

the hospital clinician regarding the diagnosis, and at the same time he can give the necessary advice to prevent the spread of the disease.

Mutation

It might be argued with justification that if the mutation rate of a hereditary disease is high there is little object in trying to prevent its spread. In Huntington's chorea, however, it is clear that the great majority of cases are inherited, and the proportion of persons who owe their disease to a mutation in one or other parent is very small indeed. Hence, if it were possible to prevent the transmission of the gene the incidence of the disease would be very greatly reduced. Although one possible instance of mutation in an earlier generation is demonstrated in the present series of eight pedigrees, Bell quotes only 6 out of 151 pedigrees.

These observations indicate that the following measures would be of value: (1) Practitioners should be encouraged to notify all cases of Huntington's chorea to the local health authority so that the family pedigrees can be investigated. (2) (i) Offspring of an affected parent who are of Roman Catholic faith should be advised against marriage. (ii) Offspring of an affected parent who are of Protestant faith should be advised not to have children, and should be encouraged to attend a birth-control clinic. The help of all churches would be of great value in undertaking these measures. It is noteworthy that the Minister of Health has sanctioned contraceptive advice at birth-control clinics "only in cases where further pregnancy would be detrimental to health." It would, however, appear only logical that the health of the offspring should be protected in the same way as the health of the parent. (3) Termination of pregnancy should be considered if either parent is suffering from the disease or may be carrying it. (4) Friendly supervision of members of choreic families should be maintained by whoever is in the best position to do so effectively. In some cases this could be the responsibility of the practitioner, in others of the district nurse, the health visitor, or the mental health worker. (5) As soon as domiciliary care is found to be inadequate, the patient should be admitted to an institution or mental hospital.

Summary

Although Huntington's chorea is described as a rare disease, no attempt has been made to assess the incidence in this country. In the present survey a questionnaire was sent to the senior partner of every practice in Northamptonshire, and with the consent of the medical superintendent of the county mental hospital the records of certified patients were made available. The results indicated that the incidence of the disease in Northamptonshire is approximately 5 diagnosed cases per 100,000 of the population. No conclusions can be drawn from such small figures in a population of about 263,000, but if this incidence is representative for the country, then there are at present more than 2,000 people suffering from Huntington's chorea in England and Wales.

It is noted that choreic families appear to be drawn mainly from Group IV of the Registrar-General's social classification.

In this survey six patients were treated with procaine amide, but no beneficial results were observed which could be attributed to the drug.

Electroencephalographic and serological investigations were carried out on members of two choreic families. The results were not found to be of any significance in prediction or diagnosis, but the serological findings may be of value in future work on this subject.

Adequate supervision of choreic individuals is very desirable on account of the heightened sexual interest

and fecundity associated with cortical degeneration in the disease. As soon as domiciliary control is insufficient patients should be admitted to hospital.

Since there is no treatment for this hereditary disease, attention is drawn to the urgent need for its prevention through the health education of afflicted families. If medical practitioners reported the disease voluntarily, the local health authority could help by investigating family pedigrees and giving the necessary advice. This work would be both of preventive and of diagnostic value. It is felt that prevention is by far the most important aspect of Huntington's chorea, and that every effort which is possible in a voluntary capacity should be made in an attempt to reduce the incidence of the disease.

I should like to express my thanks to Dr. C. M. Smith, County Medical Officer of Health, Northamptonshire, for his help and suggestions in undertaking the survey; to Dr. J. A. Fraser Roberts for his advice in the preparation of this paper; to Dr. A. N. Graham for granting me facilities to examine patients at St. Crispin Hospital; and to Dr. J. C. Goodchild for undertaking the treatment of patients with procaine amide. I should also like to thank Dr. M. M. Pickles for undertaking the serological investigations; and, finally, to express my appreciation of the co-operation received from the medical practitioners in the county, without whose help this survey would not have been possible.

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PARTIAL GASTRECTOMY: TEN YEARS LATER

BY

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The operation of partial gastrectomy has received perhaps more study and investigation than almost any other operation in surgery. The value of the procedure in the treatment of peptic ulcer is now established, and the immediate results are well known. The operative mortality rate in good hands has been established at 1-2%. The post-gastrectomy syndromes have been studied in detail by Adlersberg and Hammerschlag (1947), Irvine (1948), Mimpriss and Birt (1948), Muir (1949), Wells and Welbourn (1951), and many others. Very little is known, however, about the late results of the operation and the prospects for the patient ten or more years after surgery.

Of 119 cases of partial gastrectomy performed for the treatment of peptic ulcer before the early months of 1944, 28 were traced to 1946 only, a further 16 maintained contact by letter to 1950, and the remaining 75 have been examined at frequent intervals to the present day (1954). It is the history of these 75 patients which

concerns us here. It will be appreciated that they form a highly selected group who have not died of operation or intercurrent disease, have not gone away to sea or moved residence to another city, and have not applied elsewhere for treatment. For the same reasons the group may contain a high proportion of poor results maintaining contact with us because of dissatisfaction with the end-results. In consequence, highly analytical statistical methods cannot be applied to the investigation, and we endeavour only to demonstrate the experience of these 75 patients during the ten or more years following the operation of partial gastrectomy.

The group is composed of 60 men and 15 women. At the initial operation gastric ulcer was noted in 3 cases, a duodenal ulcer alone in 57 cases, a gastric and duodenal ulcer were both present in 6 cases, and in 9 cases no detail is available. Gastric resection for neoplasm is not considered here.

Operation

Before 1944 the extent of gastric resection for peptic ulcer was not stabilized. In general, the resection was more limited than that undertaken at the present time. In the group studied, 15 patients had, as a primary operation, gastric exclusion performed, the pyloric end of the stomach being left *in situ*. Eleven patients had undergone a Billroth I type of gastrectomy, and in 25 cases a partial gastrectomy of the Polya type was performed with an antecolic valved type of anastomosis. In neither of these latter two groups was the resection so radical as that now carried out, and they are therefore not representative of the modern variety of each operation. Twenty-four cases were treated by the modern high gastric resection with an antecolic Polya operation, and a Finsterer-Lake valved anastomosis. Such cases are quite representative of the modern technique.

The duration of time since the initial operation in each group is shown in Table I.

TABLE I.—Duration Since Gastrectomy

Operation	Duration (Years)	Cases	Operation	Duration (Years)	Cases
Gastric exclusion	12	1	Limited Polya	11	5
	14	1		12	10
	16	4		13	6
	17	6		14	1
	18	2		15	1
	23	1	16	1	
			17	1	
Billroth I	13	5	Subtotal Polya	10	11
	14	4		11	10
	15	1		12	3
	18	1			

Records

Almost all the operations were performed by one of us (C.W.) and all have been examined and investigated subsequently by the other. In all cases we are in possession of the medical history of the patients since operation, with weight records, blood examinations, and such special investigations as seemed necessary. All patients have been interviewed and examined at irregular intervals up to 1949, and at least yearly since that time. Treatment or operation to correct any of the resulting disabilities has been undertaken as required, so that many of the detected abnormalities have now been relieved. The follow-up has been standardized, and entails a complete clinical examination, blood-pressure recordings, and examination for overt evidence of vitamin deficiency and oedema. The weight is taken, and a blood sample for haemoglobin and red cell count, and for

packed cell volume if required. Glucose-tolerance investigations and faecal-fat estimations were performed when judged necessary.

For the purpose of this study, the patient is not regarded as having developed anaemia unless the haemoglobin falls below 90% in the male and 80% in the female (100% = 14.8 g. per 100 ml.). Subsequent weight changes are considered in relation to the highest weight known before operation (called "health" weight), and the weight immediately before operation. A weight loss or gain in relation to each of these figures (where known) is not regarded as significant unless the difference between these weights and subsequent weights varies by more than ± 7 lb. (3.2 kg.). This figure is arbitrary, but allows for difference in accuracy of the weighing-machines used.

Results

Gastric Exclusion Operation.—15 cases (males, 13; females, 2). In this operation the pyloric antrum is conserved in continuity with the duodenum but out of the food-stream. For a brief period, ending in 1937-8, it was performed electively, but was soon abandoned because of its bad results. Thereafter it has occasionally been carried out as a first-stage procedure. As late as 1940 one, and in 1942 a second, patient was allowed to go on indefinitely without being submitted to the intended pylorotomy. In only one case was the antral mucosa cored out (Bancroft's procedure) at the time of the initial operation. Seven of these 15 patients later developed a stomal ulcer, and another two required pylorotomy for the relief of ulcer symptoms, though no ulcer was demonstrated (Table II). Of these nine patients four obtained complete relief of ulcer symptoms when a subsequent pylorotomy was performed, three continued to have further pain or bleeding, but no further operative treatment was undertaken, and in two cases subsequent subtotal Polya gastrectomy was performed. It should be noted that, of the two patients who were subjected to secondary subtotal gastrectomy, one developed such severe bilious regurgitation with associated symptoms that a jejunoplasty was required to relieve the condition. (Incidentally, this would not be our operation of choice to-day.) Table III

TABLE II.—Results of Gastrectomy

Operation	Total No.	Well	Stomal Ulcer	Acid Dyspepsia	Bilious Regurgitation
Gastric exclusion	15	6	7	2	0
Billroth I (limited)	11	5	2	4	0
Limited Polya	25	18	2	3	2
Subtotal	24	18	0	1	5

indicates that nine of these patients developed a hypochromic microcytic anaemia at some date subsequent to operation and that one patient developed evidence of severe riboflavine deficiency. These deficiencies all responded to the appropriate treatment—namely, oral or intravenous iron and oral or parenteral vitamin B. Records of blood examinations were not available in one instance. Table III shows the weight records of all but one of these 15 patients.

TABLE III.—Anaemia, Vitamin Deficiency, and Weight Changes

Operation	Anaemia	Vitamin B Deficiency	Weight						Hypoglycaemia	Flatulence
			Health			Pre-operation				
			Gain	Same	Loss	Gain	Same	Loss		
Gastric exclusion	9	1	1	3	10	6	3	5	—	2
Billroth I (limited)	0	2	3	2	6	4	2	5	1	—
Limited Polya	9	2	2	9	14	15	5	5	1	1
Subtotal	7	0	3	7	14	10	7	7	—	1

Billroth I Gastrectomy.—11 cases (males, 7; females, 4). It will be borne in mind that a somewhat limited gastric resection was undertaken. Table II indicates the high incidence of recurrent ulceration. Only one case developed

a mild anaemia, and two patients showed evidence of riboflavine deficiency. Table III indicates the weight changes.

Limited Polya Gastrectomy.—25 cases (males, 18; females, 7). Of 25 cases of limited gastric resection and valved anastomosis, five subsequently developed symptoms of peptic ulceration. In two cases these symptoms subsided with dietetic measures and alkali. In the third case a subtotal Polya-type gastrectomy was performed two years after the first operation to relieve dyspeptic symptoms. There is no record that an ulcer was observed at the second operation. In the fourth case a jejunal ulcer developed and perforated within six months. This perforation was treated elsewhere by simple closure. Ten years later a gastro-jejuno-colic fistula was diagnosed, the fistula was closed, and a higher gastrectomy was performed. In the fifth case symptoms of recurrence were evident within a year, but the barium meal did not show ulceration, and nothing was done. Ten years after the operation bilious vomiting started and was associated with dyspeptic pain. Barium meal examination showed evidence of stomal ulceration and a transthoracic vagotomy was performed. Since that time she has remained well. Table III indicates that nine of these patients subsequently developed anaemia of the iron-deficiency type, and that two patients developed signs of riboflavine deficiency. The weight records are also shown in Table III.

Subtotal Polya Gastrectomy.—24 cases (males, 22; females, 2). These patients differ from the previous group only in that the gastric resection was more extensive and approximated to the modern subtotal operation. Of these 24 patients only one developed subsequent dyspeptic symptoms, five years after the operation. Although no stomal ulcer was detected, a transthoracic vagotomy was carried out eight years after the first operation. However, five of this group developed symptoms of afferent loop stasis (bilious vomiting), one so severely that jejunoplasty was necessary to relieve the condition. It is interesting to note that this bilious vomiting did not become evident until eight years after the operation in two cases, and seven years in two others.

Table III demonstrates that nine patients developed some anaemia subsequent to surgical treatment of their ulcer, and one showed evidence of vitamin B deficiency. Table III gives the weight records.

Discussion

Recurrent Ulceration

It has long been known that gastric exclusion operations, leaving the pyloric antrum *in situ*, are unsatisfactory. The melancholy history of this group of patients in the series only confirms this view. It is curious that the incidence of recurrent ulceration in this group is probably higher than after simple gastro-enterostomy. This is probably related to the amount of bicarbonate secreted by the pancreas and returned to the stomach by the afferent loop. In the stomach this bicarbonate partially neutralizes the free acid present. Not unnaturally, the amount of bicarbonate secreted bears a direct relationship to the amount of acid secreted. Moreover, the secretion of bicarbonate occurs most freely in response to the presence of acid in the duodenum. It follows that after gastro-enterostomy there is more antacid carried to the stomach by the afferent loop than there is after a Polya gastrectomy (especially if valved), which excludes all acid from the duodenum.

In this series, the limited Billroth I operation has been found unsatisfactory as a means of preventing recurrent ulcer. This experience, though not conclusive, would make us cautious about adopting an even higher gastric resection and Billroth I anastomosis in cases of duodenal ulcer. Recently, however, we have been impressed with the advantages of moderate gastric resection and gastro-duodenal anastomosis when combined with vagal section.

Our interest in this series centres mainly round the group of 49 cases in which partial (25) or subtotal (24) gastric resection was undertaken with a Polya-type valved ana-

stomosis. Seven cases have developed dyspeptic symptoms, and, of these, two have been very mild and have subsided during the period under review. In the remaining five cases, subsequent treatment for recurrent peptic ulcer has been carried out. In this respect—namely, the prevention of recurrence of peptic ulceration—the operation has been only reasonably successful over a period extending from 10 to 15 years. It will be noted, however, that the recurrence rate was high only where a limited resection was carried out. As would be expected, the best results have been obtained with high subtotal gastrectomy.

Ability to Work

All these 49 patients have been able to return to their former employment. In several cases this has included heavy work in engineering factories, docks, and stores. Seven of these patients have lost considerable time from work since their initial operation. In one case this was due to severe anaemia. This patient was able to return when his blood picture became normal. In respect of ability to resume work, the operation has therefore been successful. Medical treatment alone can offer comparable advantages neither as a curative measure nor as an economic factor.

Post-gastrectomy Symptoms

The adverse effects, such as they are, of this type of operation must now be considered. Almost all the patients after any of the operations have found that they were unable to eat as much food as when in normal health. With the passage of time they have been able to eat an adequate and varied diet, and have experienced little disability. It has not been possible to be precise about the incidence or the importance of nausea, distension, flatulence, and weakness after a meal. Over a period of ten years, every patient may have experienced these symptoms at some time. Even the exclusion of articles of food from the diet may result from prejudice, misunderstanding, or mistaken advice. We have considered all those patients in whom the symptoms have been sufficiently severe and persistent to affect their satisfaction with the operation. In all those suffering from such disability, bilious vomiting has, perhaps rather oddly and surprisingly, been an associated and preponderant complaint. All such cases have accordingly been classified under the heading bilious regurgitation.

Table IV shows that, of the eleven cases of Billroth I gastrectomy, one patient suffered from mild hypoglycaemic symptoms and one from occasional vomiting of food and

TABLE IV.—*Post-gastrectomy Symptoms*

Operation	Bilious Regurgitation	Vomiting (Food)	Hypoglycaemia	Flatulence
Gastric exclusion (15)	2	—	—	2
Billroth I (11)	—	1	1	—
Limited Polya (25)	2	—	1	1
Subtotal Polya (24)	5	—	—	1

bile. Of the 15 cases of gastric exclusion, two patients at the end of 10 years could still eat only small meals, and another two suffered from afferent-loop stasis and bilious regurgitation. True post-gastrectomy syndromes were therefore not common in these cases of limited gastric resection. The comparison between the 25 cases of partial resection with the Polya anastomosis and the 24 cases of subtotal resection with the same type of anastomosis is perhaps more instructive. In the group of limited gastric resections, symptoms of afferent-loop obstruction with slight bilious regurgitation after a meal associated with nausea and distension occurred in only two patients, whereas in the group undergoing subtotal resection five patients suffered from this troublesome disturbance, and in one case the symptoms were severe enough to require jejunoplasty for its relief. We have considered this complication of afferent-loop stasis following gastrectomy at length elsewhere (Wells and MacPhee, 1952), and concluded, in a much larger series than the present, that the condition is more common where high gastric resection is undertaken.

The weight records show that malnutrition, as such, has not been common, and has usually been associated with stomal ulcer.

Anaemia

In the series under review the incidence of anaemia has been nil in the cases of limited gastric resection in the Billroth I manner. In the group of gastric exclusion operations more than 50% have subsequently suffered from moderate or severe degrees of anaemia. Five of these nine patients have, however, suffered from recurrent ulcer and some from overt bleeding during this time. This group is therefore aggravated by blood loss. In this small series the patients undergoing the Polya type of operation appear to be particularly prone to anaemia. In the group with limited gastric resection the incidence of anaemia was approximately 30%, as it was in the cases of subtotal gastric resection. We are not prepared to suggest that the particular operation is prone to cause anaemia, but it does appear that, when food no longer passes through the duodenum, anaemia is apt to develop, and that, short of total gastrectomy, the incidence of anaemia is independent of the extent of the gastric resection.

In all cases under review the anaemia was of the microcytic hypochromic type which responds rapidly and adequately to iron therapy, usually by mouth. In only a few cases was iron absorption so deficient that parenteral therapy was required, but that method always proved effective.

In no case did we detect a true megaloblastic anaemia. Indeed, in a study of over 500 patients who have undergone partial gastric resection we have been unable to detect more than two cases of true megaloblastic anaemia. Analysis of the present series indicates that anaemia may develop slowly at any time during the subsequent progress, and the incidence seems to rise with the passage of time.

Loss of Weight

We have endeavoured to compare the weight subsequent to operation with the best weight of the patient in health and with the immediate pre-operative weight. In general, the pre-operative weight has been less than the "health" weight, and often considerably so. We believe that we have again demonstrated a parallelism between extent of the gastric resection and loss of weight in later years. In the group with the least extensive gastric resection (Billroth I gastrectomy), three of the nine patients actually show an increase in weight over their best health weight, and four show an increase over the pre-operative weight. As will be seen from Table III, in the cases of limited Polya gastric resection, two patients gained weight in excess of their best health weight, and nine equalled their health weight, while fourteen never regained it. In relation to their pre-operative weight, fifteen surpassed this, five equalled it, and only five lost weight continuously after operation. In the twenty-four cases of subtotal resection, three surpassed their health weight, seven equalled it, and fourteen never regained it. In relation to their pre-operative weight, ten surpassed it, seven equalled it, and seven continued to lose weight.

Where a serious weight loss does occur we have found it difficult to correct. We have observed (Wells and Welbourn, 1951) that in cases of deficient fat absorption the faecal-fat concentration can be reduced by the administration of ganglion-blocking agents such as hexamethonium bromide. In the present series, for various reasons, we have administered this drug to three patients, but have not detected any weight gain. We have observed a satisfactory weight increase in one patient whose diet was supplemented with extra protein in the form of "casilan" (Glaxo).

Intestinal Motility Disorders

Considerable work has been done in the Liverpool University department of surgery on this subject (Wells and Welbourn, 1951; Glazebrook, 1952; MacPhee, 1953). We have not observed any such disorder in the present series. We can only deduce from this that these patients were fortunate in not having such an inherent defect.

Vitamin B Deficiency

We have observed clinical evidence of riboflavin deficiency in five patients of the present series, but have not detected any true evidence of deficiency of other factors of the B group. It is curious that the patients suffering from riboflavin deficiency were not those who showed evidence of loss of weight; indeed, two exceeded their original "health" weight. This demonstrates a selective absorption deficiency which is not constant for all dietary articles. Our previous evidence of avitaminosis-B (Welbourn *et al.*, 1951) suggested that it occurred in about 10% of all patients who have undergone gastrectomy. This figure is substantiated by the results of the present series. Further, we have no evidence to show that within limits the extent of gastric resection has any bearing on the development of avitaminosis-B.

Conclusions

It is not surprising that the resection of one-half or more of the stomach for disease should modify the patient's health and even his mode of life. Until now, however, it has not been made clear just how extensive this interference with health might be. It is customary, for example, to suggest that the "dumping" syndrome subsides or is reduced within a few months of operation, but the patient is rarely followed up long enough to see whether in fact this is true.

In this study we have disregarded mild postprandial distension, and even the inability to eat certain articles of diet. We have concentrated rather on recurrent ulcer, on serious "dumping" which happens to have been associated with bilious regurgitation, on anaemia, and on vitamin deficiency. The variety and, in some instances, the inadequacy of the operations in the earlier cases should be considered in any critical analysis of our series. This study shows that half the patients can be regarded as having been free from all the disabilities of gastrectomy during the ten-year period. If anaemia and vitamin deficiency (which with rare exception are easily corrected) are excluded, the number of patients in this series of 75 free from complications rises to about three-quarters. It seems possible, therefore, that in the original 119 cases treated, disability resulting from gastrectomy arose in at most 25% of cases, more probably 15%, but the liability to these complications continued to operate over the years. The accompanying Chart shows

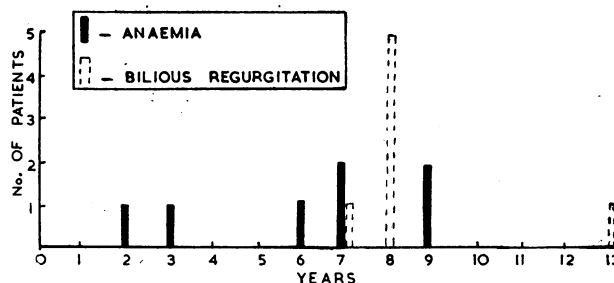


Chart showing time of onset of anaemia and bilious vomiting after partial or subtotal gastrectomy.

the detected onset of anaemia in seven patients and of bilious vomiting in seven patients after partial or subtotal gastrectomy. It will be observed that the onset of these disabilities may be delayed for many years, and the remote incidence cannot be calculated from the study of patients who have only recently undergone operation. It is neither correct nor proper to praise or blame gastric surgery on such evidence.

We do not wish to belittle the value of gastrectomy in the treatment of peptic ulcer—quite the reverse. If we except the groups of gastric exclusion and limited Billroth I gastrectomy, which will not be repeated, freedom from recurrence of peptic ulcer, and even of the symptoms of peptic ulcer, has been provided for over 85% of the patients for ten years or more, and may reasonably be expected to continue. Medical measures can offer nothing like this in

the way of effective treatment, and, indeed, the value of the medical treatment of peptic ulcer has recently been sharply questioned. Martin and Lewis (1949), in a study of 185 patients undergoing medical treatment for peptic ulcer, found that only 20% remained free from dyspeptic symptoms, that 40% endured recurrent ulcer symptoms, and that the remaining 40% required operative treatment. Evans (1954) has reported a failure rate greater than 50% in the medical treatment of peptic ulcer in a series of 111 patients. It is in the light of such studies that we can best appreciate the results of surgical treatment.

A complacent satisfaction with surgical results cannot, however, be accepted, and the lessons to be learned from a study such as this are clear. Any operation which leaves the antrum of the stomach intact is a dangerous measure. This has long been appreciated. A limited gastric resection with gastro-duodenal re-anastomosis is apt to lead to recurrent ulcer. A more extensive gastric resection in the Billroth I manner would avoid this trouble, but the technical problem of the anastomosis becomes difficult with penetrating duodenal ulcer. If vagotomy is combined with such an operation, recurrent ulcer may be avoided, and we believe this is probably the best form of treatment for peptic ulcer, and it is the principle we now follow and recommend in all cases. The Billroth I operation appears less likely to cause anaemia over the course of years, and, because there is no afferent loop, true bilious regurgitation and the prodromal symptoms associated with it are avoided. The vomiting of food mixed with bile does, however, occur, but it is not common.

The Polya type of gastrectomy is still that favoured by most surgeons. As might be expected, it seems from our study that the higher the resection the greater the freedom from recurrent ulcer but the more probable the development of serious post-gastrectomy syndromes. The very high subtotal resection is a grave offender in this respect, and is not the surgical answer to the problem of peptic ulcer treatment. A more limited resection accompanied by vagotomy may achieve the same freedom from ulcer, and lead to less serious post-gastrectomy syndromes. We have been impressed with a small series of 25 cases treated by us in this way three years ago, but it is yet too early to talk of their end-results.

Whatever the surgical method of treatment for peptic ulcer employed, a careful examination of the results must be undertaken at regular intervals. Only in this way is it possible to achieve effective treatment and satisfaction for the patient.

Finally, we may fairly claim to be gaining some understanding of the causes of disability after surgery for simple peptic ulcer. On the basis of this understanding we can see more promising initial operations developing, and, so far as concerns those who have had their operations and are still not well, we can predict with some accuracy the likelihood of response to drugs and diet, and we can recognize with some certainty those who need to face yet another surgical ordeal. To them we are beginning to be able to offer a reasonable promise of lasting relief based upon our better understanding.

Summary

In a series of 119 patients treated for peptic ulcer by partial gastrectomy 10 or more years ago, 75 patients have been regularly examined and their progress studied. The following conclusions were drawn.

1. With any type of anastomosis, the incidence of recurrent ulcer varies inversely with the extent of the gastric resection.
2. With the Polya type of anastomosis, the incidence of bilious vomiting and associated symptoms varies directly with the extent of the gastric resection.
3. Serious post-gastrectomy symptoms may not develop until many years after the operation.

4. If direct gastro-duodenal continuity is not re-established at the time of operation, hypochromic anaemia is apt to occur.

5. A more limited gastric resection combined with vagotomy and a gastro-duodenal anastomosis may represent the Aristotelian mean in the surgery of peptic ulcer.

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A LONGITUDINAL RESEARCH IN CHILD DEVELOPMENT AND SOME OF ITS PROBLEMS

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Expression is not infrequently given to the need for studies of child development in which the growth of a number of individuals could be watched and recorded as it takes place, through the years of infancy and childhood to maturity.

Another need sometimes expressed is for an integration of knowledge on the physical, intellectual, and emotional aspects of personality through the collaboration of specialists in the relevant disciplines. The present research was initiated to meet these requirements.

Previously in this country studies have been made of children at particular ages or over certain periods of development, but it is recognized that many problems can be adequately investigated only by longitudinal methods. Furthermore, in this study account is taken of some of the many environmental factors affecting mental and physical development, and in particular of the influence of the changing family background. Several longitudinal studies are in progress in the United States (see Tanner, 1948), but this is the first study of its kind to be started in Britain, and differs from any of the American studies in various respects.

Aims

The main aims may be summarized as follows:

- General.*—(a) To study some of the relationships between development and health, mental and physical.
 (b) To use our data on normal children, for comparison

*The Child Study Research Project was started in 1949 under the general direction of Professor Alan Moncrieff, Director of the Institute of Child Health, and Miss D. E. M. Gardner, University Reader in Child Development and Head of the Institute of Education Department of Child Development, with the assistance of an Academic Advisory Committee.