ACUTE APPENDICITIS WITH PNEUMOPERITONEUM

By Koh Kim Chan, M.B.,B.S. (Malaya)

(House-Surgeon, Professorial Unit, General Hospital, Singapore)

The incidence of pneumoperitoneum in acute appendicitis is not known with certainty. A review of the literature revealed a total of 12 cases reported by Vaugham and Singer, Guillemin, Kornblum, Spensley et al, Epstein and Greenberg. Below is the report of a case of acute appendicitis with spontaneous pneumoperitoneum seen in our unit.

CASE REPORT

C.K.P., a Chinese male of 51 years was admitted with epigastric pain for 4 days. The pain was colicky in nature. When it started he had bouts of vomiting which stopped on the second day. It then became generalised all over the abdomen and was aggravated by movement and coughing. As a result of this pain he had lost his appetite and had not opened his bowels. He had no previous history of epigastric pain. He was however, an opium addict. His general condition was satisfactory on admission but in severe abdominal pain. He was not anaemic and his tongue was thickly coated. His pulse was 112 per minute and his blood pressure was 150/90 mm Hg. His abdomen was slightly distended, tender and rigid. Rebound tenderness and shifting dullness were present. Liver dullness was however absent. The clinical diagnosis of peritonitis due to perforated peptic ulcer was made. Abdominal radiography was done in erect and supine positions. A layer of gas was found under the diaphram above the liver and stomach (see Figs. 1, 2 & 3).

Laparotomy was done on the same day of admission. Right paramedian incision was made in view of the clinical diagnosis and radiographic finding. No perforation was found in the stomach and duodenum but the peritoneal cavity contained pus. The incision was then extended to below the umbilicus and the bowles, large and small intestines were inspected thoroughly. Only the appendix was found to be gangrenous and the ileum around it covered with fibrin and pus. Appendicectomy was done and the incision closed. Patient had a course of Achromycin post-operatively. His recovery was uneventful.

DISCUSSION

In a busy unit like ours no studies have been made to find out the incidence of spontaneous pneumoperitoneum in appendicitis. According to Greenberg there were 1,130 patients with appendicitis admitted to his hospital in the past 10 years, free intra-peritoneal air was demonstrated only twice. This does not however indicate the true incidence since in only about 200 of these cases was abdominal radiography done. There were 98 cases of perforated appendix in the radiographed group. Frimann-Dahl radiographed over 2,000 cases of acute appendicitis routinely but failed to encounter a single example.

Radiographic detection of free air in the peritoneal cavity is easily demonstrated as only a very small volume is required. Three cubic centimeters of air beneath the diaphragm can normally be detected. If a patient is positioned upright (prior to radiography) for a long time an even smaller volume of air (1 - 2 c.c.) can be recognised. Thus, the small volume of air that could be contained in the lumen of the average normal appendix, if released into the peritoneal cavity should be readily detected. But this is seldom the case as there are certain anatomical and pathological factors to be considered. Firstly the appendix does not generally contain air in its normal dependent position. If it lies in a sub-hepatic position as in undescended caecum or reversed caecum it may contain air without being pathological. Secondly a diseased appendix has its lumen reduced in a significant percentage of cases. In a study of 50,000 appendices mostly surgically removed Collins found that the lumen was partly or completely obliterated in over one-third of the specimens. Thirdly inflammation is more frequent in retrocaecal appendix and perforations are therefore more readily sealed off. Under such circumstances the possibility of free peritoneal air is lessened.

The growth of such organisms as E. Coli, A. aerogenes, B. proteus and the Klebsiella species forms gas. Whether the gas in the pneumoperitoneum of a perforated or gangrenous appendix is of the same composition as normal intestinal gas or is the result of bacterial activity is of academic interest only. There are three possible ways for free peritoneal air to occur:— (1) From normally positioned appendix which is infected with gas-forming organisms after the occlusion of its lumen. (2) From secondary perforations of appendicular abscess containing gas. (3) From peritonitis due to infection with gas forming organisms.

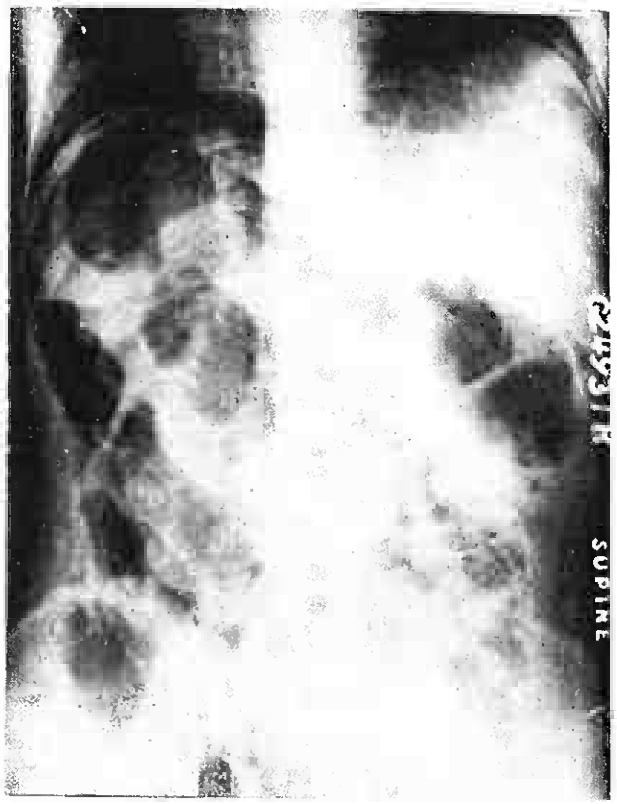

Fig. 1.

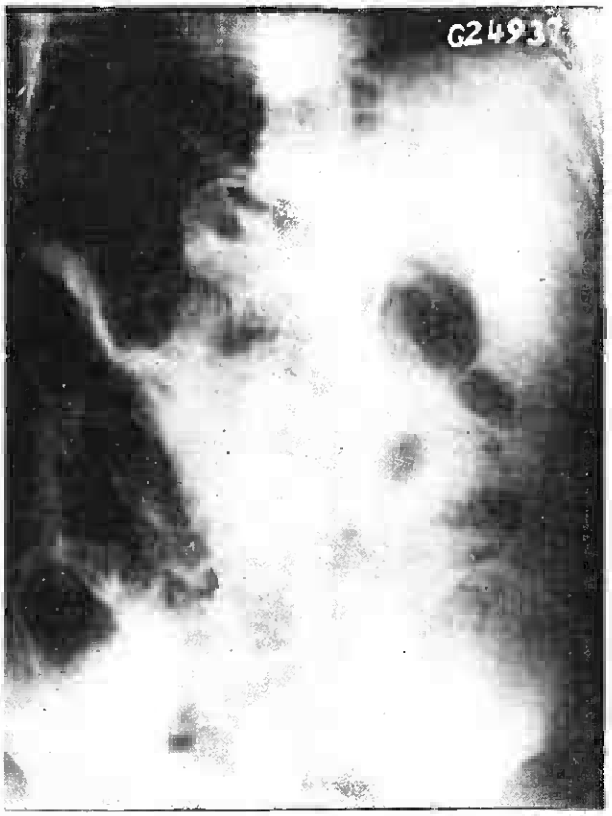

Fig. 2.

Fig. 3.

Figs. 1, 2 & 3. Showing the diaphragm above the liver and stomach.

SUMMARY

One case of spontaneous pneumoperitoneum associated with acute appendicitis is added to 12 similar cases gathered from the literature. Anatomical and pathological factors are considered with regard to the infrequent occurence of such cases. The possible sources of free gas in the peritoneal cavity are explained.

REFERENCES

Bird, C.C.Jr., Fissel G.E., and Young, B.R. : A Pathognomonic Roentgen Sign of Retro-peritoneal abscess. Report of two cases of Ruptured Appendix with Positive Roentgen Findings. Am. J. Roentgenol. 59:351-353. March 1948.

Epstein, B.S. : Clinical Radiology of Acute Abdominal Disorders. Lea and Febiger. 1958.

Guillemin, A. : Quoted by Vaugham and Singer.

Hodges, P.C. and Miller, R.E. : Intestinal Obstruction Am. J. Roentgenol 74: 1015-1022 December 1955.

Ritvo, M. and Shauffer, I.A.: Gastro-Intesinal X-ray Diagnosis. Lea & Febiger 1951.

Samuel, E. : The gas-filled appendix. Brit. J. Radiol. 30:27-30 January, 1957.

Greenberg, B.E. : Spontaneous Pneumoperitoneum in appendicitis. Radiology 77:248-251 August 1961.

Collins, D.C. : A study of 50,000 specimens of the Human Vermiform appendix. Surg. Gynec. & OBST. 101 : 437-445 October 1955.

Fisher, M.S. : A Roentgen Sign of gangrenous appendicitis. Am. J. Roentgenol. 81 : 637-639 April 1959.

Frimann-Dahl, J.C., Roentgen Examination in Acute Abdominal diseases. Springfield, III., Charles C. Thomas 2nd ed. 1960.

Kornblum, S.A. : Quoted by Greenberg.

Soteropoulos, C. and Gilmore, J.H. : Roentgen Diagnosis of Acute Appendicitis. Radiology 71 : 246-256 August 1958.

Vaugham, R.T. & Singer, H.A. : The Value of Radiology in the Diagnosis of Perforated Peptic Ulcer. : Surg., Gynec & Obst. 49 : 593-599 Nov. 1929.

Spensley, R.D., Nelson, R.E. and Childs, W.A. : Unusual Cases of Free Intraperitoneal Air in Acute Conditions of the Abdomen. A. J. Surg. 91 : 344-350 March 1956.