, revealing many small cavities containing either grease or what appeared to be thick white pus. On the radial side of the base of the middle finger a larger cavity containing pus adjacent to the flexor tendon sheath was found. A sample of the pus was taken for examination and culture, together with a portion of the affected fascia for histology. The wound was closed with interrupted silk sutures. The hand was elevated for nursing.

Examination and culture of the "pus" showed no bacteria and there was no growth. The substance was not, in fact, pus, but was found to consist of minute droplets of emulsified grease.

Histology of the palmar fascia showed a well-marked chronic inflammatory reaction with foreign-body giant cells in fair numbers.

The wound was slow to heal, but movements of the fingers improved early. There was some loss of sensation on the ulnar aspect and pulp of the middle finger. The wound remained tender, and movement did not return as fully as hoped for, but three months later, after return to work, a more rapid improvement took place. Now, over two years since the injury, there has been no loss of time from work, and the fingers and hand are practically normal in function, though some numbness of the pulp of the middle finger still remains.

Summary

An instance of the increasingly common grease-gun injury is recorded, particularly because the crippling effect of such a foreign material had largely been prevented by the immediate step of incision and expression by the patient's own doctor. Though the appearance of the affected hand was still sinister afterwards, a good result was achieved after operative removal of the rest of the grease—some of which had undergone emulsification and so mimicked creamy pus. The surgical pathology and anatomy are discussed briefly.

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Medical Memoranda

Myasthenia Gravis Occurring in Association with a Malignant Thymic Tumour

Until recently it was believed that thymic tumours associated with myasthenia gravis were benign (Bratton, 1948). There have, however, been numerous reports of the invasive character of these tumours (Claggett and Eaton, 1943; Murray and McDonald, 1945; Reid and Marcus, 1949). Some instances of implantation on to pleural surfaces and a few of lymphogenous and haematogenous spread have been reported (Keynes, 1946, 1955; Tajima, 1952). In the series of thymic tumours reported by Seybold *et al.* (1950), although many were invasive in character, embolic metastasis was not found.

Some 75% of patients having tumours develop or already suffer from myasthenia gravis. The remaining tumours unassociated with this disease are often described as highly malignant, and considerable doubt has been expressed about the true source of some of these.

CASE REPORT

An electrician, aged 41, first complained of hoarseness of voice and mild dysphagia in July, 1955. These symptoms were accompanied by a sore throat, and became worse after carrying on a conversation. In September he was seen by an E.N.T. surgeon, and an indirect laryngoscopy was performed. In December a barium swallow was carried out, and after this he was reassured and discharged.

In February, 1956, he was referred to one of us (P. E.) because he developed a mild cough. There were no physical signs in his chest. X-ray films of his chest taken in the postero-anterior and lateral positions showed a homogeneous opacity overlying the ninth and tenth ribs in the paravertebral gutter on the left side (Figs. 1 and 2). He was admitted to hospital in March, and after bronchoscopy, when no abnormality was seen, and further postero-anterior and lateral x-ray films, a thoracotomy was performed by Mr. J. R. Belcher, the provisional diagnosis being a neurofibroma or ganglio-

neuroma. During the operation an encapsulated, flattened, slightly lobulated extrapleural tumour (6 by 3 cm.) was removed from the ninth and tenth intercostal spaces posteriorly. The cut surface was soft and slightly haemorrhagic, and although not quite typical the tumour was thought to be a neurofibroma.

FIG. 1.—Postero-anterior x-ray film of chest showing a well-defined opacity (6 by 3 cm.) in the left paracardiac region overlying the ninth and tenth ribs.

FIG. 2.—Left lateral picture showing the opacity lying in the paravertebral gutter.

Post-operatively he did not recover muscle tone and spontaneous respiration for some hours, and because of the sequence of events during recovery it was thought that he was either sensitive to D-tubocurarine or suffering from myasthenia gravis. His post-operative progress was otherwise uneventful.

The histological report on the tumour stated that "the capsule is of firm fibrous tissue but the tumour is cellular. It is made up of lymphocytes without epithelial elements."

The diagnosis is either a lymphoma or a thymoma. The position of the tumour and its encapsulation made the diagnosis of lymphoma more likely than that of a thymoma or metastasis from a malignant tumour of the thymus (Fig. 3).

In view of the histological report and his apparent sensitivity to D-tubocurarine, and after a retrospective appraisal of his history, a test dose of gallamine triethiodide was given one month after his operation. He immediately responded by complaining of diplopia, extreme lethargy, and faintness. He had difficulty in talking and swallowing and in raising his head from the pillow.

During the next few months his myasthenic symptoms became rapidly worse, although partially controlled by increasing dosage of pyridostigmine ("mestinon"). He was therefore readmitted to hospital for exploration of his anterior mediastinum with a view to thymectomy.

At operation by Mr. Belcher on September 18 the thymus was found to be enlarged, cystic, and infiltrating the ascending aorta and other structures. Total removal proved impossible. Histologically the part excised resembled the tumour removed previously.

Post-operatively he was well controlled on his pre-operative dosage of pyridostigmine until the tenth day. He then developed an urticarial rash and slight jaundice, became pale, sweaty, and dyspnoeic, with a rapid pulse, and despite additional pyridostigmine his myasthenia became rapidly worse. Although positive-pressure respiration through a tracheostomy temporarily improved his condition he collapsed and died suddenly 24 hours later. Permission for a post-mortem examination was unfortunately refused.

FIG. 3.—Photomicrograph of tumour showing fibrous tissue capsule and cellular tumour made up of lymphocytes without epithelial elements.

COMMENT

The difficulties associated with the early diagnosis of myasthenia gravis and the classification of thymic tumours are well known. In retrospect the diagnosis of myasthenia gravis in this case was plain on clinical grounds. In view of the rapidity of onset of severe symptoms the possibility of malignant thymoma with extrapleural metastasis, in a most unusual site, the paravertebral gutter, was entertained, although histologically the first tumour did not appear malignant and was not typical of a thymoma.

Normally thymomata are characterized by the presence of two types of cell—the thymocyte, a small round cell resembling a lymphocyte, and a large pale cell of reticular origin. The relative proportion of these cells varies widely from tumour to tumour, so that they may be designated lymphomas, lymphosarcomas, carcinomas, and epitheliomas (Ewing, 1940).

A search through the literature has not revealed any other case of malignant tumour of the thymus presenting as a single extrapleural metastasis.

We are indebted to Mr. J. R. Belcher and Dr. K. F. W. Hinson for their help in this case.

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POSTSCRIPT.—Since this paper was written we have seen a report by B. B. Roe (*J. thorac. Surg.*, 1957, 33, 770) of a case of thymic neoplasm in which distinct myasthenia gravis developed six weeks after total thymectomy and radical mediastinal block dissection. The author makes two assumptions which are of interest. He suggests that all the thymic tissue was removed, although we feel that it is hard to be sure of this, and that the thymus was innocent in spite of the pathological report's suggestion that it was malignant. Moreover, expert pathological opinion indicates that any thymic tissue which is even mildly suspicious should be regarded as almost certainly malignant.

Meigs's Syndrome

That ascites and hydrothorax may be associated with an ovarian fibroma is well known, but the existence of such a syndrome is probably not so widely recognized as it should be. Thus its true incidence is difficult to estimate; Meigs (1954) in a review of the literature found 84 authentic examples. I myself have previously seen three cases (Lawson, 1950), and these are included in Meigs's figures. The case now reported illustrates how readily the condition may be mistaken for inoperable malignancy. Paracentesis abdominis was performed 50 times—far oftener than in any of the cases included in Meigs's collected series.

CASE REPORT

A (nulliparous) spinster aged 57 was referred for gynaecological opinion in February, 1956. There had been no vaginal bleeding since the menopause at the age of 40. A femoral hernia had been repaired in 1950; the medical history was otherwise negative. In September, 1953, blood appeared in the stools, and a surgeon diagnosed peritoneal carcinomatosis from cancer of the rectum. Soon afterwards ascites developed, and in December, 1953, paracentesis abdominis was performed for the first time. During the next two years this procedure was repeated at varying intervals, the abdomen being tapped altogether 48 times and a total of 470 pints (267 litres) of fluid aspirated. The fluid was always clear, and on one occasion it was examined bacteriologically with negative results. The patient complained of dyspnoea and ankle oedema as the fluid accumulated, but her general condition remained good.

By the summer of 1955 aspiration was required so often that the patient was admitted to hospital. Rectal bleeding had not occurred since the original episode, and there was no note that a pleural effusion had ever been detected. In January, 1956, another surgeon found a lower abdominal tumour and referred her for gynaecological examination.

Considering the long period of invalidism, the patient looked remarkably fit. The abdomen was grossly distended with fluid and there was a ventral hernia of moderate size. However, a firm, somewhat irregular, but freely mobile mass could be felt above the pubes. Vaginal examination was unsatisfactory. Rectal examination showed haemorrhoids, but no evidence of cancer. Clinical and radio-

logical investigation revealed a massive right-sided pleural effusion. Systemic examination was otherwise negative. The peritoneal cavity was tapped (49th time) on February 7, and again on the 18th, the amounts of fluid being 22 pints (12.5 litres) and 23 pints (13 litres) respectively. Paracentesis thoracis was not undertaken. A tentative diagnosis of Meigs's syndrome was made, and it was decided to perform laparotomy.

At operation on February 20 a further 20 pints (11.4 litres) of fluid was aspirated; this was a dark amber colour, but contained no obvious blood. A solid, freely mobile tumour of the right ovary was noted, the pedicle of which had undergone torsion through one-quarter of a circle. The left ovary was atrophic and the uterus normal. The tumour was removed together with the right Fallopian tube. Exploration of the abdominal cavity revealed no evidence of other disease. The greater part of the omentum was removed, as it was in places adherent to the abdominal wall and presented many foramina—presumably due to the repeated paracenteses. The ventral hernial sac was excised and the abdominal wall repaired in layers. Recovery was uneventful, and a week later clinical and radiological examination of the chest showed complete resolution of the effusion. No ascitic fluid was detected after operation. At the end of a month she looked and felt fit; nothing abnormal was found in either abdomen or chest.

The tumour was a lobulated, solid mass, measuring approximately 7 by 6 by 4 in. (17.5 by 15 by 10 cm.) and weighing 4½ lb. (2,060 kg.). Although the vessels of the pedicle had been ligated, some 500 ml. of brownish fluid exuded from the tumour within 24 hours. Part of the tumour was prepared for histological examination; the remainder continued to exude fluid for several days. The cut surface presented many dilated vessels; a few appeared to be thrombosed, but there was no evidence of any gross circulatory complication. The histological appearances were those of a simple fibroma with generalized oedema and many cystic areas.

COMMENT

A detailed description of the syndrome is given in Meigs's article of 1954. Chief interest centres on the mechanisms whereby the fluid is produced and subsequently transmitted across the diaphragm. As regards the latter point, no new information has been elicited from the above case. There can be little doubt that the source of the fluid is the tumour itself. In all four personal examples the neoplasm was so moist that "waterlogged" would not be an unfair description. Two of the tumours exuded fluid amounting to about one-quarter the total weight during a period of 24 hours; in one the vessels of the pedicle were not clamped and in the other they were ligated, and it would therefore appear that most of the fluid seeps through the covering epithelium. Owing to the fibromatous nature of the tumour, it may be that the lymphatic and venous channels are obstructed, with resultant oedema. The present case illustrates that enormous quantities of fluid may be produced in a relatively short time, and one might be justified in describing the ovarian tumour as a sort of pump, collecting fluid from the circulation and diverting it into the peritoneal cavity.

Although these speculations are of much theoretical interest, the point to be emphasized is that a clinical picture closely resembling that of advanced malignancy may have a benign aetiology. The dictum of Lawson Tait (1892) bears repetition: "There is an almost universal indication for laparotomy in abdominal disease."

I am grateful to Dr. A. L. Shivas for confirming that the tumour was a benign fibroma of the ovary.

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