had generalized from one case. It was a commonplace in psychiatry to say that each case was an individual problem, but instead of accepting this Dr. Hunter said, "Here is one case, see the brilliant result accomplished; there must be hundreds like it." Take the case which Dr. Hunter had quoted with so much enthusiasm and commendation. Not only was it imperfectly described, but it was diagnosed as "a septic psychosis." In the speaker's opinion the case would be more accurately described as one of agitated depression occurring at the involutional period, and if it had been properly recognized at first the patient would never have been sent to the chronic ward. The course of the illness was quite in accord with psychiatric experience, and the increased attention, the change to better surroundings, and the building up of resistance had as much to do with recovery as the removal of her teeth. To say that the failure to remove the teeth in the first instance caused the patient's detention in hospital for two years was an unwarrantable assumption. Similarly in Dr. Hunter's second case, with its acute onset, tempestuous course, and recovery with good insight, a good prognosis would have been given, and the operative procedures were merely concomitant. Dr. Hunter had attempted to coin a new psychiatric term; for many years psychoses with toxins and infections had been recognized, and such a term as "septic psychosis" was not required. To divide all psychoses into the septic and the others was not permissible on the actual facts. It was very dangerous to state that because something existed in a given mental case that something was the specific agent. If in some half a dozen cases there was a *B. coli* or streptococcal infection which had not given rise to clinical symptoms pointing to a toxic involvement, such a factor was merely incidental, and might or might not have any influence on the course of the psychosis. Dr. Hunter had given no clinical picture of the disease which he had named "septic psychosis." It was important to investigate all the facts carefully in every case, and not to jump to conclusions. Many a healthy abdomen had been mutilated, and many a serviceable tooth removed as the result of ill-grounded theories of the etiology of mental illness.

Dr. W. F. MENZIES (Cheddleton) agreed with Dr. Henderson, and said that the evidences of chronic sepsis were no more frequent in the insane than in the sane. Sepsis was as a rule a secondary cause of mental disorder. The hypothesis that sepsis was an important cause of mental illness was not new; forty years ago colonic lavage and Bouchard's mixture of naphthaline, charcoal, and glycerin were popular in the asylums. As long ago as 1902 he had asked a surgeon to perform a short-circuiting operation in a patient with dementia praecox. The recovery rate had not been materially raised by antiseptic measures. Autogenous vaccines were disappointing. The results of serological, metabolic, and endocrinological tests had all given results that were not at all specific. Dr. Menzies thought that the difficulty in the study of mental disorder was that the observations were made upon complex states such as paranoia and dementia praecox instead of being made upon the basal emotional feeling tones. He referred to the association of Parkinsonian rigidity with euphoria in various basal lesions; in the later stages of epidemic encephalitic Parkinsonism euphoria was almost universal. Pathological euphoria was an expression of the irritation produced in the neurones by a free flow of toxin-laden blood. In toxic mental conditions there was increased stimulation of the splanchnic reflex arcs by some toxin, probably of bacterial origin, together with irritation of the basal and cortical neurones from toxins in the blood. In the absence of rupture between the basal and cortical groups, dysphoria occurred. If there were partial dissociation, euphoria was produced. It was a pity that surgeons and physicians rarely described the mental attitude and feeling tone of their cases.

Mr. E. WATSON-WILLIAMS (Bristol) supported the view that chronic toxæmia could produce a definite psychosis, just as it constantly caused a neurosis. He instanced cases under his own observation which had been relieved by operation.

Dr. W. A. POTTS (Birmingham) discerned a very distinct clinical picture in Dr. Hunter's description; the term "septic psychosis" was the most satisfactory one he knew. Although chronic sepsis was as common in the sane as in the insane, the reason why it was to be considered as a cause of mental disorder was that in the insane there were many other contributing factors, while the septic infection had begun earlier and had, therefore, lasted longer and produced greater effects. Infection should always be eradicated before its serious sequels had developed. It was likewise necessary to deal with the psychological factors early, before the sepsis of later date had produced such mental disability that psychological treatment was out of the question.

Dr. HUNTER, in reply, insisted that the important point was the focalization of the infection. The advantage of the term "septic psychosis" was that it called attention to the cause. Kopeloff's patients were not satisfactory clinical material; the morbid process in them had lasted a long time, and the sole step taken was the elimination of a few teeth. The only patient who did well had had thirty teeth removed.

ACUTE INTESTINAL OBSTRUCTION IN INFANCY AND CHILDHOOD.

CONGENITAL ABNORMALITIES: ACQUIRED CAUSES: TREATMENT.*

BY

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ACUTE intestinal obstruction in children presents much the same symptomatology as in adults. It is a fatal malady, but with relief in prospect the prognosis in children may be somewhat less serious than in those of maturer years. As an offset to this relative benignity must be placed the fact that in many of the obstructions due to congenital malformations relief is not possible.

Children stand intestinal obstruction comparatively well, for the reason that the child's intestine is less prone to ileus than the adult's. For example, children suffer less from post-operative colic than grown-ups, and they also seldom show any deterioration from minor degrees of chronic obstruction. In the main, however, the disease is alike at all ages, and it does not really add any special complication to consider the matter as it presents itself in the young. There is one class of obstruction which is entitled to separate consideration—I refer to obstruction due to congenital deformities.

1. Duodenal Stenosis.

From time to time instances of this type are reported in the journals. Probably a complete stenosis is commoner than one which is incomplete. A feature of these conditions, as indeed of all developmental obstructions, is the tendency for the bowel distal to the obstruction to be in a state of what might be described as embryonic spasticity. Thus a functional atresia is superimposed upon the anatomical. It is to the former condition that we must ascribe the wellnigh hopeless prognosis. The obstruction in the duodenum is usually proximal to the entrance of the bile duct; it may, however, be in the region of the ampulla, while there may be anomalies of the pancreatic duct. Three varieties may be recognized: (a) those which present a gap in the continuity of the bowel and where the duodenum above is much distended, (b) those which show merely a partition in the bowel, and (c) cases where the lumen is narrowed to a serious extent; this type may be due to an inherent lesion of the duodenum itself, or be the result of fibrous bands crossing the bowel, or be due to rotatory errors during development.

Fortunately the condition is one of considerable rarity,

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for it is seldom diagnosed early enough for successful treatment. Indeed, it is rarely possible that any treatment could be curative, on account of the non-distensibility of the jejunum being almost if not always an accompaniment.

The symptoms upon which most reliance must be placed are early and persisting vomiting, with, in many cases, icterus. The combination of icterus with vomiting is suggestive, but, on the other hand, there is no special characteristic about the jaundice to distinguish it from the common fleeting icterus neonatorum. As a rule these infants are brought under expert observation only after the fourth day, when intervention, even if theoretically possible, is useless. The examination of the meconium may reveal that it does not contain any down from the foetal skin, but a negative finding is inconclusive.

The operative repair of such a condition is one which will tax both the child and the surgeon. Gastro-enterostomy and duodeno-jejunosomy are operations having a high mortality in infants, even before they show signs of breaking up, but in a moribund infant there is little hope of success. The operation is practically doomed to failure if it consumes more than twenty minutes. I cannot claim a single success, even though, in one instance, a gastro-enterostomy was carried out in eleven minutes; the deeply jaundiced infant was 5 days old and showed a complete stenosis of the duodenum, which was dilated, while the jejunum was hopelessly shrunken.

2. Jejunal and Ileal Atresias.

These conditions may be due to gaps existing in the bowel, to obstructions from congenital tumours which more or less replace the gut, and to impermeability of the bowel in short or long sections. The proximal bowel is usually much distended and shows a great contrast to the under-development of the lumen distal to the defect. Certain of these cases are associated with errors in rotation, and the obstructions may be multiple. There is no special situation where these deformities are more likely to occur, but as a rule they should be looked for high up in the jejunum or low down in the ileum in the neighbourhood of Meckel's diverticulum. Theoretically these anomalies should be easily remedied, but the under-development of the lumen of the bowel distal to the obstruction forms an insuperable barrier to restoration. An enterotomy of the distended bowel is essential, as otherwise the developing ileus is bound to be progressive. The proximal bowel, already enfeebled by overinflation, cannot blow out the semi-solid distal intestine.

3. Colic Obstructions.

It is said that gaps are found less commonly in the colon than in the small intestine. If we omit the pelvic colon this statement is probably correct. It is, however, comparatively common to find the colon end abruptly at the place where it should join up with the rectum, but probably the commonest type is the non-development of the lumen. The entire colon is apt to be involved. The rectum may be normal, but in its upper part it will be found to become conical. These cases are occasionally diagnosed as imperforate conditions of the rectum. Their treatment is quite beyond the range of surgery. In cases where union between pelvic colon and rectum has failed to become established an attempt is often made to tunnel through the intervening tissue, but if an entrance is gained to the lower end of the blind pelvic colon an inveterate stricture subsequently develops. A primary inguinal colotomy is the only possible solution of the trouble.

In my experience errors in rotation of the colon do not produce obstructions of the colon but rather of the ileum.

4. Rectal Obstructions.

Malformations of the rectum are so frequently associated with malformations of the urethra and bladder that the cases are very complicated, but if the possibility of the membranous urethra being involved is remembered our treatment may be more successful. Where the sphincter is defective an artificial anus should never be made in the perineum; this is the worst possible site for such an opening. As an emergency measure the sinus into a cloaca may

be widened at the expense of the perineum, but in doing so the possibility of damaging the sphincter should not be forgotten.

5. Exomphalos.

Hernias into the umbilical cord are a class by themselves, and strangulation is unusual as rupture of the covering membrane occurs too early, with the production of a fatal peritonitis. An obstruction may, however, be present, and it may involve both large and small bowel. Suffice it to say that all cases of exomphalos should be operated upon as soon as possible. In one case the radical operation was successfully performed and the infant returned to bed aged 1 hour.

6. Meckel's Diverticulum.

A more prolific cause of trouble from congenital abnormality is produced by a Meckel's diverticulum. The diverticulum may be adherent at its tip to the inner aspect of the umbilicus and a loop or loops of bowel may become entangled round this intra-abdominal pillar. The tip of the diverticulum may become adherent to visceral or parietal peritoneum, and may act as a band strangling one or more loops of bowel.

7. Strangulated Hernia.

Among the innumerable instances of hernia it is fortunately unusual for many to strangle, yet the condition is quite common none the less; it calls for no further comment.

Acquired Causes.

It would be futile to go into all the various causes of acute obstruction in children, but I might refer to one or two types which are frequently met with. To begin with, it must not be forgotten that the term "acute obstruction," which refers to symptoms, is not synonymous with "complete obstruction," hence the dividing line between acute and chronic obstruction is a broad one. We have acute exacerbations superimposing themselves on the chronic, and as in children the chronic part is masked we will have, clinically, only the attacks of acute obstruction recognizable. Under this aspect of the case would come to be considered those obstructions which resulted from a tuberculous infection of the mesenteric glands with band formation, or adhesions with more or less kinking of the bowel (and consequent narrowing of the lumen) from a contracting cicatrix. These conditions are often associated with a healed tuberculosis, but they may crop up during the infective stage of a plastic peritonitis. How far the final stage in any peritonitis is due to obstruction is a point on which discussion might profitably take place. Whatever the cause of the obstruction the symptoms will vary according to the level and degree of completeness of the stenosis and to the degree of interference with the circulation. Symptoms indistinguishable from those produced by obstruction may be set up by other conditions without implication of the lumen of the bowel at all. For instance, strangulated omentum, a strangulated Richter's hernia, and a mesenteric embolism will produce a set of symptoms almost incapable of differentiation from a true obstruction. So much is this the case that we are greatly given to label a particular lesion as an example of the acute abdomen, and are content if we decide for or against exploration.

It is the general custom to classify intussusception among the obstructions, and I would like to enter a protest against such an arrangement as conducing to delay in operation. Intussusception is no more an obstruction than appendicitis is a general peritonitis. Both are alike in this respect, that under such a view they demand treatment before they come into their proper categories; intussusception must be operated upon before it is obstructive, as must an inflamed appendix before it gives rise to a general peritonitis. The risk of leaving an appendicitis till perforative peritonitis has developed is not nearly so serious as leaving an intussusception till obstructive symptoms set in. In intussusception, which is possibly often one phase of the status lymphaticus, death is apt to be sudden and entirely unexpected.

The reference to appendicitis brings to mind the

obstruction which complicates the operation. It develops about the fifth day, usually suddenly, and it requires prompt treatment. I do not refer to the ileus developing with a spreading peritonitis, but to a local obstruction of the lumen of a section of bowel.

Simple tumours rarely occasion an intestinal obstruction. Malignant tumours are so seldom found that we hardly ever think of including them in the discussion of a differential diagnosis.

The symptoms which result from the interruption of the intestinal flow may be briefly considered.

1. *Vomiting*.—At first this may be a reflex phenomenon; it soon, however, becomes a sign of reversal in the direction of the intestinal current. It is persistent, and its character changes in the well recognized manner so that it becomes pathognomonic.

2. *Visible Peristalsis*.—This symptom is probably more fully developed in the chronic obstructions, but it is an important aid to diagnosis even in the acute. It may be accentuated by tapping the abdomen and in some cases by lightly scratching the skin.

3. *Distension*.—To begin with, this is the alternative to spasm, but it soon becomes permanent to the exclusion of the spasm. When the entire small bowel becomes distended the well recognized designation of "ladder abdomen" to the appearance shown is a condition of sinister meaning. No doubt the distension is due to the evolution of gas which cannot find an exit, but soon the overdistension passes into a paralysis, so that mere escape of the gas brings no relief.

Symptoms Due to Interference with Function.

These might be referred to under the following sections:

(a) *Toxaemia*.—Chemical changes in the contents of the intestine soon take place; the initial disturbance cannot be explained in this way, but later symptoms and the tendency to death are certainly due to this cause. The experimental work done to elucidate the results of obstruction of the intestine is considerable, and while it has been enlightening it has added an element of complexity. The action of the chlorides, which are so quickly reduced in the circulation, has been proved to be of the greatest importance in such toxæmias as we are considering, but that their repletion is the desideratum is not yet established. Whether a distortion of metabolism takes place in the wall of the bowel, due to the pressure of the distension or to chemical changes instituted by the infection of the enteric fluids, is not decided. It is, I think, proved that the gas-producing organisms make highly toxic substances, and we thus have to attempt to inhibit such manufacture from the point of view of gas as well as toxin. It is more than likely that a vicious circle is set up—the more toxin the greater the inflation, and vice versa. Distension alone is serious from its pressure effects on the thoracic organs, its interference with deep respiration, and with the heart. From clinical experience, as from scientific research, the emptying of the bowel, etc., is essential.

(b) *Disturbance through the Sympathetic*.—Some of the symptoms might be so explained. By wearing out the action of the sympathetic ganglia the pneumogastric inhibition becomes more active or the vagus is initially stimulated, and the heart shows the effect sometimes very rapidly. Thus irregularity of the pulse in intussusception is often an early sign. Of course, a toxin might well have a direct action on the heart without reference to the nervous system.

(c) *Paralysis of the Bowel*.—This condition will develop at a period governed to some extent by the nature and situation of the obstruction, and whether the obstruction be complicated with peritonitis.

(d) The changes in the circulation of the bowel and the reflex stimuli will account for the effusion of fluid which takes place almost invariably with an obstruction.

(e) *Peritonitis from Perforation*.—As the result of gangrene this very serious catastrophe may set going its own series of symptoms, but as a rule death takes place before this occurs. Examination by x rays is rarely possible, as we rightly hesitate to allow the expenditure

of the time required, to say nothing of the difficulty and disturbance caused by trying to force the retention of the opaque meal.

Treatment.

The stomach should be washed out early in the anaesthetic period, and great care should be exercised that none of the stomach contents finds its way into the trachea. I do not propose to touch on all the various plans of treatment possible of adoption, either from the point of view of operation or as adjunct treatment, but rather to refer to some aspects of the matter which are discussible.

After opening the abdomen, distended bowel should be avoided, and a gentle search for undistended gut instituted, the obstruction being approached from the sound side. After the obstruction has been relieved, if anything further is required we are often placed in a dilemma whether to resect, perform a lateral anastomosis, or to be content with an enterotomy. There does not seem to me to be any great reason why an enterotomy should not be done irrespective of whatever else may have been demanded. We dislike making a fistula, but these fistulae (in children at any rate), if made through the omentum, show a great tendency to spontaneous closure. The omentum should not be pushed aside, but the most prominent loop of bowel above the umbilicus should be drawn through a hole made in it. An enterotomy likely to function should be made high in the jejunum.

The handling required in resecting is against its success, and so the quick methods of performing intestinal union are attractive. The possibility of adding infection to the already damaged abdominal contents is to be avoided at all costs. It is a decided advantage to leave as much saline in the abdomen as it will hold, and I think the addition to it of 5 per cent. cane sugar, a half to one cubic centimetre of pituitrin, and the same quantity of adrenaline, is beneficial.

The Anaesthetic.—The choice of an anaesthetic is of importance. Most surgeons dislike chloroform for an intestinal obstruction, but where chloroform gains is in its greater power of producing muscular relaxation. A shorter incision suffices, and manipulation in the abdomen is facilitated, with consequent shortening of the operation time. As obstruction is more often associated with an alkalosis than an acidosis, it is possible that this general dislike of chloroform may not be an entirely sound doctrine. In this connexion the recent proposal to introduce pepsin and hydrochloric acid with saline into the peritoneum as a remedy in peritonitis may find support, and the almost invariable rule to give alkalis and glucose may require to be sometimes departed from. The advice to give excess sodium chloride may well receive a careful trial, not only because its quantity has been reduced, but also because it has a direct antagonistic action on the toxins developing in the distended bowel. It certainly tends to reduce the dehydrating effects of the poisons.

Enteritis after Operation.—This is a condition which is prone to develop in children at all times, and more especially after damage to the intestine. Grey powder and so-called intestinal antiseptics may be indicated. I have found the oral administration of normal horse serum to be most effective.

Pneumonia.—Trivial changes in the atmosphere, in the temperature of the sick-room, etc., cannot account for the onset of this complication, but it is almost certainly due to a toxæmia or septicaemia.

Pyelitis.—After intestinal operations I think there is a direct tendency for a *Bacillus coli* septicaemia to become established, and I have observed a few cases where pyelitis resulted from an enterectomy. The urinary infection has thus a common source with that causing pneumonia.

There are many other complications which occur, such as those referable to thrombosis, etc., but it is unnecessary to elaborate the matter further.

Prognosis.

The important item in the prognosis is the degree of ileus present, and this will depend to some extent on the amount of handling which has been found necessary at the operation, as well as upon the nature of the obstruction

and the general robustness of the child. Where evisceration has been performed the prognosis is bad. Scientific investigation may help us to neutralize the toxins and restore motility to the overstretched intestine.

An early diagnosis, followed by prompt intervention, is still the thing which matters most.

DISCUSSION.

Mr. L. E. BARRINGTON-WARD (London) emphasized those points in symptomatology and physical examination which his experience led him to believe were most helpful in diagnosis. He hoped the day was not far distant when, as a result of earlier diagnosis, the surgeon would seldom be faced with the difficult and debatable problems of how to deal with an irreducible mass in intussusception or treat a length of gangrenous intestine. The patient's age was often of assistance in deciding beforehand the nature of an obstruction in early life. He referred at length to some of the rarer forms of intestinal obstruction in childhood. (1) Internal hernia—(a) through a congenital hole in the mesentery or omentum, (b) diaphragmatic, (c) retro-peritoneal. (2) Volvulus of the small intestine apart from volvulus neonatorum. He based his remarks on the latter form upon a series of six cases which had occurred during a period of twenty-five years at Great Ormond Street Hospital. All were dependent on a deficient attachment of the mesenteries of the small intestine and ascending colon. The diagnosis of the condition from ketonaemia had presented great difficulties, and he thought the character and time of onset of the abdominal pain were the points which were likely to be of most help in differentiation. In the treatment of intussusception he had tried and been impressed with the value of Farr's method, which consisted of an injection of air into the colon followed by a small abdominal incision to enable the reduction to be completed. This procedure eliminated the element of uncertainty of the older method of reduction by inflation alone, and was associated with less shock than complete reduction by laparotomy. Where reduction was impossible he was in the habit of resecting and performing an anastomosis at once. The infant did not seem to tolerate temporary drainage well.

Miss GERTRUDE HERZFELD (Edinburgh) referred to the fact that in acute obstruction in children abdominal distension was usually not a striking feature. She emphasized the desirability of combating dehydration and washing out the stomach as preliminary measures. As a routine anaesthetic in these cases she preferred open ether combined with local infiltration, but recently had been using spinal anaesthesia successfully in cases of intussusception. Where distension of the bowel was marked she did not hesitate to perform immediate puncture of the gut by means of a fine trocar and cannula. She did not agree with Mr. MacLennan's contention that obstructive symptoms were so definitely secondary in intussusception that to include the latter under the category of acute obstruction was calculated to lead to delay in operating. It was her experience that in the majority of cases obstruction of the bowel was complete within three or four hours. She had had 109 primary cases of intussusception under her care during a period of seven and a half years—71 in male and 38 in female children; 78 were in children under 1 year old. One child was moribund on admission and died without an operation. Spontaneous reduction occurred in three instances; immediate operation was performed in the remaining 105 cases. A recurrence took place in 7, and in one case proved fatal. Including the recurrences, 112 operations were carried out, with 24 deaths, giving a death rate of 21.4 per cent. In the last 50 cases, however, there had been only 7 deaths—that is, a mortality of 14 per cent. This improvement was chiefly due to earlier diagnosis on the part of the practitioner. As regards the type, 84 per cent. occurred in the ileo-caecal region, 11 per cent. were of the colic, and 5 per cent. of the enteric variety. All the colic cases recovered. Most of the 7 recurrences took place from eight to fifteen months after the primary operations. It was interesting to note that in 2 of the recurrent cases fixation of the caecum had been performed at the first operation. There were 9 cases

in which resection was found to be necessary, with 5 deaths. Tearing of the peritoneum, even when extensive, was not in itself regarded as an indication for resection. During the same period 16 cases of obstruction due to abdominal tuberculosis had occurred; there were 6 deaths, all in children under 3 years. Of obstruction due to irreducible and strangulated hernia, there were 22 examples; the average age was 5½ months. Resection was necessary on two occasions, once in a baby of 12 days. All the patients in this group recovered. In the course of 197 cases of acute appendicitis 6 examples of true post-operative obstruction arose. The average time at which operation for this complication was called for was the fourteenth day after appendicectomy. The methods of dealing with this emergency were discussed. The only fatal case was one of streptococcal appendicitis in which obstruction occurred on the fifth day after operation and an enterostomy was performed.

Mr. F. C. PYBUS (Newcastle-on-Tyne) dealt with the sequence of development and relative importance of the symptoms and signs of obstruction. He maintained that it was often possible to determine beforehand the nature of an obstruction from a carefully taken and interpreted history. He quoted cases illustrative of the difficulties of diagnosis, with special reference to ketonaemia and Henoch's purpura. Chloroform as an anaesthetic was to be avoided.

Mr. NORMAN M. DOTT (Edinburgh) submitted two theses for consideration: (1) that, inasmuch as children suffering from acute intestinal obstruction tolerated operations up to one hour's duration remarkably well, delicate accurate technique should not be subordinated to mere speed in operating; (2) that resection was possibly the best treatment in certain cases of intussusception in which the bowel, though reducible and viable, was yet severely bruised in the process of reduction. He developed his argument from a review of 20 cases of intussusception which he had been called upon to treat during the past two years. All these cases had been operated on and 4 deaths had occurred. In 3 of the fatal cases the condition was so severe and advanced on admission that a fatal issue was wellnigh inevitable; he had thought it right, however, to give them the chance offered by operation. The fourth fatality was in a baby of 5 months who had a double intussusception of fourteen hours' duration. Reduction was extremely difficult, but was finally accomplished with viable bowel. The immediate effect of the operation was negligible, but the child's condition rapidly deteriorated and death took place after twenty hours. The cause of death, in Mr. Dott's opinion, was toxic absorption from an excessively bruised bowel, and he believed that removal of this injured segment might have been a life-saving measure. Excluding the 3 unavoidable fatalities, his series was reduced to 17, with one death. The 16 recoveries took place in cases which on the average were of a severe type. In operating great speed had not been aimed at. It was his rule to make a "gridiron" or rectus displacement incision, to carry out fixation by the finest interrupted silk sutures, and to close the wound deliberately in layers. Further, 3 of the 17 patients were subjected to procedures of considerable magnitude. One was a baby of 10 months, who had an ileo-colic intussusception of forty-three hours' duration. A good recovery followed an operation which occupied thirty-five minutes. Four days later an enteric intussusception developed, necessitating a second laparotomy. Another child, of 4 months, had an ileo-caecal intussusception of five days' duration. Reduction was impossible and a right hemicolectomy, with lateral anastomosis by the aseptic method, was performed. The operation lasted one hour. The third was a child of 3 months with a gangrenous ileo-colic intussusception of three days' duration. A right hemicolectomy, with end-to-end anastomosis by the aseptic method, was carried out. Recovery in these three cases was uneventful.

Dr. H. C. CAMERON (London) spoke of the need for early diagnosis when confronted with the grave symptoms of intestinal obstruction in a newborn infant. There was too great a tendency to wrap the child in a shawl and adopt

a fatalistic attitude. In duodenal obstruction the diagnosis could only be made by an x-ray examination in the first few days of life. One such case of duodenal atresia operated on by Mr. Steward made a complete recovery. With regard to acute intussusception, he called attention to the contrast in practice prevailing in Scandinavia. There, in 80 per cent. of the cases, taxis through the abdominal wall without laparotomy was successful. Secondary laparotomy was necessary in the remaining 20 per cent. He referred to the case of a small boy suffering from extreme ketonaemia, with the characteristic tonelessness of the abdominal muscles, who had developed after some days of illness a complicating intussusception. Mr. Jennings Marshall had reduced the intussusception in a moment, and without difficulty. In this case it was the ketonaemic amyotonia that explained the ease of reduction. The differential diagnosis of intussusception from follicular colitis and Henoch's purpura was helped by noting the odour of the blood-stained evacuation. In intussusception the motion was odourless, in the other conditions foul-smelling. Lastly, he spoke of the immense value of a blood transfusion before a young feeble infant was submitted to a severe operation.

Dr. C. P. LAPAGE (Manchester) thought that the history in cases of intussusception was so distinctive that it was often possible to make a diagnosis before blood appeared in the stools, or even on the finger after rectal examination. The earlier spasms of abdominal pain were often overlooked unless the mother was closely questioned. In the differential diagnosis between obstruction and ketonaemia a history of previous attacks and the presence of certain clinical peculiarities in the latter group were helpful. In Henoch's purpura the difficulty was greater, but as a rule the blood in the motions was more profuse than in intussusception, and the purpura patients were often peculiarly sensitive to rectal examination. He protested against the indiscriminate use of purgatives which was still so common in the treatment of patients with abdominal symptoms. As an illustration of the ability of the youngest infant to tolerate severe surgical procedures, he referred to the case of a baby of a few weeks who had had a mesenteric cyst of the size of its own head successfully removed by his colleague Mr. Morley.

Dr. MARGARET TOD (Edinburgh) pointed out that it was often by no means easy to distinguish between acute enteritis and intussusception. Enteritis might determine an intussusception and the history of the antecedent enteritis confuse the issue. On the other hand, at the outset of an intussusception there might be one or two greenish motions, suggesting a diagnosis of enteritis. She had been impressed, especially during a recent visit to America, by the great value of transfusion as a pre-operative or post-operative measure.

DEAF-MUTISM DUE TO A BILATERAL LESION OF THE AUDITORY SENSORY AREAS.*

BY

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In the vast majority of cases of deaf-mutism the lesion is situated in the ear itself. Deaf-mutism is usually divided into the congenital and the acquired varieties.

In Switzerland endemic congenital deaf-mutism is met with in association with goitre and cretinism. Here the lesion is in the middle ear, the niches of the oval and round windows being filled with connective tissue. Many of these patients, however, have fairly good hearing, and the mutism is mainly caused by their feeble mental development. In this country sporadic congenital deaf-mutism is by no means uncommon. The lesion in these cases is in the inner ear and, as a rule, consists in maldevelopment of the membranous cochlea and sacculus—the pars superior of the

labyrinth—while the utricle and semicircular canals are normal. In such cases the vestibular apparatus reacts normally to the rotation and caloric tests, though the patient is almost or entirely deaf.

Acquired deaf-mutism is due to labyrinthitis, which may result (1) from the otitis media of such infections as scarlatina or measles invading the inner ear; (2) from injury, as in fracture of the base of the skull involving both labyrinths; (3) from purulent infiltration of the labyrinth from the meninges—as, for example, in cases of epidemic cerebro-spinal meningitis, in which the infection may pass to both labyrinths along the eighth nerve; or (4) from congenital syphilitic infection of the inner ear, which, as a rule, only occurs after the age of 9, when the child has already learned to speak. The vestibular tests in cases of acquired deaf-mutism give negative results.

The microscopic changes in the ear in these various kinds of congenital and acquired deaf-mutism have been well known for many years from the work of Politzer, Alexander, Neumann, Denker, Mondini, Scheibe, Gray, and others.¹ Castex, however, holds that deaf-mutism is usually due, not to lesions of the ear, but to changes in the cortical hearing area which may be caused by intra-uterine meningitis. Though we hold that such an occurrence is extremely rare it must be admitted that all cases of deaf-mutism have not been explained by histological examination of the ears. For this reason the following case appears to be worthy of publication.

A male child, aged 3, had suffered from bilateral middle-ear suppuration at the age of 1 year; the cause was unknown. Three months before admission to hospital on August 2nd, 1921, an abscess formed behind the left ear and was opened by his doctor. A week before admission a swelling appeared behind the right ear, with pain and loss of sleep. There was no history of giddiness or sickness. Examination showed the scar of an old mastoid abscess behind the left ear. The left meatus contained purulent discharge and a polypus; there was also profuse discharge from the right ear, and a subperiosteal abscess was present. The child did not speak, but his cry was like that of a child who heard.

On August 3rd a radical mastoid operation was performed on the right ear; there was erosion of the cortex, and the antrum contained cholesteatoma. The incus was absent, there was slight erosion of the lateral canal, and granulations were present in the tympanum. A cold lotion applied to the inner wall produced prompt conjugate deviation to the left. A skin graft was applied, leaving the inner wall of the antrum and -tulus uncovered over the erosion in the lateral canal, and the wound was closed. The temperature remained normal after the operation, and the wound and operation cavity were satisfactory on August 7th; seventeen days later the patient was discharged.

Nearly one year later, on June 13th, 1922, the child was brought back with an acute exacerbation of the chronic middle-ear suppuration in the left ear. An abscess had been present over the left mastoid for five days, but there was no vomiting; the child still did not speak, and did not appear to hear. A radical operation was performed on the left ear; there was a subperiosteal abscess and the cortex and whole of the mastoid were hollowed out by cholesteatoma. There was no erosion of the lateral canal. The ossicles were absent and the vestibular apparatus responded promptly to cold lotion. A skin graft was applied. The temperature continued normal until June 28th, when it rose to 99°, and on the next day to 101°; there was slight stiffness of the neck and Kernig's sign was present. The operation cavity appeared satisfactory and there was no nystagmus, but a lumbar puncture showed cerebro-spinal fluid under pressure and slightly turbid. The patient had a lemon-yellow colour.

On June 30th the temperature rose to 103°. At an operation on July 1st the sinus wall was found to be greyish yellow and thickened. Neumann's labyrinth operation was performed on the left side; the internal meatus was opened through the vestibule and a flow of cerebro-spinal fluid was obtained.

On the day after the operation the temperature remained between 100° and 101°; drainage through the internal meatus was not very free. On July 3rd the temperature was 102° and the pulse 164; the cerebro-spinal fluid was still draining. Two days later the temperature was 104°, and death ensued.

At the necropsy purulent meningitis was found at the base and over the left cerebral hemisphere; there was no thrombosis of the venous sinuses. The infecting organism was the pneumococcus.

Microscopic Examination of Right Ear.—The Eustachian tube was closed by thickening of the submucosa, which showed cystic spaces. The tympanum, attic, and antrum were lined with squamous epithelium; there was a gap filled with fibrous tissue in the footplate of the stapes, though the crura were entire. This showed that the gap in the footplate was not due to injury at operation. The round window membrane was only slightly thickened. The cartilage bone capsule of the labyrinth was healthy; the vessels of the fossa subarcuata were dilated, and veins could be traced from the inner wall of the antrum, through the fossa subarcuata to the posterior cranial fossa. On the left side this may have been a possible route of infection from the middle ear to the meninges. The vessels of the modiolus were dilated, and Reissner's membrane was slightly depressed, as is usual in cases of meningitis.

* Read in the Section of Laryngology and Otolgy at the Annual Meeting of the British Medical Association, Edinburgh, 1927.