SPONTANEOUS PNEUMOPERITONEUM

Associated with Meckel's Diverticulum

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There have been many articles on the subject of *pneumoperitoneum*. The following case gave considerable anxiety in the theatre and a search of the literature has not revealed any exactly similar.

Case Report

The patient, a girl of 13, was admitted to hospital on May 23, 1951, complaining of abdominal pain of four hours' duration and of sudden onset. The pain began in the right hypochondrium and spread to the right iliac fossa. It was continuous, did not radiate, extended higher than one would expect from a retrocaecal appendix and was present under the right costal margin. She was nauseated but did not vomit.

On examination she was resting quietly in bed and stated that she now felt better. The temperature was 100, pulse 108. Some tenderness to deep pressure was present in the right iliac fossa but there was no rigidity and rectal examination did not reveal any tenderness. The chest showed no abnormality; B.P., 120/80. A tentative diagnosis of appendicitis was made.

She was re-examined later and although there was no rigidity and tenderness was present still only on deep pressure, careful examination revealed some slight distension. It was therefore decided to open the abdomen.

A McBurney's incision was carried out and the moment the peritoneum was opened there was a marked hiss of escaping gas. This was of considerable quantity but without odour. The caecum was mobile and a healthy retrocaecal appendix was easily exposed. There was, however, a small amount of free fluid in the abdomen. The appendix did not seem to be responsible for the findings.

In view of this it was decided to explore the rest of the bowel; a Meckel's diverticulum was found 18 in. proximal to the ileo-caecal junction. The diverticulum itself was about 2 in. in length and $\frac{3}{4}$ to 1 in. in width at the base, with

normal blood vessels. It appeared to be healthy and showed no evidence of perforation.

An upper midline incision was therefore made in order to explore the stomach and duodenum. Again no abnormality was found. The McBurney's incision was re-explored and the whole of the small bowel, tubes, ovaries, uterus and bladder were examined but there was no sign of a perforated viscus. The only abnormality was a small collection of non-purulent fluid in the pelvis. The Meckel's diverticulum was removed and the bowel repaired in a transverse direction.

Beyond some slight haemorrhage from the wound, convalescence was uneventful. A chest X-ray post-operatively showed no abnormality and the patient was discharged after three weeks with the wound healed. She was seen five months after operation in good health and without symptoms.

An extract from the histological report (for which I am indebted to Dr. A. G. Marshall) reads:

'The specimen of Meckel's diverticulum shows that the mucous membrane appears normal but there are several petechial spots upon it. In section the mucous membrane is intestinal in type and no heterotopic gastric mucosa was found. There are numerous hyperplastic lymphoid follicles in the submucosa.

'I cannot see how the diverticulum can be related to the pneumoperitoneum in the absence of perforation. The absence of histological inflammatory changes supports the opinion that there was no perforation.'

Discussion

Pneumoperitoneum may be classified as:

1. Therapeutic.
2. Spontaneous.
 - (a) Known causes.
 - (b) Unknown causes.

The known causes may be subdivided into the following groups:

1. Perforation of a hollow viscus as by foreign bodies or in peptic ulcer, carcinoma of the stomach, carcinoma of the colon, perforated diverticulitis, typhoid ulceration, etc.
2. Inflammatory causes in other viscera, e.g. acute pancreatitis.
3. 'Pneumatosis cystoides intestinalis.'
4. After artificial pneumothorax.

In some cases it is impossible, however, at laparotomy and even at post-mortem examination to determine the cause of the pneumoperitoneum. These cases may be considered in three groups:

(a) *No cause is found.* Cases are described in which a pneumoperitoneum developed under tension with no clinical manifestation other than that of abdominal distension. Typical are those of Pruvot and Leger (1947). They describe a female of 35 in whom a pneumoperitoneum was found and no cause was discovered at operation. This patient died under spinal anaesthesia giving an opportunity for an adequate post-mortem examination, but even here no cause for the pneumoperitoneum could be discovered. They describe a second case, a male of 35 with similar symptoms who eventually came to laparotomy and nothing abnormal could be discovered other than the pneumoperitoneum. He died a fortnight afterwards in a recurrent attack for which he refused admission.

Monad and Hollander (1932) give an account of a Polish male, aged 35, in whom tension pneumoperitoneum developed. This patient came to laparotomy and no cause could be discovered. Other similar cases have been described by Mason and Kesmodel (1946), Hinkle (1940), Leys (1944), Ayres (1950) and Sidel and Wolbarsht (1944).

(b) The second group comprises those cases in which a lesion is found in the abdomen but this lesion does not seem to account for the pneumoperitoneum. Michejda (1927) describes a case in which the only abnormality found was that the appendix was a little red but not grossly or microscopically abnormal. Durozelle (1934) described a similar case in which a pneumoperitoneum and free fluid were found but no perforation, the appendix being normal, with complete recovery after laparotomy. Kurdnac (1930) describes a similar case in a girl of 18 in which no abnormality was found.

(c) The third group consists of cases in which there is an intra-abdominal factor such as carcinoma of the pancreas or acute pancreatitis in association with the pneumoperitoneum. Faxon (1950) reported such a case of acute pancreatitis and pneumoperitoneum.

Our interest lies particularly with the second group of patients, that is to say a lesion being found in the abdomen which itself does not seem to account for the pneumoperitoneum. In most of these cases some fluid was present in the abdomen in addition to the gas. This fluid was either colourless or yellow, contained fibrin, was sometimes stated to be malodorous but was not purulent.

Pruvot and Leger (1947) discussed whether this was reactionary fluid or due to an unknown perforation, and in their paper give an account of the pathogenesis of the fluid in detail. They point out that the clinical features are the sudden and variable onset of pain, the latter practically always in the right hypochondrium, the absence of real rigidity, the difficulty of making a diagnosis and the fact that most of these cases were considered to be of inflammatory origin often with ileus. They review 53 cases in the literature in which operation was carried out on 31. Eight of these showed no macroscopic lesion whilst in 23 a non-perforated lesion was discovered. However, they do not state the precise nature of the findings in these cases and whether or not Meckel's diverticulum was present. Twenty-two cases were not operated on and they mention one case of Chalochet (1933) in which a pneumoperitoneum appeared with every menstrual period.

In the present case it is difficult to believe that without a perforation the diverticulum could be responsible for the pneumoperitoneum. It has been stated that in the condition of gas cysts of the intestine associated with pneumoperitoneum, the cysts may almost entirely disappear at laparotomy leaving only grayish white plaques on the wall of the gut, but the writer cannot believe that this can be the cause in this particular case.

Many authors have failed to find an adequate explanation for their cases. It is particularly difficult in the cases quoted by Michejda, Pruvot and Leger. It can, of course, be postulated that there was a small perforation which had sealed itself off, but once again the histology does not confirm this.

Summary

A case is described of a spontaneous pneumoperitoneum associated with an apparently normal Meckel's diverticulum, being non-perforated and not containing heterotopic gastric mucous membrane. Laparotomy did not reveal any obvious perforation of a viscus. The patient was not suffering from any gastroduodenal disorder. It was not associated with any pulmonary disease such as pneumothorax, nor with any genito-urinary disorders.

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reference for such an illustration. Vean's treatment of the premaxilla, 'as though closing a drawer,' might have been more fully explained. The author thinks that good speech is more desirable than correct dental occlusion. He points out that lack of individual initiative and persistence on the part of the patient must affect the best surgical results.

Contracture of the mid-line scar in the soft palate brings about some shortening of the palate, and he deals with the problem of elongating the nasal mucosa when attempting primary lengthening of the palate. It is acknowledged that secondary corrective operations are but briefly considered. The value of the 'cupid's bow' operation for shortening the deep lip is described. The section on anaesthesia is instructive; the best anaesthetic is considered to be that which approaches physio-

logical sleep rather than deep or indifferent anaesthesia. There is a chapter on nursing care. The idea of leaving a traction suture in the tongue for 24 hours might not meet with general agreement.

For those interested this is a book worth possessing. E.L.

MIND—A SOCIAL PHENOMENON

By F. S. A. DORAN, M.A., M.D., F.R.C.S. Pp. 182. London: C. A. Watts & Co., Ltd. 1952. 10s. 6d.

The author sketches the history of various theories of the relation of mind to body and illustrates the thesis that the content of man's mind is determined by his environment. The author's subsidiary arguments are open to question.

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A brief review of the literature is given.

Familiarity with the condition may relieve anxiety in the theatre, but is no excuse for the omission of a prolonged and careful search for a cause.

Acknowledgments

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BIBLIOGRAPHY

- AYRES, R. W., *et al.* (1950), *Amer. J. Dig. Dis.*, **17**, 345.
- CHALOCHE (1934), *Picardie Medicale*, June.
- DUROZELLE (1934), *Bull. Soc. Nat. Chir., Paris*, **60**, 698.
- FAXON, H. H., *et al.* (1950), *New Engl. J. Med.*, **242**, 715.
- HINKLE, C. L. (1940), *Amer. J. Roentgenol.*, **43**, 377.
- KURDNAC, J. (1930), *Zbl. Chir.*, **57**, 260.
- LEYS, D. (1944), *Brit. med. J.*, **2**, 562.
- MASON, J. M., MASON, E. M., and KESMODEL, K. *Sth. med. J.*, **38**, 620.
- MICHEDJA (1927), *Zeit. f. Chir.*, **2**, 1871.
- MONAD and HOLLANDER (1932), *Bull. Mem. Soc. Nat. Chir.*, **58**, 940.
- PRUVOT, G., and LEGER, L. (1947), *J. Chir., Paris*, **63**, 632.
- SIDEL, N., and WOLBARSH, A. (1944), *New Engl. J. Med.*, **231**, 450.

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