day in a camp reception station. After admission he was given sulphathiazole by mouth and local treatment by short-wave therapy.

On Sept. 15 the patient suddenly collapsed. It was apparent that a severe intraperitoneal haemorrhage had occurred; a blood count was carried out and blood transfusion was given. The count showed: red cells, 3,800,000 per c.mm.; Hb, 60% (Sahli—standard 100% = 15.5 g.); white cells, 36,370 per c.mm.: myelocytes 3,700, metamyelocytes 6,600, neutrophil polymorphs 22,000, lymphocytes 2,590, eosinophils 370, mononuclears 1,110 per c.mm. There were no nucleated red cells: this was taken to be a response to severe haemorrhage. A pre-operative diagnosis was made of rupture of the spleen or of an intraperitoneal aneurysm, probably of the splenic artery.

At operation the peritoneal cavity was full of blood, five and a quarter pints being measured. The spleen was ruptured transversely at its convex border. Splenectomy was easily performed, as there were no adhesions and the splenic pedicle was unusually long. The patient collapsed during closure of the abdomen and died in spite of the usual resuscitation methods.

Post-mortem Findings.—The stomach contained a fair quantity of undigested food and some bright blood. The mucosa showed minute erosions, but no chronic ulceration. The sternal bone marrow was greyish red and hyperplastic. No other pathological lesions were found.

Histological Examinations.—Spleen:—No definite pathological change was noted in the sections, apart from evidence of acute inflammation. Sections were sent to Dr. A. H. T. Robb-Smith for his opinion. His report is as follows: "The spleen has the appearances, apart from actual trauma, of those found in a reaction to an acute inflammation, and it is likely to be an example of an acute inflammatory condition with an acute splenic tumour which has ruptured spontaneously." The weight was 280 g. Axillary lymph glands showed microscopical evidence of subacute lymphadenitis; this finding was confirmed by Dr. Robb-Smith. Bone-marrow films (taken immediately after death) revealed marked myeloid reaction, presumably due to inflammatory changes. The liver showed no abnormal changes.

Past History.—Steps were taken to trace the previous medical history of the patient. His Army record sheet showed that he had never been abroad. There was no history from the patient or from his unit of any injury within recent months. Apart from bronchitis he had had no other illnesses.

Discussion

Zuckerman and Jacobi (1937) consider that minor degrees of torsion or of angulation of the splenic pedicle are sufficient to slow the circulation and to cause congestion of the spleen, resulting in rupture. They also consider that minor gastro-intestinal disorders may initiate the torsion or angulation and thereby cause the congestion and rupture. They found that the phrenico-splenic ligament is absent in about 2% of individuals; absence of this ligament is one of the causes of undue mobility of the spleen.

In the present case the serious condition of the patient prevented accurate anatomical investigation, but it was remarked at the time of the operation that the spleen was excessively mobile and thus splenectomy was a most simple procedure. It is therefore probable that the phrenico-splenic ligament was absent, and no restricting peritoneal bands were encountered. The patient had vomited before admission: this and the finding of food residue in the stomach, long after solid food had been taken, suggest that a gastro-intestinal disorder had developed. The presence of blood in the stomach may be attributable to obstruction of the vasa brevia by the same angulation or torsion that contributed to the rupture of the spleen. The presence of blood in the stomach and intestines has been reported in conditions of shock. The spleen in our case was not grossly enlarged; the structural changes were those representing the normal response of the spleen to a toxæmia and, as such, are to be expected in any acute inflammatory process. The rupture must therefore be regarded as being due to a mechanical process rather than to a pathological condition.

Ledderhose (1890) and Foucault (1925) considered that spontaneous rupture could occur only in a diseased spleen. Zuckerman and Jacobi have reviewed 28 cases of rupture of the alleged normal spleen, but accepted only 21 cases as genuinely normal. None of these was associated with acute inflammation. In their series spontaneous rupture occurred in 16 males and 12 females. The age incidence was: under 20 years, 2 cases; 20–30, 7 cases; 30–40, 6 cases; 40–50, 7 cases; 50–60, 5 cases. In 5 cases there was a history of epigastric distress related to meals, and in 5 cases the onset of

rupture was just after eating or drinking. Shock was noted in only 15 cases. Pain in the left shoulder was present in 3 cases and in the right shoulder in 1 case. Halliwell (1933) reported a case of spontaneous rupture of a normal spleen in which there was a long splenic pedicle. In Stretton's case (1926) rupture occurred in a female patient after coitus. In Susman's case (1927) the rupture occurred after the patient had bent down to lift a heavy object, and it was suggested that the contraction of the abdominal wall caused the rupture. Bohler (1933) reported a similar case occurring after the patient had bent to lift a heavy object. Abell (1933) recorded a case of rupture of a wandering spleen with torsion of its pedicle. In the cases described by Smith, Morrison, and Sladden (1933) and by Burnett and McMenemy (1935) splenomegaly was solely due to congestion, and in the former case pregnancy was thought to be a contributory factor.

In our own case the spleen was excessively mobile and rupture occurred at rest in bed. No gross pathological changes were discovered in the spleen beyond simple inflammatory processes such as must exist in most septic conditions. Some gastro-intestinal disorder was indicated by the vomiting before admission and also by the post-mortem finding of undigested food residue in the stomach many hours after the preceding meal.

Summary

A case of spontaneous rupture of an abnormally mobile spleen is described in which the rupture occurred while the patient was at rest in bed and in which there was no preceding accident.

A discussion of the causes of spontaneous rupture of the spleen and a review of the literature suggest that excessive mobility may subject the spleen to congestion by angulation or torsion of its pedicle sufficient to result in spontaneous rupture.

Our sincere thanks are due to Dr. Robb-Smith for reporting on the sections and for helpful criticisms.

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Medical Memoranda

Achrestic Anaemia with Achlorhydria

Achrestic anaemia as first described by Israëls and Wilkinson is characterized by: (1) the findings of a macrocytic anaemia; (2) free HCl in the stomach contents; (3) a prolonged course which fails to respond to efficient anti-pernicious-anaemia therapy; (4) megaloblastic hyperplasia of the bone marrow; (5) the recovery of adequate amounts of the anti-anaemic principle from the liver. The aetiology is the failure to utilize the anti-anaemic principle or to mobilize it from the tissue stores.

Recently I have had under my care a case of achrestic anaemia differing a little from the above outline in that there was achlorhydria. Such a condition must be very rare.

CASE HISTORY

A widow aged 56 was admitted to hospital, having complained for six months of dyspnoea, faintness, weakness of the arms and legs, extreme exhaustion, nausea, and vomiting. The symptoms were gradually getting more pronounced. Her appetite had been poor, but her weight was steady. She had received no previous treatment.

Examination revealed a pale woman who looked older than her years but showed no signs of wasting. The pulse was 100 and regular. The face was puffy and the teeth were carious. There were purpuric spots on the arms, chest, and abdomen, with oedema of the hands and feet. The tip of the spleen was just palpable, and the liver was enlarged 2 in. There were no enlarged lymph glands, and no other abnormality in the heart, lungs, C.N.S., or urine was detected. The blood count was: red cells, 715,000; white cells, 4,000; haemoglobin, 20%; colour index, 1.4. The film showed definite macrocytosis. Fractional test meals even with histamine revealed achlorhydria, with excess of mucus. The stools were always negative for occult blood.

The patient was immediately given one pint of citrated blood by the drip method. There was no reticulocyte response to intramuscular injections of hepatex, 10 c.cm. stat. and 5 c.cm. daily for two weeks, the reticulocyte count never going above 1%. This same hepatex gave good results in other cases of pernicious anaemia in the ward. She was repeatedly transfused, as transfusion seemed the only means of keeping her alive. She was given liberal allowances of fersolate, redoxon, yeast, marmite, liveroid, ventriculin, thyroid, and HCl dil. No one preparation or combination of preparations seemed to help. At times, quite independently of treatment, there were definite remissions, and on one occasion the haemoglobin rose to 58%. No cause for these remissions could be detected. During one of them her carious teeth were extracted, but even this did not appear to affect her progress.

After being treated for a year the patient died of bronchopneumonia. At the necropsy (by Dr. W. Whitelaw) the only pathology of the intestinal tract was a chronic gastritis. The femoral bone marrow was extremely hyperplastic. The heart was not enlarged, and the myocardium was pale. The lungs gave the findings of bronchopneumonia. There was much free iron in the liver, kidneys, and spleen. On microscopical examination the bone marrow was seen to be megaloblastic.

This case presented most of the characteristics of achrestic anaemia, as there were the findings of a macrocytic anaemia, failure to respond to efficient anti-pernicious-anaemia therapy, and a megaloblastic hyperplasia of the bone marrow. Achlorhydria is certainly very unusual, but Israëls and Wilkinson (1940) have suggested that it might occur in achrestic anaemia, and state that they had one such instance. In my case the achlorhydria may have been due to the chronic gastritis, the result of dental sepsis. Unfortunately there were no facilities for testing the amounts of anti-anaemic principle in the liver, but there is enough evidence to substantiate the case without this.

I wish to thank Dr. John F. Wilkinson, Liverpool, for his help and advice; Dr. T. M. Anderson, medical superintendent, Dudley Road Hospital, Birmingham, for permission to publish the case; and Dr. W. Whitelaw, pathologist, Dudley Road Hospital, for his post-mortem findings.

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A Proposal to Prevent Necrosis of the Tabula Externa of the Skull denuded of Periosteum

In extensive scalp wounds in which a large area of the skull is deprived of the periosteum the tabula externa undergoes necrosis unless it is covered by skin within a reasonable time. A free graft has very little chance of success in these circumstances because of the poor blood supply of the host tissue, and a pedicle graft may encounter technical difficulties. In my experience the following new method has been helpful:

Multiple burr-holes are made by a hand drill into the whole denuded area of the external table. The holes are 2 to 4 mm. in calibre and 15 mm. apart. They should penetrate into the diploe—a fact indicated by slight bleeding from the bone. In about 7 to 10

Drawing showing, at different stages, the granulations growing out of the diploe.

days granulation tissue originating from the diploe will appear through the holes and spread flatly over the tabula externa surface. The drawing shows the granulations at different stages. In a few days' time the granulations are sufficiently confluent to provide a good blood supply, and are then covered by a Thiersch graft. The graft is treated in the usual manner. The denuded area should be covered from the beginning with a 10% cod-liver-oil-vaseline ointment in order to prevent drying.

Whether this method would be useful or not in cases in which there is already some necrosis of the external table is not yet certain, and only future experience will show; but it is certainly worth trying.

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Reviews

ENCEPHALOGRAPHY

Encephalography. By E. Graeme Robertson, M.D., M.R.C.P., F.R.A.C.P. Monographs from the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne. No. 2. (Pp. 105. 32s. 6d.) Melbourne and London: Macmillan and Co.

The invention of encephalography, by which is meant radiography of the brain after the introduction of air by the lumbar route, put at the disposal of neurologists a diagnostic technique the value of which is still too little appreciated. Dr. Graeme Robertson's book would be of value, therefore, if it did no more than bring home to the physician how much can be learned by means of encephalography when this is carried out by an expert.

Robertson gives a detailed account of his technique with a discussion of its anatomical basis. Encephalography carefully carried out may be expected to yield information about the contents of the posterior fossa, including the fourth ventricle, the aqueduct of Sylvius, the third and lateral ventricles, and the cerebral subarachnoid space. The author might perhaps have stretched his title enough to include a chapter on myelography, in which air is used in the diagnosis of obstructions of the spinal subarachnoid space. The value of encephalography in the diagnosis of intracranial tumour is well known. Dr. Robertson thinks that its usefulness in the diagnosis of post-traumatic headache and epilepsy has probably been overestimated, but it gives considerable help in the recognition of degenerative lesions, and may help to distinguish between cerebellar degeneration and neoplasm.

The illustrations are numerous and beautifully reproduced, and line drawings are used with advantage to interpret the skiagrams.

OCCUPATIONAL THERAPY

Principles and Practice of Rehabilitation. By John Eisele Davis, M.A., Sc.D. (Pp. 211. \$3.00.) New York: A. S. Barnes and Co., Inc.

This book is mainly concerned with methods of rehabilitation that have been found useful for the mentally ill. The term "rehabilitation" as used by the author is practically synonymous with the older term "occupational therapy." The emphasis is on the scientific approach; each individual has to be assessed for his assets as well as his liabilities before a plan of rehabilitation is drawn up. Attention is paid first to the individual's peculiarities and then to the problem of his socialization. The author points out the importance of the gap that is apt to exist between the kind of activities available in hospital and the kind of work that the patient will be expected to face when he has to re-establish himself as a wage-earning unit in the world outside. In the treatment itself the author reminds us that we have on the one hand to be content to begin with very simple activities to suit the patient's level of performance; but that, on the other hand, his self-esteem must not be hurt by introducing him to a childish type of occupation.

The book contains a discussion of principles and seems to come down on the side of work as an end in itself. Galen is quoted to the effect that work is Nature's best physician. Nevertheless the author does not fail to emphasize as well what work means in terms of self-esteem. Examples from the experience of countries at war are added as illustrations, and the point is made that a better community organization in peacetime might maintain as useful members of the community many individuals who ordinarily become chronic neurotics, or at least a burden to themselves or others.

CLINICAL PATHOLOGY

Clinical Laboratory Diagnosis. By Samuel A. Levinson, M.S., M.D., and Robert P. MacFate, M.S., Ph.D. Second edition, thoroughly revised. (Pp. 980; illustrated. 48s.) London: Henry Kimpton. 1943.

It is doubtful whether anyone can be an authority on all branches of clinical pathology, and somewhat doubtful whether a single book can properly cover the whole subject: individual works on bacteriology, haematology, pathological chemistry, histology, and toxicology are likely to be better sources of information. There are nevertheless several American omnibus