None of the above causes can, I think, satisfactorily account for the case I have quoted. An explanation I wish to offer is this: These are really cases of aborted pneumonias, in which the congestive stage is fully developed, and then the disease stops, being relieved by the escape of the collected serum, to end either in rapid recovery or in rapid death. The consolidation of the lung is not often demonstrated, but the signs of acute congestion are present. It is worth noticing in my case that only one lung was attacked, and that herpes on the lips was present, both symptoms suggesting a pneumonic origin. Influenza seems to favour this condition, being the starting point of the pneumonia in two or three cases recorded—in my case an influenza epidemic was present in the district where the girl lived.

Treatment.—Immediate venesection is the treatment generally recommended (especially by French physicians), together with outward applications, such as wet cupping and mustard plasters. Morphia, iodides, or blisters should not be used for obvious reasons.

PRIMARY PHLEGMONOUS ENTERITIS:

WITH NOTES ON A CASE OCCURRING IN A CHILD.

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Phlegmonous enteritis may be defined as an acute infection of the small intestine characterised mainly by a diffuse inflammatory infiltration of the submucosa. Pathologically it is similar to the more common condition of phlegmonous gastritis and to the less common condition of phlegmonous colitis. Phlegmons of the gastro-intestinal tract are, however, events of rare frequency, and extremely fatal diseases. Phlegmonous enteritis is said to occur sometimes as a secondary manifestation in connexion with such conditions as strangulated hernia and intussusception, where a mechanical interference with the bowel or its circulation has taken place.

As a *primary* condition it is exceedingly rare, and in the interests of knowledge it is desirable that all such cases should be recorded. The analogy of an intestinal phlegmon to a subcutaneous cellulitis is a very close one, but occasionally a circumscribed abscess is formed, and such a case, occurring in the duodenum, has been described by Taylor and Lakin.¹ In an excellent article on the subject, MacCallum,² describing a case of his own in 1906, cites seven other cases of primary phlegmonous enteritis which he had collected from the literature. All these cases terminated fatally. Adams and Cassidy³ also describe a typical case which ended fatally. In a more recent paper Zoepffel,⁴ describing a case successfully treated by operation, states that some 30 cases have now been recorded, and is of opinion that the condition occurs more commonly than is suggested by the literature. From the material available it is possible to distinguish the more characteristic features of primary phlegmonous enteritis.

Pathology.

(a) *Ætiology.*—The male sex is far more commonly affected than the female, and the ages recorded vary from 20 to 75 years. In some cases, but by no means invariably, a history of previous injury has been obtained. Askanazy (quoted by MacCallum) suggests that the proximal part of the small intestine, owing to its relatively fixed position, is affected by trauma more readily than the more distal and less fixed part, and thus gives rise to a chance for infection. Zoepffel considers that elderly men are prone to the disease by reason of a diminished hydrochloric acid content of the gastric juice (induced by chronic gastritis), which is therefore less bactericidal and allows injurious bacteria to reach the upper intestine. In all cases the exciting cause is a pyogenic organism, usually of the streptococcal class. Hedenius (quoted by MacCallum) considered the phlegmonous infiltration in his case to

be of an infectious nature, and similar in that respect to the phlegmons of the subcutaneous tissue.

(b) *Morbid Anatomy.*—The site usually selected by the disease is the proximal part of the small intestine, either duodenum or jejunum. In the case described below the lesion occurred in the distal part of the ileum. The mucous membrane of the intestine is greyish or yellow, often swollen and ulcerated, and the valvulae conniventes are enlarged. The submucosa and muscularis mucosa show considerable swelling owing to a purulent infiltration. In some cases this is associated with a hæmorrhagic extravasation. The muscular coats may show a similar purulent or hæmorrhagic infiltration, or simply an inflammatory oedema.

Signs and Symptoms.—The symptoms usually begin with abdominal pain referred to the epigastrium. Zoepffel describes this pain as being cramp-like, a description which applies in the case which I record below. Vomiting, nausea, or both, may be present. The temperature is not usually high and the pulse-rate is a variable factor. Examination of the abdomen shows slight distension, with tenderness and rigidity, especially of the upper abdomen. A point of some importance is the passage of blood per rectum, either in the stools or on the finger following a rectal examination.

Diagnosis.—The usual diagnosis previous to operation (ante or post mortem) is intestinal obstruction, though in one case a diagnosis of perforated gastric ulcer was made, and in my own case a tentative diagnosis of acute appendicitis was given. Zoepffel states that it may be possible to make a correct diagnosis of primary phlegmonous enteritis; but advantageous as this may appear to be, I am of opinion that it is more important to recognise the presence of an acute abdominal lesion which requires immediate operative treatment.

Treatment.—Operation is the only method of treatment likely to be successful. Excision of the affected gut with restoration of continuity by anastomosis is the ideal method, but, owing to the fact that a high position in the small intestine is usually selected by the lesion, this is not always practicable, and in such cases some surgical ingenuity will be called for.

Prognosis.—This is admittedly bad. The fact that the upper intestine is usually affected militates against a good prognosis, but the early recognition of an acute abdominal lesion and prompt operative treatment will do much to improve a patient's chances of recovery.

Notes of a Case.

The following notes are taken from a case of acute primary phlegmonous enteritis occurring in my own practice.

History.—On May 7th, 1921, a hot spring day, the patient, a boy aged 6 years, in apparently normal health, was "bitten" on the forearms by "midges." An acute local reaction ensued, to such an extent that the family doctor, who was called in, considered that there was a cellulitis of the forearms. Cooling lotions were applied and the condition gradually subsided. Three days later the boy complained of pains in the elbows and knees; examination of these joints led the doctor to make a diagnosis of acute rheumatism, especially as the temperature registered 102° F. Suitable treatment was adopted and was followed by a partial remission of the symptoms. On the 14th, one week after the apparent initial onset, the boy complained of abdominal pain. This pain was paroxysmal and of a cramp-like character, and was associated with a further rise of temperature (103°). There was no vomiting and no nausea; the bowels acted well, and the stools, apart from being somewhat loose, showed no special features. Examination of the abdomen revealed hardness and tenderness of the hypogastrium. This is the information which was given to me when I first saw the boy on the 15th. On examination his condition was unchanged, except that the paroxysms of pain were very frequent. The abdomen now showed slight but definite distension; there was voluntary rigidity of the hypogastrium and tenderness was elicited on deep palpation over this area. Hyperæsthesia was obtained over both iliac fossæ, the patient objecting to the test more on the right than on the left side. It was obvious that an acute abdominal lesion was present, and although a provisional diagnosis of acute appendicitis was given, it was made with a considerable

amount of reserve in view of the unusual history and symptoms. Immediate operation was decided upon.

Operation.—Under ether anaesthesia a right pararectal incision was made, and on opening the peritoneal cavity some free, non-odorous, blood-stained fluid at once escaped. The right iliac fossa was isolated with gauze swabs and the caecal region exposed without difficulty. The appendix showed nothing more than a superficial congestion—evidently a concomitant feature and not the cause of the abdominal lesion. A rapid appendicectomy was performed. On removing the gauze swabs one had not far to seek for the true lesion. Adherent to the anterior abdominal wall of the hypogastrium by recent adhesions was a coil of small intestine, afterwards located to the distal part of the ileum. The adhesions were easily broken down and the affected coil of gut was delivered through the wound. The length of this coil was roughly estimated at about 18 inches, and the distal limit of the disease was apparently some 8 inches from the ileo-caecal valve. It was intensely congested, much thickened, almost black in colour, and there were associated with it enormously enlarged mesenteric glands. Excision of the coil was decided upon and carried out, care being taken to include some three or four inches of apparently healthy bowel on both proximal and distal sides. The mesentery was divided close to the bowel and an end-to-end anastomosis established. Drainage of the pelvis was effected by a small rubber tube through a stab wound in the suprapubic region, and the original wound was sutured in layers. The whole operation occupied rather less than one hour, and the boy's condition was, under the circumstances, quite satisfactory.

After Treatment.—Saline infusions per rectum were given for 24 hours and then discontinued. The temperature fell to normal after the first 24 hours, the pulse-rate decreasing *pari passu*. The drainage-tube, after draining an inconsiderable quantity of blood-stained fluid, was removed on the third day. The bowels acted well on the third day after calomel had been administered in one-grain doses hourly for four hours. The boy made satisfactory progress for two weeks, at the end of which time he had a recurrence of his original symptoms—blotchy rash on the forearms and legs, slight swelling of the knees, streaks of blood in the stools, and paroxysms of colicky pain. Salol, 5 gr., and a mixture containing sod. bicarb., 5 gr., and tinct. belladonna, 5 minims, were administered. The pains ceased during the next 24 hours, and the rash and the joint signs gradually disappeared. The patient subsequently made rapid progress, and returned home one month after the operation, apparently in normal health.

Pathology.—The specimen was forwarded to the Public Health Laboratory, York-place, Manchester, for examination, and I am indebted to Dr. G. D. Dawson for the following report:—

"The specimen consists of 26 inches of the ileum. The whole bowel, but especially the middle third, is dark red in colour. Near the mesentery the peritoneum, elsewhere smooth, has a limited but thick covering of fibrinous deposit; here the bowel wall is puckered. The mucosa is deeply congested, swollen, and covered with thick mucus. Enormous ulcers are present along the whole length of the specimen. Towards the end they are small, but in the middle third one oval ulcer measures $1\frac{1}{2}$ in. in length by $\frac{1}{2}$ in. wide, and another $2\frac{1}{2}$ in. long by $1\frac{1}{2}$ in. wide. In every case the margin is irregular, the base ragged in appearance.

Microscopical Examination.—(a) Transverse section through large ulcer. On either side of the ulcer the deeper parts only of the mucosa are present; the rest is more or less disintegrated, and the surface is covered with a layer, sometimes of considerable thickness, of degenerated epithelial, and other cells held together by mucus. The mucous membrane is absent from a large part of the surface, the ulcer extending to the submucosa. The submucosa, especially in the region of the ulcer, is much swollen and cedematous, and contains numerous extensive hæmorrhages (the pigment is partly diffused) and some large areas of small-celled infiltration; a large proportion of these small cells are of the polynuclear type. Beneath the ulcer the structure of the muscular coats is indistinct; there is much cedema and hæmorrhagic infiltration. At either side hæmorrhages are common in the muscular coats.

(b) Transverse section through less affected part. The changes are similar in type but less advanced. There is the same superficial necrosis of the mucosa, which, however, is nowhere completely absent. Interstitial hæmorrhages are numerous in the interglandular stroma and in the submucosa. The section passes through a group of much enlarged lymphoid follicles.

(c) Sections stained for bacteria. No Gram-positive organisms are present. In the mucosa, but not in the deeper layers, there are numerous clusters of medium-sized Gram-negative bacilli (probably *B. coli communis*).

Cultivation.—Cultures from different parts of the inner surface gave pure growths of *B. coli communis*.

Inoculation.—On inoculation into guinea-pigs cultures of the *B. coli communis* isolated did not appear to be unusually virulent.

Conclusion.—Acute enteritis of phlegmonous type with extensive hæmorrhagic extravasation."

(It is necessary to state that the above examination for bacteria is inconclusive, as I, unfortunately, placed the specimen in a weak solution of formalin before conveyance to the Public Health Laboratory.)

Comments.

The chief features of interest in this case are the differences which separate it from the usual type—notably, the age of the patient, the site of the lesion, and the apparent predisposing cause. The fact that the disease can occur in a child makes it probable that no age is exempt, and it would appear that in children, phlegmonous enteritis—either primary or secondary—occupies a place in the consideration of the differential diagnosis of acute intussusception. The unusual site of the lesion in the lower intestine is difficult of explanation, but there is no question that such a site is a distinct advantage, offering greater facility for operative measures and consequently a much more favourable prognosis.

It is interesting to note the apparent similarity between the initial subcutaneous cellulitis and the subsequent phlegmon of the intestine. Whether the latter had any causal relation with the former is mere conjecture, the difficulty being to discover a reason which will adequately explain the connexion.

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LOSS OF WEIGHT IN CASES OF ARTIFICIAL PNEUMOTHORAX.

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IN artificial pneumothorax treatment the time-honoured background in a typical picture of progress—namely, the gain in weight—is frequently absent. As a rule when this treatment is started there is a drop in weight for the first few weeks. This loss, however, though disquieting at the time, is generally made up as the treatment continues; but usually when one lung is collapsed the normal weight is never reached, although the weight obtained is greater than it was at the beginning of the treatment. A certain small number of cases, on the contrary, gain weight from the beginning. Others after the initial loss of weight do not begin to gain—except possibly for a short time—but continue to lose steadily, and in one case in particular this loss assumed alarming proportions.

Impaired Metabolism.

We think this loss can be explained on the basis of an impaired metabolism; for it is not difficult to imagine that the collapse of one lung will cause a general metabolic upset to which the body has to accommodate itself. As we hope to prove in a subsequent paper, efficient aeration of the blood becomes more difficult, particularly if the movement of the uncollapsed lung is restricted by a displaced mediastinum. This opinion is supported by the work of Dr. S. W. F. Underhill.¹ The diminished oxygen concentration of the blood apparently causes an inefficient combustion of carbohydrates and fats. A consequent demand on the body fats is made by the

¹ Brit. Med. Jour., 1921, ii., 779.