A Clinical Lecture

ON

THE KINKS WHICH DEVELOP IN OUR DRAINAGE SYSTEM IN CHRONIC INTESTINAL STASIS.

DELIVERED AT GUY'S HOSPITAL, MARCH 22ND,

BY

W. ARBUTHNOT LANE, M.S., F.R.C.S.,

SURGEON TO GUY'S HOSPITAL, AND SENIOR SURGEON TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET, W.C.

GENTLEMEN,—I would call attention to our drainage apparatus in the present condition of civilization, and would point out to you how difficult it is in the circumstances to render it efficient for the purpose in hand—namely, to transmit its contents at such a rate that they shall not have time to undergo such a degree of decomposition as will produce harm to the individual by the absorption of the products.

Let us regard the gastro-intestinal tract as it exists when the erect position of the trunk is assumed, which is the case from the time one gets up till one goes to bed. In other words, except for an average of about seven hours in the twenty-four, there exists a constant tendency to the falling of the viscera in the abdomen.

Consider the stomach, which is held immovably in position by the oesophagus, which forms its chief ligament. The drag of the contents of the stomach, augmented by that of the loaded transverse colon, transmitted to the stomach through the great omentum, tends to displace the stomach downwards. This displacement is opposed by the oesophagus and by the lesser omentum, which is a comparatively feeble structure, and ill fitted to oppose this displacement.

A new ligament representing the crystallization of lines of resistance forms between the pylorus and the under surface of the liver in front of the transverse fissure extending along the cystic duct and gall bladder. This ligament, though not very thick, offers a very definite resistance to the downward displacement of the pylorus, and when the stomach is distended it tends to kink and occlude the pylorus.

The chief tearing strain upon the stomach when it is distended, and especially when its weight is increased by that of the loaded transverse colon, is experienced along the lesser curvature. If a stomach be made in rubber and be fixed in position by ties representing the oesophagus and the newly developed ligament, which for all practical purpose is a local hypertrophy of the lesser omentum, and if the stomach be filled with fluid, it will tear along its lesser curvature, and especially so in the vicinity of the pyloric ligament, which gets a very limited grip of the stomach. If the pyloric end be dropped, as occurs when the liver becomes displaced downwards, the point at which the tear is likely to take place approaches the oesophageal attachment, and separates from the pyloric attachment in a degree proportionate to the downward displacement of the liver.

The result of defective drainage of the stomach is an alteration in the chemical character of its contents. This alteration has attracted the attention of the physician, who regards it as the primary factor in the development of an ulcer of the stomach rather than the effect of intestinal stasis as affecting the stomach.

Now look at the duodenum, through which the contents of the stomach are carried after they have escaped from that organ. Note that the first part alone is mobile and covered by peritoneum, while the remainder is fixed securely in position.

Continuing the direction of the end of the duodenum is the commencement of that portion of the drain-pipe to which the term "jejunum" has been given. You notice that the end of the duodenum is fixed in a peritoneal grip, which is so arranged as to present a sharp margin. This after a time becomes thickened by new bands that develop in the under surface of the great omentum in consequence of the strain thrown upon it by a loaded transverse colon. You see at once that if the individual is exhausted for any

reason whatever the jejunum passes directly downwards from this band and kinks the drainage tube abruptly at this point. This is, perhaps, the most unsatisfactory point in the drainage scheme.

The block, which results from what we might call the duodeno-jejunal kink, produces in the duodenum a distension which is naturally experienced most in that portion of the duodenum which alone is capable of distension—namely, the first portion which is free and covered by peritoneum. The distension may not be sufficient to produce any change in this portion of the bowel appreciable to the eye or finger, or it may produce engorgement, abrasion, or ulceration of the mucous membrane of this segment of the drainage scheme.

In any case, when the obstruction exists it produces pain and tenderness in the duodenum, coming on when the food has passed from the stomach into it. This condition is relieved by assuming the supine posture, when the loop of jejunum drops back into the left loin and the kink is relieved. This obstruction may occasionally be overcome by taking food into the stomach, which would appear to set up such a forcible reflex contraction of the duodenum as is able to overcome the obstruction, and so relieve the tension in the duodenal segment. Practically all severe pain in any portion of the drainage apparatus is set up by obstruction in one form or another. Physicians seem to have grasped this vaguely, since they apply the term "colic" to many of these pains, indicating the recognition in their minds of mechanics common to them all.

Can I afford you more evidence of this kinking of the drain-pipe at the junction of the absolutely immobile termination of the duodenum with the completely mobile commencement of the jejunum?

You know that physicians treat duodenal ulcer as they do gastric ulcers—by rest in the supine position, differing among themselves as to the varying advantages resulting from mouth and rectal feeding. Apparently the mode of feeding makes very little difference to the treatment of the ulcer, while the rectal variety has the disadvantage of being very unpleasant, and at the same time unsatisfactory to the cravings of the patient.

The duodenal ulcer gets well very rapidly indeed in this position, since the cause of its production, namely, the kinking of the pipe, ceases to exist while the patient is in this posture. The gastric ulcer, on the other hand, gets well very slowly, since the strain upon it is only partially relieved.

The surgeon cures duodenal ulcer by performing what is called gastro-enterostomy. In other words, he secures the commencement of the jejunum to the stomach in such a manner that it can no longer fall vertically downwards and kink at its junction with the duodenum. In a certain proportion of cases where the stomach is very dilated he fails to secure the jejunum satisfactorily, and it may still kink. This is due to the fact that the part of this operation which has impressed itself on his mind as being the most important is the formation of a hole between the stomach and jejunum which is very effectual should the duodenal ulcer contract in healing sufficiently to occlude the lumen of the duodenum, but in the usual case of engorgement, abrasion, or ulceration of the duodenum, it affords the patient no advantage, while it occasionally exposes him to what is called a vicious circle if the operation is done by a surgeon who is not too competent at the job.

Still whether the jejunum is attached to the posterior wall of the stomach in a very variable direction, as is usual nowadays, or whether it is connected with the anterior wall, as it is in so-called anterior gastro-enterostomy, does not matter so long as the mobile segment of jejunum is so fixed that it cannot kink upon the fixed duodenum.

The next weak spot in the drainage system occurs at the end of the small intestine—the ileum. The caecum, which is the blind extremity of the cesspool, tends to become displaced into the true pelvis, which it occupies to the inconvenience of other important structures. This tendency to fall is met as before by the crystallization of lines of strain. These form bands external to the caecum and ascending colon, and fix these structures to the abdominal wall. The lowest secures the appendix, and frequently kinks it, with the result that the portion beyond the kink distends and produces symptoms of

varying severity which are comprised under the term "appendicitis."

The strain internal to the caecum comes upon the termination of the ileum and the posterior layer of its mesentery. In the latter region a layer of peritoneum is formed which kinks the ileum in two planes, one being vertical and angular, and the other being due to torsion, the new ligament gradually extending over the peritoneal aspect of the affected loop of intestine. These conditions have been illustrated in a previous paper published in the *Lancet*, and entitled "The Kink of the Ileum in Intestinal Stasis." By this means the end of the ileum and the additional thickening and contraction of the posterior layer of the mesentery form an internal ligament which tends to keep the caecum out of the pelvis, while the acquired external ligament of the caecum is represented by the planes of peritoneum which extend inwards from the abdominal wall on to this portion of the cecum, and by the proximal part of the appendix should this structure become involved in these acquired adhesions, as it so often does.

Nothing appears so absurd as the attempts of surgeons to make out that the inflammation of the appendix is a primary condition, and that it is productive of several of the other effects of intestinal stasis. The fallacy of regarding one effect as the cause of another is so general in medicine that it is really hardly worth while calling attention to it in this particular sequence, except that in this condition one is appalled at the correspondence on the subject, which lingers and then breaks out at intervals in the medical press.

The next kinks to which I would call your attention are those that develop abruptly at the hepatic and splenic flexures of the colon. To meet the drag upon the transverse colon with the pull exerted by the loaded caecum and ascending colon lines of strain are crystallized as peritoneal bands, which drag these flexures upwards and convert the passage from a round turn into a sharp kink. This is exaggerated still further by the formation of bands which connect the adjacent surfaces of the transverse, ascending, and descending colon, and which serve to transmit some of the weight of the loaded transverse colon through the ascending and descending colon to the abdominal wall, so taking some strain off the convexity of the stomach. They also are crystallizations of lines of strain in peritoneum. These, like all the other bands I have described, are obviously evolutionary, and are not inflammatory in origin, and exist in the first instance for the advantage of the individual. Yet, like all variations from the normal which develop in the bodies of labourers to enable them to perform their functions more economically, they tend to shorten the life of the individual. This is illustrated more clearly in the evolutionary bands in the abdomen than in any other part of the body, the result being more disastrous to life here than elsewhere.

Both the splenic and hepatic flexures, ceasing to perform the functions of round turns and becoming angular in character, are exposed to much more irritation, and at these points the results of such irritation are liable to develop and to terminate as malignant disease.

The kink of the hepatic flexure occasionally becomes partly or completely occluded, and the conditions develop to which the terms acute and chronic volvulus of the caecum are applied.

A kink may develop at the level of the iliac crest on the right side, where a firm, strong band of adhesions may attach and control the lumen of the ascending colon sufficiently to cause some obstruction at this point.

Again, the acquired ligament that develops between the pylorus and the under surface of the liver and gall bladder frequently extends over the pylorus to the transverse colon, helping to secure it indirectly to the under surface of the liver. In a number of cases it gets a sufficiently firm grip of this portion of the transverse colon as to obstruct its lumen very definitely and to produce sufficient irritation in this situation as to make it a favourite locality for the development of cancerous or other infection.

The descending colon rarely becomes much damaged by the fixation it undergoes in transmitting a portion of the weight of the transverse colon through acquired adhesions to the abdominal wall external to it.

The bowel beyond it is, however, a source of great trouble in the erect posture, and the modifications it

undergoes because of the efforts of Nature to effect a useful compromise are very various, and are associated frequently with more or less disastrous consequences.

The original function of the sigmoid loop is to exert strain on the bowel beyond it under the influence of the impacting left thigh, which forces its loop upwards and inwards in defaecation, and so facilitates the passage of hard faeces along a tube which by this means is rendered as straight as possible. It is quite obvious that while the extension of the rectum permits of the more ready passage through it of solid matter under the influence of an increased intra-abdominal pressure, an abnormal elongation of the rectum and a puddling of its loose loops in the floor of the true pelvis afford the most complete obstacle imaginable, short of the presence of a stricture, to the passage of solid matter through it under the influence of the same intra-abdominal pressure.

How to deal with the so-called sigmoid loop in the erect position affords a very difficult problem for the ingenuity of the organism. The presence of this loop loaded up with solid faeces in the true pelvis struggling with the caecum and transverse colon to occupy a portion of this space, to the great discomfort and disadvantage to the functioning of the viscera which reside there normally, has to be met in some way. As elsewhere, this is effected by the crystallization of lines of strain which are laid down as peritoneal bands or adhesions, which extend from the peritoneum external to the meso-sigmoid to the outer surface of the meso-sigmoid, shortening it up till, in a typical case, the mobile loop of bowel is replaced by a short straight tube, which crosses the iliac fossa obliquely, and has only a partial peritoneal covering. This is the best manner in which the disability of the loop can be met. Still it presents certain distinct disadvantages. The tube is narrower than normal, and, being fixed, it affords a greater obstacle to the passage of solid material through it. The resistance offered to the passage of material is evidenced by the formation of diverticula, and foci of infection by inflammatory and cancerous organisms in this anchored bowel. In a considerable proportion of cases the formation of the peritoneal bands fails to secure the mesentery of the sigmoid loop uniformly. They may only secure the ends of the loop which are approximated by their contraction when both limbs are partly obstructed, the distal much more than the proximal. This results in a gradual increase in the size of the loop owing to the progressive exaggeration of the distal kink, and any aggravation of the kink results in complete obstruction to the passage of faeces through it when the condition is described as one of volvulus.

Or the fixation of the loop may be in such a manner that it forms two loops, the distal ends of which are chronically partly, and occasionally completely, kinked. A somewhat frequent condition is that the upper portion of the sigmoid loop is pinned down to the fossa, while the remainder becomes free and joins the rectum, to form a very long loose pipe, which occupies the true pelvis. Since this mechanism affords a very marked obstacle to the passage of solid faeces through it, it acts in the same manner as a kink or other obstruction, with the result that there is a tendency to the progressive increase in the length of this part of the bowel, and to the accumulation of a large quantity of solid material in it, without the individual being aware of the fact in any way. There is also no reason either why there should not be a daily evacuation of a portion of the contents, which stagnate in the gradually elongating terminal segment of the gastrointestinal drain-pipe.

It is a peculiar thing that this type of alteration is the one that exists apparently without exception in tuberculous patients. On the supposition that a patient cannot become tuberculous unless the resisting power to the entry of organisms into the tissues has been reduced by intestinal auto-intoxication, I have disconnected the large bowel in cases so advanced as not to yield to rest and tuberculin, with the greatest advantage to the patient, whose local and general conditions have improved in a marvellous manner. In some of these children the portion of mobile gut intervening between the upper fixed portion of the sigmoid loop and the portion of rectum which has no peritoneal covering was excessively long, in one case measuring at least 3 ft. This fact renders it possible for the surgeon to effect the entry of the divided ileum low

down into the mobile loop, quite close to its termination. The operation produces no shock whatever, and is followed by an obvious and increasing improvement in the child's general condition within two or three days after the operation.

CHRONIC INTESTINAL STASIS TREATED BY SHORT-CIRCUITING OR COLECTOMY.

A BRIEF STUDY OF THE LIFE-HISTORIES OF FIFTY CASES.

BY HAROLD CHAPPLE, F.R.C.S.

RECOGNIZING the importance of the ill effects on the individual produced by defective drainage of the bowel, and realizing the necessity of a radical treatment in many of these cases, in 1901 Mr. Arbuthnot Lane performed the first of a series of operations for a condition which he has fully described under the title of "Chronic Intestinal Stasis." Since then this work has progressed and developed and thrown a new light on the consideration of problems of such vast importance that it seemed to me that it would serve a very useful purpose if the accessible cases so treated were subjected to a careful analysis, and fancies replaced by facts. If it be true that a real condition has been observed and subjected to a satisfactory treatment, then progress has indeed been made; but if, on the other hand, the results of these operations have proved to be a series of monotonous failures—as, apparently, some would have us believe—then by all means let us follow their advice, and relegate such operations into oblivion.

I shall only describe such things as I have myself seen. I have endeavoured to take nothing for granted, but as I have been fortunate enough to see a large number of these cases beforehand and have assisted at many of the operations, I feel that I am in a position to put forward evidence derived from personal observation, and I have gone into the cases as fully as possible from all points of view.

The statement that colectomy has been recommended for constipation rivals in its completeness one made to the effect that amputation of a carcinomatous breast was advised for the removal of the lump. The constipation in itself cannot be a pathological entity, but is merely the outward and visible sign, patent even to the lay mind, of a defective intestinal drainage, which, it is submitted, is productive of very grave harm. None of the patients whose histories are recorded below would have permitted themselves to be subjected to operative treatment for the mere fact that his or her bowels were not opened regularly, nor would such a treatment have been suggested. It was the observation that this intestinal stagnation was accompanied by and resulted in such a grave condition that led to the adoption of radical surgical measures. In no case was any operative treatment suggested before all simpler remedies had been given a prolonged trial and failed. It will be well to keep this fact in mind when judging of the results.

I have divided the cases into two groups, the former of which, Group A, includes those whom I have been able to observe and question personally, and it is on their evidence that I have based most of what follows. The information contained in Group B was obtained by correspondence with the patient and the medical attendant, and reference to the Surgical Reports of Guy's Hospital. My list does not pretend to include all the cases that have been subjected to operative treatment. It includes fifty of those that were reasonably accessible to me, and the object of this paper is to submit the facts observed and to try and suggest what can be learnt from a detailed study of the life-histories of these patients.

A careful analysis of these histories shows a remarkably constant set of symptoms, and examination of the patients reveals a very constant set of signs, and it is submitted first that these are due to a condition of chronic delay in the passage of the intestinal contents, which delay is mainly in the colon; secondly, that this delay is due to the mechanical obstruction caused by evolutionary adhesions, and results in an absorption of an amount of toxic material greater than can be efficiently dealt with by the individual. Based on this hypothesis, and having

found that the mere breaking down of such adhesions was futile owing to their rapid re-formation, the lower end of the ileum was divided and an end-to-side anastomosis made between this divided end and the upper part of the rectum. Should pain have been a sufficiently prominent feature the colon is removed to the site of anastomosis, at the same operation if the condition of the patient is sufficiently satisfactory, or if not, at a subsequent operation if necessary.

SYMPTOMS.

First of all let us observe what features these patients presented, and note their conditions both before and after their operations. A comparison drawn between these will place us in a position to be able to judge of the results obtained, and to see how far we are justified in assuming that the hypothesis on which this work is based is a correct one.

It will be seen that in the majority of the cases the constipation was not regarded as of any importance by the patient, but the abdominal pain was the symptom which brought them to seek advice, and it was for this pain that the operation was first performed. The degree of this pain varied considerably in the different patients, but in almost every case was sufficient to make the sufferer lead the life of a chronic invalid, and in a large number of the cases had brought about a condition of total inability to perform the duties of life. The site of the pain varied, too, and its position was usually indicated by a hand placed on either side of the abdomen, and in those patients whom I subsequently saw operated on this was a very fair guide to the main site of obstruction.

Associated with this abdominal pain was a set of signs and symptoms which are grouped under the title of those due to "autointoxication." These symptoms were found so constantly associated with a condition of intestinal stasis, and were so constantly and definitely removed by exclusion of the large bowel or its actual removal and the consequent relief of the stasis, that there can be little doubt as to their causation. The symptoms complained of by these patients were:

1. *Headaches*, which were severe and frequent.
2. *Attacks of nausea*, often followed by retching or actual vomiting. In some cases the vomiting was very frequent indeed and of a severe nature. It was very interesting to note that in several of the cases blood was frequently present in the vomit, and had led very able men to the diagnosis of gastric ulcer, although none such was found at the operation.
3. *Loss of appetite* was almost constantly present.
4. *Loss of weight* was present in all cases.
5. *Markedly cold hands and feet*, which gave an indication of a defective circulation.
6. *Mental apathy*. This was very definite in most cases. It was most marked in Case xxx, who was in a state that was well described by her medical attendant as one of torpor. Many felt that death would be a welcome relief from their physical and mental misery, and two had actually attempted to bring about that end.
7. *Constipation*, which in all was persistent and its previous treatment had failed. One case had gone on several occasions for twenty-eight days without an action of her bowels in spite of treatment.
8. *A constant foul taste in the mouth*, which was often accompanied by foul breath and carious teeth. The tongue was constantly furred.
9. *Attacks of abdominal distension*, which were accompanied by discomfort and relieved by eructation or the passage of flatus or an action of the bowels.
10. *General muscular pain* and a loss of freedom in the movements of the joints.

A physical examination showed:

Skin-staining, as a rule of a general sallow or brownish nature, associated with more definite localized patches under the eyes, in the axillae, groins, etc., or in any region where pressure was made by the clothes. This was often definitely appreciated by the patient and had become more noticeable recently. The degree of staining varied directly with the distance of the site of obstruction from the stomach.

The breasts showed changes, which in the early stages are similar to those usually described as chronic mastitis and later as cystic degeneration. The degree of these breast changes seems to bear a direct relation to the