THESIS

ON

THE SYMPTOMATOLOGY OF FATAL ENTERIC FEVER

FOR DEGREE OF M.D.

BY

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THE SYMPTOMATOLOGY OF FATAL ENTERIC FEVER

In the following paper, the writer's personal experience of fatal enteric fever has been supplemented by reference to the records of Belvidere Fever Hospital, with a view to studying the onset and course of symptoms which most frequently attend death, and which are, therefore, of unfavourable import during the life of the patient. In all, the records of 200 fatal cases - including those under personal observation - have been submitted to examination; and while no statistical authority is claimed for the result, it is hoped that it may have its value as a clinical exercise.

The list of cases under consideration includes males and females in nearly equal proportions, whose ages ranged from 15 months to 58 years. The day of illness on which death oc-

curred varied between the limits of the sixth and fifty-sixth, the average date being the twenty-second day, a period at which ulceration and sloughing reach their maximum and bring in their wake the risks of fatal haemorrhage or perforation; or at which, in cases escaping these particular complications, the powers of resistance, and especially the cardiac vigour, become worn out. Symptoms will be considered as they affect the various systems of the body.

VASCULAR SYSTEM

PULSE

The pulse in fatal enteric fever does not present any characters differing from those which accompany cardiac failure in any other acute febrile disease. Steady increase in the pulse rate is a constant feature, the beats toward the end of life numbering 140, 150, or more. An increase in rate even short of those figures is of unfavourable import in view of the familiar observation that the pulse of enteric fever is frequently slow in proportion to the elevation of temperature, a well marked case sometimes running its course, according to Murchison,[1]

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with a pulse rate not exceeding 80. The tension of the pulse is low, and dicrotism frequent as well in favourable as in fatal cases, but in the graver degrees of cardiac debility the dicrotism becomes less marked and finally lost as the pulsations run into one another, and latterly become indistinguishable. Irregularity in force of the pulse is sometimes noted, but the writer has not been impressed with the frequency of irregular rhythm.

HEART

Evidence of muscular debility of the heart may be derived from auscultation, the first sound becoming weaker, and finally inaudible. This condition is one frequently of early occurrence, and it has been noted in conjunction with a fairly well marked apex impulse, and a pulse of comparatively low rate and fair tension maintained for some time after obliteration of the first sound. It is probable that evidence of dilatation of the heart is not often obtained by percussion, though a progressive outward displacement of the apex beat may be observed, as in the case of a man aetat. 51, who died in the second

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week, with all the signs of cardiac failure. Actual inflammation of the heart (endo - and pericarditis) is generally held to be rare. The writer has twice observed the development of sounds having the acoustic characters of pericardial friction, but in neither case was post mortem evidence available.

The general indications of failure of the peripheral circulation are constant, pallor or lividity of the face and finger nails, coldness of the extremities etc.

While cardiac failure is as a rule gradual, a sudden collapse has brought about the end in several instances, even in what appeared to be a favourable course of illness. A man aetat 29, admitted on the fifteenth day of illness, made perfectly satisfactory progress till the twenty-first day, on the morning of which he suddenly started from sleep, and complained of choking. The pulse, previously regular and of fair strength, suddenly became very rapid and irregular, and soon ceased to be perceptible at the wrist. Respiration became hurried and

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distressed, extremities cold, and body covered with cold perspiration. He died two and a half hours after the onset of alarming symptoms. At the autopsy, in addition to the lesions of enteric fever, there were found abundant deposit of fat on the heart walls, well marked fatty degeneration of the muscular tissue, and dilatation of both ventricles. A certain amount of fatty change in the heart no doubt existed before the onset of enteric fever, rendering the organ less able to withstand the inroads of the disease.

CHANGES IN THE BLOOD

Some cases are found to present appearances indicative of a profound alteration in the constitution of the blood, a condition leading to haemorrhages in the skin and from mucous membranes. These were noted in four cases of this series, all of which presented extravasations of blood, of varying size, into the skin: one, in addition, haematuria, without other evidence of acute nephritis, or gross lesion of the genito-urinary tract: and another, small blisters on lips and tongue filled with blood,

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which escaped into the mouth on the rupture of the vesicles. Intestinal haemorrhage was also a feature of the last-mentioned case, death on the twenty-third day of illness being preceded by a copious bleeding. All of these cases were characterised by the early appearance of profound toxaemia and great exhaustion. Trousseau[2] described the condition of the blood which these illustrate as "an essential change in the blood, which is in a dissolved state:" and so greatly impressed was he with the importance of this change, that he ascribed to it not only cutaneous haemorrhages, but, in a majority of cases, intestinal haemorrhage also. Recent research has shewn that the number of corpuscles, and the amount of haemoglobin, but especially the latter, are greatly reduced, more particularly, according to Cabot[3], in and after the third week of illness. The coagulability of the blood is greatly reduced, especially where death is preceded for several days by the typhoid state, as pointed out by Murchison[4].

EPISTAXIS

The epistaxis which occurs in the later periods of

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enteric fever is probably also due to this depraved condition of the blood. The symptom is by no means characteristic of fatal enteric, but may occasionally be so copious as to modify the course of the disease. In two cases of this series, profuse haemorrhage from the nose occurred, and in one of these repeated bleeding during the last three days of life seemed to contribute directly to the fatal issue. Louis[5] states that epistaxis is less common in mild than in severe cases, and he noted its occurrence in eleven of sixteen fatalities.

LESIONS OF BLOOD-VESSELS

Lesions of blood-vessels are described by all writers on enteric fever, obliteration of these by clot occasionally leading to more or less extensive necrosis of peripheral parts. The essential lesion is held to be an arteritis, leading secondarily to coagulation of the blood and obliteration of the vessel by the increasing size of the blood clot. The following case is an example of an unusually extensive and rapidly spreading necrosis of tissue, which it is impossible to doubt hastened the fatal

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end.

M. B. female, aetat 17 years was admitted to Belvidere Hospital on the thirteenth day of illness, with symptoms of a severe attack of enteric fever. In the afternoon of the fourteenth day, she complained of pain in the right leg, and a patch of lividity, resembling a bruise, was discovered over the gastrocnemius muscle. In two hours, this had so increased in size as to occupy the entire calf of the leg, extending from the heel to above the knee joint, but not encroaching on the front of the leg. Blebs formed over the central part of the discolouration, and the limb, from the knee downward, was swollen, hard, and very painful.

In five and a half hours gangrene had spread upward to the thigh, round the front of the leg and down to the foot and toes. Patient was in a condition of extreme exhaustion, and died on the morning of the fifteenth day. A post mortem examination was refused: but judging from the moist character and rapid spread of the gangrene, the lesion present

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was in all probability simultaneous occlusion of the femoral artery and vein.

DIGESTIVE SYSTEM

TONGUE

In the examination of the organs of the digestive system, the condition of the tongue at once attracts attention. Toward the end of fatal cases it is practically without exception, dry, brown, fissured, bleeding, and often so completely "baked" as to render it incapable of protrusion. Fatal cases have been observed in which the tongue remained moist throughout, but in only one of this series was it so. Absence of fur is not infrequent, the organ being then dry, intensely red, and glazed, as though from desquamation of the surface epithelium. The mucous membrane may either appear tightly stretched over the tongue, or shrivelled and puckered. The tremulous condition of the tongue when protruded is part of the general muscular debility.

DYSPHAGIA

Dysphagia is a common symptom, and has been found

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frequently to depend upon a morbid condition of the faucial and pharyngeal mucous membrane, which appears dry, congested, and frequently raw and scalded, and covered with streaks and patches of tenacious mucus. It is not surprising that this condition should lead to complaint of sore throat, as it frequently does: and patients, especially if mentally beclouded, sometimes obstinately refuse to swallow. Dysphagia may also be due, as insisted upon by Keen[6], to necrotic changes in the laryngeal cartilages, a condition to be further referred to.

CANCRUM ORIS

The "tendency to gangrene" insisted upon by Trousseau as characteristic of enteric fever sometimes manifests itself, especially in young subjects, in necrosis of the tissue of the mouth and cheeks - cancrum oris. This complication occurred in two cases of this series, both females, and aged 4½ and 6 years. It set in, in both, at the end of the second week. Cancrum oris adds greatly to the gravity of the case, as, besides being an indica-

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tion of profound prostration and toxaemia, it may lead directly to fatal pulmonary complications from inhalation of the discharges from the mouth. The following case illustrates this order of events. It came under the writer's observation in the East London Children's Hospital, and for permission to make this use of his notes, he is indebted to Dr. Eustace Smith.

E. I. female, aetat 6½ years, was admitted to Hospital on the ninth day of illness, presenting the signs and symptoms of enteric fever. The course of illness was at first favourable, temperature becoming normal on the eighteenth day, but rising in a relapse on the twenty-first, confirmed by fresh eruption of rose spots. By the thirty-sixth day, the child had become much exhausted and emaciated, and on that date a swelling of the left lower jaw was observed, which soon became red externally, while in the mouth, a large black slough was seen along the lower alveolar ridge, and extending to the inside of the left cheek. The breath

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was horribly offensive. On the fortieth day a general anaesthetic was administered, and the sloughing tissue scraped and cauterised. This operation was followed by some local and general improvement, the temperature becoming normal for a few days. It began again to rise on the forty-fifth day, and the child had some cough. Dulness, and fine moist and crepitant rale were present over the upper lobe of the left lung in front, the right lung appearing normal to physical examination. Consolidation of the left lung steadily advanced, till it involved the whole upper, and a considerable part of the lower lobe. The child lingered till the fifty-seventh day, when death occurred. At the autopsy, the upper lobe of the left lung was found completely consolidated, with the pleura over it adherent to the costal layer. The finer bronchial tubes contained a considerable quantity of yellow pus, while scattered patches of consolidation and purulent foci were present throughout the left lower lobe, and the whole of the right lung. Healed en-

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teric ulcers were found in the ileum, and numerous black circular ulcers in the large intestine.

SICKNESS - VOMITING

Sickness, with vomiting of undigested food, occurs not infrequently, but has not been noted as specially characteristic of cases which end in death. Apart from cases of peritonitis, it has seemed to indicate nothing more than an abeyance of digestive power, and consequent irritation of the stomach by undigested food.

ABDOMINAL DISTENSION

With regard to the state of the abdomen, gaseous distension has been present, more or less, in a large majority of these cases, and in the writer's personal experience of fatal enteric fever, it has been absent only once. In these cases there was no suspicion of peritonitis, the distension being due solely to paralysis of the intestinal wall, a condition enhanced, according to Osler[7], by infiltration of the wall of the gut with serum. Marked distension has been noted by the writer as early as the ninth day of illness in two cases. The degree

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varies frequently in the same individual, at different periods of illness, sometimes undergoing marked diminution without any other indication of improvement. It has been noted thus to come and go in the presence of severe and persistent diarrhoea, and while usually greatly increasing just before death, in a few cases has markedly diminished. The frequency of this condition in fatal cases coincides with the opinion of experienced observers as to its grave prognostic importance. Some have regarded it as an index to the extent of the lesions in the intestine.

ABDOMINAL PAIN

Coincident with tympanites, and in some cases apart from it, abdominal pain has been frequent, though seldom referred by the patient to the right iliac region, but rather to the umbilical, or the whole lower abdominal area. It cannot be said that abdominal pain has been found characteristic of fatal cases, many of those who made loudest complaint ultimately recovering. Jenner[8], however, noted this symptom in fifteen out of twenty fatalities. Re-

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garding iliac tenderness and gurgling the writer has no observation of his own to offer, having been careful to abstain from attempts to elicit these.

DIARRHOEA

Diarrhoea is generally admitted to be characteristic of enteric fever, and study of fatal cases shews it to be specially so of them - accepting the term as meaning spontaneous evacuation of the bowels, with loose, often watery, motions, but without reference to the number of such motions per diem. In this sense, the great majority of this series of cases presented the symptom at some period or other, many in a very severe form, diarrhoea being described as "excessive," or "uncontrollable," particularly so toward the end, when the motions frequently became involuntary. The character of the stools has been found, on the whole, to conform to the classical description, but the frequency with which the motions have been green - sometimes resembling chopped parsley - is worthy of note. The intensity of diarrhoea varies much. It may be

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moderate throughout, though constant: it may alternate with short periods of constipation: and it may occasionally be so severe as of itself to precipitate the fatal issue by collapse. In the case of a female, aetat 21, admitted on the eighth day of illness, diarrhoea was from the first an urgent symptom, and by the eleventh day, it had become excessive, the patient presenting a considerable degree of collapse, with small pulse, and slow sighing respiration. During the eleventh day, fourteen stools were passed, six of these copious and watery. On the twelfth day, the patient was very restless, throwing her arms about. Respiration was slow and sighing: pulse rapid and flickering: face and extremities cold and damp. Temporary improvement followed the infusion of saline solution into a vein, but patient again collapsed and died on the same day - the twelfth. At no time did blood escape from the bowel, but the deprivation of fluid lead to a train of symptoms similar to those which follow severe haemorrhage.

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It is held by almost all authorities that the severity of the diarrhoea bears no relation to the extent of the intestinal lesion, although Murchison[9] expressed very strongly the opinion that it is a direct index to the gravity of the case. The writer's clinical and pathological experience - necessarily limited - would lead him to hazard the opinion that severe diarrhoea as a rule indicates severe ulceration, but that moderate diarrhoea, or even constipation, are compatible with extensive intestinal lesions. Thus, in the case of a man, aetat 40, who died on the third day after admission to Hospital, (day of illness uncertain), the bowels had not moved at all during residence in Hospital, and prior to admission only after purgative drugs. The autopsy, nevertheless, revealed numerous large fungating ulcers in the lower part of the ileum, some reaching two inches in length and one inch in breadth, the lower ones covered with large sloughs. Other cases have been examined post mortem with like result, in which during life the bowels had been

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evacuated spontaneously, but so seldom that diarrhoea attracted little attention. On the other hand, in all cases of this series characterised during life by severe diarrhoea, in which post mortem examination was performed, there was found extensive, sometimes extreme, ulceration of Peyer's patches, and of the solitary glands of the small, and frequently also of the large, intestine. The case of a female aetat 14, admitted on the eleventh day of illness is typical of this class. She had had diarrhoea from the third day of illness onward, and during residence in Hospital she passed from four to six large loose stools per diem. The progress of the case was characterised by sustained and irregular pyrexia, nervous prostration and progressive cardiac failure, patient dying on the twenty-fifth day of illness. At the autopsy, the last few inches of the ileum, before opening the gut, felt like a perfectly rigid tube, and refused to collapse unless under considerable pressure. On opening the intestine at this point, one continuous ulcerating, sloughing surface was revealed,

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which, with the accompanying swelling and induration, resembled a fungating malignant growth. The large intestine was normal in this case: but in another, a man aetat 38, whose clinical symptoms were similar - four to seven copious watery stools being passed per diem, the autopsy revealed an ulcerative condition almost entirely confined to the large gut, only two decided ulcers, and one enlarged lymphoid patch being present above the ileo-caecal valve. The large intestine was thickly studded with ulcers of varying size, shape, and depth, from the caput caecum to the upper part of the rectum, the caput caecum itself being lined by a continuous ulcerating and sloughing surface. In this case the diarrhoea possessed no special character to lead to the suspicion that the large intestine was the seat of ulceration.

HAEMORRHAGE

Intestinal haemorrhage is a frequent occurrence in fatal enteric fever, being noted in 53 of this series of cases, a little over a quarter of the total number. Jenner[10] noted the symptom in seven of twenty-

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one fatal cases. These proportions are note-worthy as confirming the tendency of opinion toward regarding it as a grave symptom. Trousseau[11] regarded haemorrhage as "usually of favourable augury," and Graves[12] cited cases in which he believed it to be followed by improvement. In America, Jackson[13] reported that "in some instances the haemorrhage was followed by relief, and in a few by well marked and permanent relief." Most authorities at present regard the symptom less lightly. In these cases, haemorrhage has made its first appearance at periods varying from the thirteenth to the fifty-fourth day of illness - in the latter instance, during a relapse. In all except this case it was added to an existing diarrhoea. The quantity of blood passed was in many cases small - merely a few clots - and could hardly be supposed of itself to have had any influence on the ultimate issue. In one instance, however, such a small bleeding was but the precursor of a copious haemorrhage two days later, a repetition of which induced a state of ex-

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haustion from which the patient did not rally. As will presently be seen, an insignificant haemorrhage has also been observed to precede perforation. On the other hand, the amount of blood lost from the bowel may itself induce fatal collapse, as in the following case.

R. McD, male, aetat 42, was admitted to Hospital on the twelfth day of illness, with characteristic enteric symptoms. On the thirteenth day he passed about two ounces of blood per rectum. On the fourteenth day, three haemorrhages occurred, amounting together to about twenty-one ounces. Patient sank into a condition of collapse. Colour became leaden, pulse feeble, and temperature fell from 101° to 98.2°. By the fifteenth day, collapse had somewhat passed off and temperature had risen to 103°, but haemorrhage recurred to the extent of twenty ounces. On the sixteenth day, two further bleedings occurred, but the amount of blood lost was not accurately estimated. Patient again became extremely collapsed, and though from this

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date till death on the nineteenth day, no bleeding further than oozing from the rectum took place, his appearance suggested continued internal haemorrhage. At the autopsy, extensive and deep ulceration of Pyer's patches was found, with much sloughing and accumulation of blood clot in several of the ulcers, denoting the source of haemorrhage. Intestinal bleeding of this degree of severity is usually ascribed to rupture of a comparatively large blood vessel, but the writer's post mortem examinations have shewn only an oozing from a number of small points in the fungating tissue, and never a demonstrable opening into a vessel of any size. Indeed, the actual ulcers from which bleeding had taken place have sometimes been inferred merely from the level at which the intestinal contents became blood-stained. In this connection the altered constitution of the blood already referred to is of importance. That an erosion of vessels of some size does occur, however, has been demonstrated by the experiments

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of Jenner and Hamernjk[14], who injected water into the superior mesenteric artery and found it escape freely from an ulcer in the ileum. In the case of a female, aetat 47, admitted to Hospital on the fifteenth day of illness, the clinical symptoms pointed to a sudden and copious haemorrhage only explicable on such grounds. This patient progressed favourably till the twenty-sixth day, when, while talking to a neighbouring patient, the latter saw her become suddenly pale, and she complained of faintness. In a few minutes the pulse became rapid and feeble, respiration hurried and sighing, mucous membranes blanched, and extremities cold. Patient died in forty-five minutes after the first appearance of alarming symptoms. Unfortunately, no autopsy was performed.

PERFORATION An all but inevitably fatal complication connected with the digestive system is perforation of the intestine as a direct result of the ulcerative process. In the present series of cases thirty-eight terminated with symptoms pointing to this

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complication, and of these twenty-one were submitted to post mortem examination and found to be the subjects of perforation. The date at which it occurred has been found to vary between the twelfth and the forty-second days of illness. One case presented symptoms of perforation on the forty-fourth day, but the diagnosis was not verified by post mortem inspection. The average time was the twenty-first day, but it is known to occur much earlier than that, while it has occasionally been met with far on in convalescence, even after the patient had left the house, and the stools were formed and healthy, as in a case recorded by Tweedie[15].

The cases of this series terminating in perforation have been of all degrees of severity, from one in which, after an apparently mild course of illness, it occurred on the second day of normal temperature, to many in which the patients were too ill to give definite signs of the complication.

The association of diarrhoea with perforation is of interest in view of what has been said of

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that symptom in relation to ulceration of the intestine. In twenty-seven of these thirty-eight cases, diarrhoea was present from an early period of illness, in twelve being noted as very severe. In eight cases haemorrhage also was present. In four the bowels were constipated throughout, while of the remainder no definite statement is found on this point. It will thus be seen, that diarrhoea preceded perforation in a considerable majority of the cases, and where haemorrhage coincided, a still stronger presumption of deep ulceration was afforded.

A consideration of the symptoms on which a diagnosis of perforation is based leads to a separation of the cases into two classes, one in which the symptoms set in abruptly, and are from the beginning well defined; and another in which the onset is insidious, and the diagnosis frequently uncertain to the end. No single symptom is constant, and even where an abrupt onset renders the suspicion of perforation from the first strong, the symptoms may

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subsequently be modified and a temporary improvement of misleading significance set in. The diagnosis is thus frequently a matter of great difficulty in the early stages of perforation especially, a period at which the recent application of surgical treatment to the complication renders a decision of paramount importance.

PAIN IN PERFORATION

One of the most constant symptoms is abdominal pain, also in general one of the earliest. Pain is referred as a rule to the umbilical region, or is general over the whole abdomen, and frequently of such severity as to cause the patient to scream. It may be of startling suddenness in onset, as in a case in which the writer, while at the bedside was startled by the patient's sudden outcry, and observed him pass in a few minutes from a condition of perfect comfort to one of intense suffering. More frequently, however, the pain is at first moderate, but very rapidly increases in intensity. Its value as a symptom is increased should its onset follow some movement or slight exertion on the

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part of the patient. Thus, it has been noted in some of these cases as occurring during or immediately after defaecation: on the patient raising himself in bed, or suddenly flexing the limbs, or turning on the side. In the case of a man, aetat 48, admitted to Hospital with symptoms of perforation well advanced, the patient had been taking purgative drugs, and had been at work till the day of admission. Pain may be delayed in onset. In the case of a female, aetat 23, it did not become evident till after vomiting, thoracic respiration and abdominal rigidity had excited suspicion of perforation. At the post mortem, two perforations of the ileum were found. The situation of the pain first complained of may be misleading. In one instance severe praecordial pain preceded abdominal suffering by several hours: the post mortem discovered perforation of the caput caecum. In another case, severe pain in the scrotum was complained of, and the abdomen was but little tender or painful. Vomiting and collapse ensued, patient died thirty-eight hours after, and the autopsy re-

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vealed perforation of the ileum. An intermittent character, or complete disappearance of the pain for a considerable period may disarm the suspicion of perforation for a time. This is well illustrated by the following case:-

D. A. male, aetat 17, was admitted to Hospital at the end of the fourth week of illness, with a temperature of 103.2° Fahrenheit, and general symptoms of a very mild description. The temperature steadily fell, and became normal on what was regarded as the thirty-sixth day. On the afternoon of the thirty-seventh day, immediately after defaecation, patient gave a loud cry, and made great complaint of abdominal pain, while the abdominal muscles were found to be rigid on palpation. There was no collapse. In about two hours pain subsided (apart from the use of sedatives), and patient fell asleep, while four hours after onset of pain he had no discomfort whatever, and permitted perfectly free palpation of the abdomen, which remained apparently natural. His aspect was placid. Temperature had in the meantime risen from normal to 104° Fahrenheit.

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In eight hours pain returned with great severity, and the pulse rate had increased considerably: the abdomen was rigid and tender, though not distended; hepatic dulness in front disappeared: respiration became thoracic, and he presented all the symptoms of peritonitis except vomiting. This set in nineteen and a half hours after pain. During a considerable part of the thirty-eighth day pain was again absent. Patient died on the thirty-ninth day, forty-two and a half hours after the first symptom. Unfortunately a post mortem examination was not permitted, but it is impossible to doubt from the clinical course that perforation, followed by general peritonitis, took place. The complete disappearance of pain, combined with absence of abdominal tenderness, and the apparent well-being of the patient in all respects (save in regard to temperature) at first weighed against the occurrence of perforation. The case presented a perfect example of the "period of repose" dwelt upon by Symonds[16], which sometimes follows perforation of an abdominal viscus.

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VOMITING IN PERFORATION

Another frequent and valuable symptom of perforation is vomiting. It may be the first sign of the complication: may begin simultaneously with pain, or a few hours or a day after it: or it may be, as in one case presenting otherwise typical signs verified post mortem, absent entirely. The vomited matter is generally of bilious character, but may contain altered blood in the form of "coffee grounds." There is frequently much accompanying retching, especially where vomiting sets in early, but when delayed till the establishment of general peritonitis, it is often easily accomplished, and retching entirely absent.

CONDITION OF ABDOMEN

Rigidity of the abdominal muscles and lack of respiratory movement, while usually present in the later stages, are very variable symptoms. In one case these appearances were among the first to excite suspicion of perforation, anticipating pain and distension by several hours. They coincided with slight vomiting. Other cases have been observed, in which the time of perforation could (in the light

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of subsequent events) be fixed with tolerable accuracy, and in which the abdominal muscles remained quite flaccid for many hours. In the case of D. A., already quoted, rigidity did not set in for eight hours. Abdominal tenderness is also sometimes long delayed in its onset, or if at first present, may pass off in the "period of repose." As positive symptoms the above are of value in arriving at a diagnosis. Gaseous distension of the abdomen is also frequently of late onset, pertaining to the stage of general peritonitis. In cases of which tympanites is not already a feature, its development can be appreciated by frequent measurement of the abdomen. Before marked inflation occurs, however, the presence of gas in the peritoneal cavity may frequently be inferred from the rapid disappearance of hepatic dulness in front, due, as Liebermeister observed, to the free gas allowing the liver to fall backwards from the ribs. The value of this sign depends upon its rapid development in association with other symptoms of perforation, as it need hardly be said that hepatic dulness

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may be obliterated by gas-distended intestine alone. The first indication of general abdominal distension is frequently to be observed as a gentle elevation of the upper part only of the abdominal wall, to be distinguished from distended transverse colon by its lack of precise and definite outline. In many cases, no doubt, this distinction will fail, but it is one which the writer has several times been enabled to draw.

These signs were well illustrated in the case of a man aetat 30, in whom symptoms of perforation set in suddenly on the twenty-third day. When seen half an hour after the sudden onset of pain, hepatic dulness in the nipple line - known to exist previously - had quite disappeared, and in eight hours the upper part of the abdomen, though moving freely with respiration, presented the appearance above described. The patient died in thirteen hours, and an autopsy revealed perforation of the ileum.

PULSE

The character of the pulse varies with the degree

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of collapse induced. In general, there is a rapid rise in rate, and loss in strength. A sudden increase in pulse rate, in the absence of characteristic signs, may be the most important symptom of perforation on which reliance can be placed.

TEMPERATURE IN PERFORATION

Sudden changes in the course of temperature are of very constant occurrence after perforation. The temperature frequently falls to normal, or even to collapse registers, again rising before death; or an exacerbation of fever may take place without antecedent fall. Such a change, coinciding with a similar one in the pulse, was mainly relied upon in establishing the diagnosis in the following case:-

Mrs. McG. aetat 28, admitted with symptoms of moderate severity. About the middle of the fourth week of illness, a certain amount of abdominal pain was complained of: she collapsed slightly - face became for a short time rather livid and damp - and she vomited a mouthful of fluid. She speedily recovered from the collapse: abdominal pain was very slight and tenderness practically absent, and

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the abdomen moved freely with respiration. Her expression was not indicative of suffering, but within one and a half hours from the first symptom, the temperature had risen from 101.6° Fahrenheit to 105.2° Fahrenheit, and the pulse from 104 (maximum so far) to 144 per minute, while it was steadily losing strength. Laparotomy was performed, and a perforation of the ileum discovered and sutured. Patient died twelve hours after operation. In this case the abdominal symptoms were slight and inconclusive, and such as are not uncommonly met with in the course of severe enteric fever apart from suspicion of perforation. It was almost entirely upon the evidence afforded by temperature and pulse that operation was decided upon. Should the temperature be normal or nearly so at the time of perforation a rapid rise may be confidently looked for, as well exemplified in the case of D. A. above. Failure of the temperature to rise may be accepted as important - almost conclusive - negative evidence in cases bearing a general resemblance to perforation. How close that resemblance may be is

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shewn in the following case.

Mrs. S., aetat 32, was admitted to Hospital in the fourth week of illness, with temperature of 102° Fahrenheit, and symptoms of a mild description. Ten days after admission, and six days after temperature had fallen to normal, she complained of sharp pain in the right iliac region, immediately after an enema of soap and water. Pain soon became extreme, and patient writhed in acute agony, presenting at the same time a considerable degree of collapse - hands and face cold and clammy. Tongue was dry, and she complained of nausea. The abdomen was extremely tender over its lower part, and muscular resistance to palpation very great. Respiration was rapid and restrained on account of pain. Temperature 98.8° Fahrenheit, pulse 82. Six hours after onset pain subsided largely, and collapse passed off. The abdomen became less rigid and more mobile, and remained free from distension, hepatic dulness remaining. Patient, however, had vomited a good deal of greenish watery fluid containing a little altered blood. Temperature 97.8° Fahrenheit, pulse 100.

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Nineteen hours after onset, she had vomited on four occasions, but pain had still further declined. Temperature 97.6° Fahrenheit, pulse 72. In twenty-seven hours the symptoms had entirely passed off, leaving nothing but some general abdominal tenderness.

In this case the symptoms at first strongly suggested perforation, especially occurring, as they did, immediately after an enema. The reassuring feature throughout was the steadiness of temperature and pulse, both of which were kept under frequent observation.

Where the above symptoms are at all well marked and abrupt in onset, the diagnosis of perforation is comparatively easy, but cases are frequently met with in which the commencement is so insidious as almost entirely to escape observation. In such instances the patient is usually so prostrate from the severity of his attack as to be unable to give intelligible expression to his sensations, and the diagnosis has to be made entirely on objective signs. Moreover, almost any symptom of perforation may be

DIGESTIVE SYSTEM Contd.

simulated in severe cases by conditions having their origin quite apart from that lesion, and the difficulty of diagnosis may be very great where, for example, the patient makes no complaint, and the abdomen is already the seat of tympanitic distension. Should occasional vomiting have been a feature of the case, the difficulty is still further increased. The importance of observing the course of pulse and temperature has already been emphasised.

In the case of a male, aetat 13, the occurrence of perforation on what was believed to be the thirteenth day was apparently signalised by a severe rigor, with rise of pulse and temperature. Patient was wildly delirious, and much exhausted, so that he made no complaint of pain. Toward the end he had occasional vomiting and moderate abdominal distension. Post mortem, perforative peritonitis was found. In another instance (a lad aetat 18) illness was characterised by severe diarrhoea and haemorrhage, and marked asthenia. The only

DIGESTIVE SYSTEM Contd.

suspicious symptom was progressive distension of the abdomen during the twenty-fifth day - a circumstance in itself by no means conclusive. There was complete absence of vomiting: no acute collapse and no complaint of pain, yet the autopsy discovered perforation of the ileum.

In the case of a female, aetat 22, suffering from a severe attack of enteric fever, the patient awoke from sleep early on the thirtieth morning of illness, vomited a mouthful of bilious fluid, and seemed for a little inclined to collapse. Within three quarters of an hour she was again asleep. Within six hours she made complaint of a little abdominal pain and tenderness, but she permitted free palpation of the abdomen. So gradual was the course of symptoms that it was not till the appearance of vomiting, distension and collapse some hours later that suspicion of perforation was definitely entertained. She died in thirty-three and a half hours, and the diagnosis was verified by post mortem examination, the floor of an ulcer in the ileum hav-

DIGESTIVE SYSTEM Contd.

ing sloughed en masse.

In attempting to establish a diagnosis of perforation in such anomalous cases, the consideration of individual symptoms will frequently be found to yield little result, and only the closest scrutiny of the general condition of the patient will aid in coming to a decision. Auscultation of the abdomen may occasionally be of use, decided peritonitic friction being heard in one instance of this series.

PRE-PERFORATIVE STAGE

In some cases the onset of perforation is preceded by peritonitic symptoms of greater or less severity, which may either pass very gradually into those of acute general peritonitis or undergo such a sudden aggravation as to make the time of rupture fairly certain. Cushing[17] has specially directed attention to this, the so-called "pre-perforative stage of ulceration" which he describes as "a localised "inflammation of the serosa leading to a slight ad- "hesive peritonitis due to the near approach of an "ulcer to the general peritoneal surface." The symptoms are a gradual, rather than sudden, onset

DIGESTIVE SYSTEM Contd.

of continuous pain associated with more or less general or local abdominal tenderness, and often with some muscular rigidity. Vomiting and alterations of temperature are usually absent. These symptoms may precede perforation for several days.

In the case of a female, aetat 12, there was constant complaint of abdominal pain, and tenderness about the umbilicus for several days prior to the fifteenth of illness. On the fifteenth day, patient screamed with an acute exacerbation of pain, and the temperature dropped from 103° Fahrenheit to 95° Fahrenheit. The abdomen became distended; retching, vomiting and collapse set in, and she died with all the appearances of perforation, though lingering into the fifth day after acute pain. No autopsy was held, but the clinical course belongs to the class described by Cushing. A similar sequence of symptoms was observed in a man, aetat 30, who first complained of abdominal pain on the 16th day. It continued on the seventeenth and eighteenth days, the abdomen becoming much distended and the tongue foul. By the twenty-fourth day these symptoms had

DIGESTIVE SYSTEM Contd.

passed off and the temperature was normal. Signs of acute perforative peritonitis set in on the twenty-fifth day, and he died on the twenty-seventh. Perforation of the ileum with intense general peritonitis was discovered post mortem.

Pathological evidence of a pre-perforative peritonitis is met with in the shape of more or less firm limiting adhesions, obviously an attempt on the part of nature to protect the general peritoneal cavity. Such a condition was discovered in the case of a female aetat 48, who had first complained of abdominal pain and tenderness on the fourteenth day of illness. Pain continued more or less till the sixteenth day, when the symptoms were aggravated by the addition of bilious vomiting and general abdominal distension, both of which quickly became extreme. Patient died on the eighteenth day. At the autopsy, a perforation of the ileum was found, opening into a space in the right iliac fossa more or less limited by peritoneal adhesions. General peritonitis was evident in addition. It is fair to

DIGESTIVE SYSTEM Contd.

assume that the adhesions were formed before actual rupture of the gut, which, with the ensuing general peritonitis, was probably marked by the onset of vomiting and distension on the sixteenth day. The conclusion appears justified, then, both on clinical and pathological grounds that in some cases a "pre-perforative stage" can with fair certainty be distinguished.

SEAT OF PERFORATION

The seat of perforation is, as might be expected, most frequently the ileum, but the present series includes two cases of perforation of the caecum, and one of the vermiform appendix. Of perforations of the ileum, two cases shewed multiple ruptures, two and three respectively.

DURATION OF LIFE

As regards duration of life after perforation it has been found, in the cases verified by post mortem examination, to vary between eight and three quarter hours and four days. The average survival has been thirty-nine and a half hours. In the case presenting double perforation of the ileum, the patient lingered for four days after the onset of symptoms,

DIGESTIVE SYSTEM Contd.

although the autopsy shewed no sign of the peritonitis having been at any time other than general.

PERITONITIS WITHOUT PERFORATION

The fatal result in enteric fever is sometimes brought about by an acute general peritonitis where no perforation is discovered post mortem, the peritonitis apparently arising by direct extension of the inflammatory process through the floor of an ulcer, or ulcers, and not by actual rupture of the gut. Four such cases are included here.

As regards symptoms, such cases agree with those of perforative peritonitis in presenting more or less constant and severe abdominal pain, tenderness, distension, and sooner or later, vomiting. The four cases in point were all characterised by severe diarrhoea, and two by haemorrhage, pointing to the presence of deep ulceration. They all presented a somewhat more insidious onset of peritonitic symptoms than is found in at least a majority of cases of perforation, and the period of survival would appear to have been longer than the average in the latter. One case presented peritonitic symp-

DIGESTIVE SYSTEM Contd.

toms over a period of nine days, and two others during five and four days respectively, while in the fourth case, the duration of symptoms was not fixed. Gradual onset and long duration of symptoms may assist in arriving at a diagnosis, but in view of what has been seen regarding the variability of symptoms in cases of actual rupture, it may be concluded that peritonitis with and without perforation can seldom be distinguished ante mortem.

NERVOUS SYSTEM

Symptoms of nervous prostration are practically constant in fatal enteric fever, and furnish some of the most characteristic components of the "typhoid state." Among the earliest is sleeplessness, a condition noted, with few exceptions, in all the cases of this series. When sleep deserts him, the patient usually becomes restless, sometimes to an extreme degree, especially in the case of children. Snatches of sleep may occur during the day, but restlessness

SLEEPLESSNESS

NERVOUS SYSTEM Contd.

returns toward night. Later in the illness, this

COMA condition may give place to stupor or complete coma, lasting till death. In the case of a lad aetat 20, who died in the fourth week of illness, a temporary rally from coma (accompanied by Cheyne-Stokes respiration) took place two days before death, to the extent that he appeared to understand and attempted to comply when asked to protrude the tongue. He relapsed into former condition just before death.

Coma vigil, a rare symptom in enteric fever, according to Murchison, was noted in one case.

DELIRIUM Delirium is almost constant, varying in degree from slight mental wandering from which the patient can be recalled by speaking to him, to noisy outcry and violent struggling, calling for the exercise of force at times, to keep him in bed. Sometimes violence is only provoked by attempts at examination, or at feeding the patient, and, especially in young subjects, the utmost difficulty may be experienced in administering nourishment. The writer has observed the mental aberration take the form of fixed and definite delusions, in a patient who

NERVOUS SYSTEM Contd.

was, nevertheless, capable of answering questions as to her condition with intelligence and accuracy.

TREMOR ETC. Muscular tremor of the hands; subsultus tendinum; carphology and floccitatio are almost constant accompaniments of the increasing prostration which foreshadows death. Irregular movements of the same nature may affect the facial muscles, twitching of these, sometimes to an extreme degree, being not uncommon. In the case of a man, aetat 26, who died on the sixteenth day, great twitching and tonic spasm of the orbicularis palpebrarum and risorius muscles occurred, resulting in prolonged grimaces; while in another instance this state of matters was replaced by a rhythmical opening and closing of the mouth which occurred during sleep, and in the semi-coma preceding death, appearing to be entirely independent of voluntary effort.

CEREBRO-SPINAL SYMPTOMS Symptoms are sometimes observed which suggest organic implication of the central nervous system. A boy, aetat 4, presented two days before death irregular respiration, occasional strabismus,

NERVOUS SYSTEM Contd.

twitching of the mouth, fixed and contracted pupils, and a cry suggesting the meningeal shriek. Post mortem the brain was found to be healthy, and only the characteristic lesions of enteric fever were found. Rigidity of limbs, especially of the arms is not uncommon, with or without jerking movements of the shoulders. A female, aetat 22, became affected toward the end of the second week, with retraction of the head, flexure of the hands, and rigidity of the arms. The eyes were rolled upward, and there was now and then a tendency to opisthotonos. The legs were rigid, with feet extended and toes flexed. These phenomena passed off at the end of the second week, but recurred at intervals till the nervous symptoms became those of the typhoid state, patient dying in the fourth week.

Well marked epileptiform seizures were noted in the case of a girl, aetat 20, who, however, had a history of antecedent epilepsy. On the last two days of life (thirty-eighth and thirty-ninth of illness) she had two and four general and severe con-

NERVOUS SYSTEM Contd.

vulsions, with violent local muscular twitchings in the intervals. Cutaneous hyperaesthesia of the trunk was observed in one instance, the lightest touch upon the skin causing the appearance of acute pain.

DEAFNESS

Of affections of the organs of special sense, deafness more or less complete is very common, but while present in a large number of fatal cases, it is by no means peculiar to these, having been noted of equal severity in less grave and even in mild attacks. Trousseau[18] indeed considered bilateral deafness a favourable sign, stating that he had "almost never seen persons die who had been deaf on both sides during the course of the disease." One patient, a female aetat 45, complained loudly of tinnitus aurium, a symptom which had to be met by special treatment.

RESPIRATORY SYSTEM

Enteric fever is very frequently accompanied by

RESPIRATORY SYSTEM Contd.

pulmonary symptoms, which, in fatal cases, may become of extreme urgency, the implication of the lungs being often the immediate cause of death. Apart from any organic changes in the lungs or upper air passages which are appreciable to physical examination, the rate of respiration increases slowly, but steadily, during the progress of the disease, a circumstance probably due to the depraved condition of the blood interfering with its oxygen-carrying function, and to the general effect of the fever upon the tissues.

LARYNX

Laryngeal symptoms have been noted in three cases of this series. In two instances these pointed to an ordinary inflammatory invasion of the larynx, the symptoms being husky cough, hoarseness of voice, and latterly aphonia more or less complete. In the third case, that of a female aetat 31, there was present in addition, from the ninth day till death on the seventeenth day, marked laryngeal tenderness. No case presented acute suffocative signs suggestive of oedema of the glottis.

In the above, no post mortem examinations were

RESPIRATORY SYSTEM Contd.

performed, so that it cannot be said whether they belonged, in any case, to the class described in detail by Trousseau[19] as presenting ulceration of the larynx and necrosis of cartilages. That such appearances are found all authorities are agreed, and Louis[20] attached such importance to them as to state that they "establish with nearly perfect certainty . . . . . that the affection was typhoid fever." The symptoms of this affection are those noted above, and are probably insufficient of themselves to distinguish necrosis of tissue from simple inflammatory swelling and thickening. Indeed, Murchison[21] has found necrosis of laryngeal cartilage post mortem where no symptoms at all had existed during life.

LUNGS

Cough is a frequent symptom, most often due to more or less bronchitis, though it may arise from laryngeal or pharyngeal inflammation. The degree of bronchitis varies from a mild catarrh of the larger bronchi to a severe affection of the smaller tubes, leading to urgent suffocative symptoms. An extreme example of the latter is afforded by the

RESPIRATORY SYSTEM Contd.

case of a female aetat 24, who, as early as the sixth day presented laboured respiration, cyanosis, and abundant fine moist râle all over the chest. These symptoms increased in severity, patient became semi-comatose and died on the tenth day, death being preceded by a general convulsion, due probably to the surcharging of the blood with CO_2.

HYPOSTASIS

The most common pulmonary lesion is passive congestion, a condition noted in a large majority of these cases. It has been observed to set in toward the end of the second or beginning of the third week, though in one case as early as the tenth day. As the heart begins to fail there becomes audible at the bases of the lungs, more or less moist râle varying from medium to subcrepitant. With the advance of congestion the patient shews evidence in his facies and respiration of pulmonary embarrassment and malaëration of the blood, and may assume, as has several times been noted, a characteristic pneumonic aspect. The course of events is well illustrated in the following case.

J. R., male, aetat 22, was admitted to Hospital

RESPIRATORY SYSTEM Contd.

on the eleventh day of an undoubted attack of enteric fever. From the first, the face was rather livid, respiration rapid, nares dilated with inspiration, and short cough was frequent, though expectoration was absent. At the bases of both lungs, respiratory murmur was feeble, and accompanied by numerous moist and sibilant rales. By the fifteenth day percussion dulness appeared over the right base, respiratory murmur became tubular, and moist rale more abundant. The condition grew gradually worse, and by the twenty-fifth day patient experienced severe and prolonged attacks of coughing. Lividity of the face and nails became extreme: respiration more rapid and embarrassed: the quantity of exudation in the lungs greater: and patient died from the pulmonary complications on the thirty-first day of illness.

In this instance the symptoms exhibited by the patient kept pace with the physical signs of hypostatic engorgement, but in other cases it has not been so, especially where signs of nervous prostration coincided. In such, a marked degree of hypostasis, even to well marked signs of consolidation

RESPIRATORY SYSTEM Contd.

may be present without giving rise to more than a little lividity and short cough. The physical signs of hypostasis may be limited to the presence of moist rale and some weakness of respiratory murmur at the bases of the lungs, but in cases of longer standing, dulness, tubular breathing and increase of vocal resonance may be developed, the phenomena then closely resembling those of ordinary lobar pneumonia. The pathological condition, indeed, closely resembles in these cases that of pneumonia, as, according to Coats[22], "fibrin and catarrhal cells are present in the lung alveoli, the lung tissue becomes more solid, approaching to the condition of hepatization." The coincidence

PNEUMONIA

of acute inflammatory changes in the lung parenchyma with enteric fever would appear to be of comparative rarity. Symptoms pointing in this direction have been noted in four cases of this series. In one of these, however, the pneumonic element was not the fatal complication, though the signs of consolidation in the upper lobe of the right lung lead at first to a diagnosis of pneu-

monia pure and simple. After resolution in the lung the patient underwent an enteric relapse which proved fatal, and the diagnosis of typhoid fever was verified post mortem.

In a female child, aetat 4½ years, acute broncho-pneumonia brought about death on the sixteenth day. A male, aetat 27, presented on admission in the fourth week of illness, cough, rusty sputum, and signs of consolidation at the right base behind, in addition to enteric symptoms. After death, four days later, the right base was found in a state of grey hepatization, enteric ulcers being present in the small intestine.

Severe hiccough has been observed to precede death in a few cases.

URINARY SYSTEM

In the cases under consideration, symptoms connected with the urinary system have not been particularly noteworthy. Retention of urine is not uncommon in the early stages of illness, due probably to

URINARY SYSTEM Contd.

spasm, or to the unaccustomed position in which the bladder has to be emptied. In a few cases this phenomenon has been of late onset, due then probably to atony of the muscular coat of the bladder.

ALBUMINURIA

Regarding the urine itself, it possesses in the febrile period, the ordinary characters of febrile excretion, and in a large proportion of the cases it has contained more or less albumen, generally a small quantity at first, increasing to a large deposit in the test tube after boiling, toward the end of life. In some instances a large amount of albumen has been present without evidence of desquamation from the renal tubules in the shape of tube casts, being discovered: but in a majority of such cases, casts, granular and epithelial, have been found in the sediment, pointing to an irritation of the kidney substance, due in large measure doubtless to passive congestion.

NEPHRITIS

In the case of a male, aetat 26, the presence of blood, abundant albumen and tube casts in the urine lead to a diagnosis of acute nephritis, though there was no oedema of the cellular tissue. These symp-

URINARY SYSTEM Contd.

toms lasted from the fourteenth day till death on the twenty-eighth day of illness, and the haematuria was not associated with bleeding from any other source. No post mortem examination was made. Rostoski[23], in a recent paper, states that he found signs of acute nephritis (blood, albumen and casts) in thirty-seven of two hundred and five cases of enteric fever, some of these (so called "renal typhoid") presenting at first only the signs of acute nephritis and subsequently declaring themselves as enteric. In many of these cases he cultivated typhoid bacilli from the urine - a sufficient explanation of the local inflammatory process. The writer has been impressed with the frequency of nephritic urine (apart, however, from the presence of blood) in fatal cases, and with its persistence into convalescence in the more severe forms which recover; so much so, that it has been found of use in making a retrospective diagnosis in cases admitted to Hospital after the pyrexial period had passed. Several such underwent typical enteric relapses. It seems fair to conclude that the severe forms of enteric fever make more than a transient impression on the renal

URINARY SYSTEM Contd.

tissue, and hence that nephritis is to be looked for in many fatal cases.

CUTANEOUS SYSTEM

RASH

Prior to the appearance of rose spots, two cases presented a well marked roseola, such as described by Jenner[24], In both instances, it appeared on the chest and limbs on the tenth day, rose spots following in abundance. The enteric eruption proper has been present in a large majority of the cases, but is noted as absent throughout in fifteen. In eleven cases it was found profuse, in the others moderate or scanty in amount. The abundance of the rash is generally held to bear no direct relation to the severity of the attack. On the contrary, Stewart[25] in 1836 was led to believe that the more plentiful the eruption the less serious the case. In the few instances in which the writer has observed a profuse - once almost morbilliform - eruption, the course of illness has been mild, while the rash in fatal cases has

CUTANEOUS SYSTEM Contd.

been always scanty.

SWEATING

Profuse perspiration is a symptom of comparative frequency. Austin Flint[26] met with it in one half of his fatal cases. The sweating may be general, but is frequently localised to the head and neck, and has been observed to saturate the patient's pillow for days before death. It often undergoes an exacerbation in the early morning hours, but has not been observed to bear any relation to the temperature curve, nor to occur in association with rigors or chills as in the "sudoral typhoid" described by Jaccoud.[27]

COURSE OF TEMPERATURE

There remains to be discussed the course of temperature in fatal cases of enteric fever, where, as a rule, a pronounced departure from type is observed.

As regards the onset of fever, opportunities for observing the invasion absolutely from the beginning are few, and little can be said as to the frequency of a rapidly attained maximum temperature

COURSE OF TEMPERATURE Contd.

in cases which end fatally. According to Wunderlich[28], however, such rapidity of onset is very exceptional, but where the rise of temperature is completed by the end of the second day, a severe course of illness must be expected. In the case of a female, aetat 21, the patient was in Hospital suffering from a disease other than enteric fever, but exposed to infection by residence in an enteric ward. At the time of onset, she was the subject of regular night and morning observations of temperature. On the day on which she first complained of headache and malaise, her evening temperature was 99° Fahrenheit, and a degree higher the following morning. On the second evening of illness, the temperature was 103.6° Fahrenheit, practically the maximum record for the whole illness. The case ran a severe course, temperature being sustained, with but slight variation, on the 103° line, and ended fatally on the seventeenth day.

The characteristic feature of the temperature in severe cases is irregularity, usually taking the form of absence of the morning remission, or reduc-

COURSE OF TEMPERATURE Contd.

tion of this to a very slight fall, commonly under 1°. The temperature thus becomes sustained, with a minimum seldom below 102°, more often running along the 103°, or even 104° line. Such slight remissions as do occur are not always noted in the morning, an inverted type of pyrexia being sometimes observed in which the morning record is constantly a little higher than the evening. The irregularity may take the form of repeated sudden drops of temperature to normal or nearly normal registers, independent of any obvious incident or complication tending to produce collapse. Thus, in the case of a male, aetat 12, who died upon the twenty-eighth day, after a course of temperature running between 103° and 104° Fahrenheit, a sudden drop to 99° occurred on the twenty-second evening, followed by a morning rise to 104.4°. Again, on the twenty-fifth and twenty-sixth days the temperature touched 96.4°, regaining its former level before death. The case was characterised by nervous prostration alternating with excitement: bowels were constipated throughout, and no external hae-

COURSE OF TEMPERATURE Contd.

morrhage occurred. After death, no blood was found in the intestine, though ulceration and sloughing were extreme.

Fall of temperature in association with haemorrhage from the bowel has found many illustrations in these cases, but the defervescence has been in many cases gradual, in conjunction with repeated bleedings, rather than in the form of sudden collapse after a single haemorrhage. In the case of a female, aetat 45, the temperature shewed a steady fall from 104° on the fifteenth day to 101° on the twenty-first - the day of death. Severe haemorrhage became apparent on the eighteenth day, but it is probable that internal bleeding took place before blood appeared in the stools. The same gradual and steady decline of fever has been noted along with advancing asthenia, as in the case of a girl of 10 years, where the temperature fell from 104° on the ninth day to 99° on the fifteenth day, remaining below the latter level till death on the sixteenth day. The case was characterised by extreme toxaemia, all the phenomena of the typhoid state being well marked.

COURSE OF TEMPERATURE Contd.

Severe diarrhoea apart from haemorrhage has been observed to depress the temperature.

In a few instances, a steady rise of temperature to hyperpyretic registers has been seen, not the slightest remission taking place from the time the case came under observation, till death. Even in cases pursuing a more remittent course a hyperpyretic temperature immediately before death is very frequent - commonly 106° to 108° Fahrenheit. In two cases of this series, 109.2° and 109.4° were recorded. While this is the more common occurrence, the reverse may take place, the temperature just before death dropping to normal or thereby, after a course sustained between 103° and 104°. The fatal issue may, however, be postponed till some time after the fall of temperature, the patient, instead of rallying, becoming more exhausted. A lad of 17 years was admitted to Hospital at the end of the second week, the further progress of his illness being marked by appearances of profound alteration in the blood, for example, haemorrhage from the bowel, petechiae in the skin, and haematuria.

COURSE OF TEMPERATURE Contd.

Nervous disturbance took the common form of sleeplessness and delirium, and muscular prostration was marked. From the fifteenth to the twenty-third days, the temperature was between 102° and 103.4°, declining thereafter, becoming normal on the twenty-ninth morning, and remaining below 99.4° for a period of fourteen days. Patient became more exhausted and emaciated, and died on the fortieth day. Murchison[29] states that he has seen cases prove fatal by marasmus months after the cessation of fever, where the only post mortem appearances were atrophy of the intestinal mucous membrane and the mesenteric glands, conditions, no doubt, greatly impeding the process of absorption. The unfavourable import of the above types of temperature receives striking illustration when one of them is imposed upon a previously regular pyrexia, associated with a mild course of symptoms. Such an alteration in the temperature chart has been frequently observed to coincide with, or even to anticipate the advent (or aggravation) of diarrhoea, tympanites or haemorrhage, or to mark the commence-

COURSE OF TEMPERATURE Contd.

ment of a rapidly increasing and ultimately fatal cardiac and nervous asthenia.

EFFECT OF PREGNANCY

The coincidence of pregnancy with enteric fever is regarded by many as a serious complication, by other authorities as less so than is generally supposed. Abortion is frequent, but may of itself have no unfavourable effect on the patient. The writer has observed miscarriage take place in a patient already gravely ill, without apparently affecting her strength, death occurring several days later from intestinal haemorrhage. In one instance, however, the onset of labour appeared to determine the fatal issue by exhaustion. The patient was six months pregnant on admission. Her illness was severe and protracted, so that, by the thirty-sixth day, when labour set in, she was considerably exhausted. The birth of the child was speedily followed by collapse of the mother, who died 6½ hours later.

EFFECT OF PREGNANCY Contd.

As to the effect of miscarriage on the patient, much will depend on the duration of pregnancy and the stage of her illness. The earlier in both that miscarriage occurs, the less serious a complication is it likely to prove.

RELAPSES

Of the cases in this series, eight died during the course of a relapse, while one had passed through an illness in Belvidere Hospital eight years before, which was alleged to be enteric fever.

CONCLUSION

From this review of the symptomatology of fatal enteric fever, the fact emerges that a considerably larger proportion of deaths occur from exhaustion, asthenia, or cardiac failure, with or without a notable degree of hypostatic engorgement of the lungs, than from the special sequels of enteric ulceration, viz. haemorrhage, perforation and peritonitis. The symptoms, therefore, which should excite apprehension are specially those of cardiac debility and nervous prostration. Severe diarrhoea and haemorrhage are also of grave import, while symptoms at all conclusive of perforative peritonitis afford ground for a hopeless prognosis, in spite of the fact that laparotomy is now freely undertaken for the suture of the ruptured gut. The condition of the patient is seldom one favourable for a major operation, but some successful cases are reported - a recent one in the records of Belvidere Hospital - and it is to be hoped that in future surgical interference will do still more to diminish the mortality from this complication.

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