RADIOLOGICAL EXAMINATION OF STOMACH AND DUODENUM

WITH SPECIAL REFERENCE TO THE EARLY DIAGNOSIS OF CANCER *

BY

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In this paper I shall discuss some of the problems inherent in radiological investigation, particularly of the stomach and duodenum, not only from the diagnostic and technical viewpoint, but also as they involve the interrelationship of patient, physician, and radiologist.

"Physician" and "Radiologist"

It might be expedient before proceeding further to define these two terms in the sense in which they are used throughout this paper. The word "physician" is applied generically to embrace the medical man or men, whether general practitioner, consultant physician, surgeon, or other specialist, in charge of the patient referred for radiological examination; "radiologist" denotes the man or group of men charged with carrying out such investigation.

It must be appreciated, however, that one of the essential attributes of a radiologist is that he be also a physician and pathologist. Besides being specially skilled in a highly technical method he must command an unusually extensive knowledge of disease and medicine in general, and, in particular, of the radiological manifestations of macroscopic pathology. He must be, above all things, a clinician, using as his main weapon what is undoubtedly the most powerful instrument of investigation yet discovered, but, at the same time, collating his findings with all other available clinical data.

This latter process should be transacted, where possible, in collaboration with the physician, though, owing to geographical and other obstacles, this may not always be practicable. In these more enlightened days the advantage of such consultation between physician and radiologist is becoming generally recognized. Not every investigation calls for it. The all too frequent advanced gastric carcinoma and the obvious peptic ulcer are instances, within the limited sphere of this paper, in which the radiological evidence is in itself decisive. Though even here questions such as that of operability may well merit discussion.

Value of History and Clinical Findings

Many cases, however, exhibit equivocal x-ray signs, which demand the fullest interchange of views between the physician and radiologist and consideration of all relevant facts. Indeed, my associates and I frequently feel justified in getting into personal touch with the physician referring the case, intimating that we do not wish to issue any formal report in writing until after such consultation has taken place. Moreover, without this interchange of views and discussion of the case from all aspects, the radiologist's report is likely to be either too determinate and confident, in the positive or negative sense, or too cautious and non-committal, and so of little use to the physician.

It may be asserted as a general principle that, whether it is possible or not for such consultations to take place, the radiologist should be fully informed by the physician as to what is already known, and should be free to

amplify this by his own interrogation of the patient, or otherwise, as by physical examination. It is just as unreasonable to ask the radiologist to make a diagnosis without a full knowledge of the history of the case and other clinical facts, as it would be, in these days, to expect the physician to do so without the x-ray findings. Also the radiologist should not be limited by too precise instructions as to the extent of his investigation. I have known cancer of the transverse colon to be missed because the case was referred as probably a gastric carcinoma and I was instructed to examine the stomach and duodenum only. Many similar instances have been reported. The late Sir Richard Stawell, at a congress in Sydney a few years ago, said: "The proper attitude towards the radiologist is to treat him as a consultant; to put fully our problem to him and ask him to help us in whatever way he may think best; not to dictate to him what to do and still less how to do it." I cannot vouch for the exact words, but I can vouch for the exact sense, as the statement was a rejoinder to my own plea made in open congress for just this freedom of action.

Another way in which the physician (and especially the surgeon) can collaborate with the radiologist, to the great ultimate benefit of all concerned, is by advising the radiologist as to the confirmation or otherwise of the x-ray diagnosis by subsequent events, especially the operative or post-mortem findings. The radiologist must also help himself by embracing every opportunity of following up cases to the operating theatre, the pathological department, and the post-mortem room, and his colleague should assist by notifying him of these occasions.

Necessity for Re-examinations

That further investigation may be indispensable in certain cases is not sufficiently recognized. The fluoroscopic observations must be correlated with the appearances seen in the corresponding films. The latter cannot be subjected to the necessary meticulous scrutiny until dry. Moreover, where a number of radiologists are working together as a team, consultation between them may be considered advisable even before discussing the findings with the physician. By this time the patient frequently has quitted the scene. Where ultimately there is even a shadow of doubt about a case, the patient should return for further and more detailed study, if necessary by special methods.

The question of expense may be raised, but it must be remembered that the stakes are high, that frequently the patient's life may be in jeopardy.

The Difficulties of the Radiologist

Many perplexities beset even the most competent radiologists, and this to a superlative degree in the search for early pathological changes in the gastric wall among the latter's highly irregular and multitudinous mucosal folds or rugae. Though mainly of interest to the radiologist, it were well that the physician had cognizance of the technical difficulties involved. The more the physician knows of the troubles encompassing the path of the radiologist, the better for the mutual understanding between the two; just as it is essential for the radiologist to appreciate the problems confronting the physician in regard to the patients he sends for examination, and to realize for what help he is appealing.

To the same end it should also be remembered by the physician that an x-ray report represents a human opinion and not a machine-made diagnosis. The knowledge, experience, and clinical acumen of the radiologist are everything. Without these the machine, the x-ray apparatus, impressive though it may appear to the uninitiated, is

* Read in opening a discussion in the Section of Radiology and Radiotherapeutics at the Annual Meeting of the British Medical Association, Melbourne, 1935.

worse than useless. It must then be recognized that the radiologist, in common with his other colleagues and the rest of the human race, is subject to human fallibility. He must make his mistakes, especially when overloaded with work, and more particularly when early reports are demanded, probably when he is mentally tired and there is no time for reflection and quiet consideration of the cases. Many of these errors could be eliminated, especially by giving the radiologist more opportunity for consultation, and for re-examination of the patient, if desired, and more time for his final review and the evaluation of his collected data.

The Outstanding Problem: The Earlier Diagnosis of Cancer

The most frequent of all malignant processes is gastric carcinoma, and its most trustworthy method of detection is the Roentgen ray. It is the universal experience of radiologists, however, that among the many cases they have demonstrated the number of really small carcinomata has been almost infinitesimal. The majority of gastric cancers when first seen are so far advanced that they readily could have been detected had they been an eighth, a sixteenth, or, in some cases, perhaps a hundredth of their observed size.

It is difficult to translate this into terms of time. Cancer of the stomach is not a thing that one sits down to and watches grow. A few cases, however, have been reported where early carcinoma has been seen or suspected and the initial radiological evidence not considered conclusive enough to warrant laparotomy. Berg¹ quotes one which he first demonstrated when, as estimated by him, the growth was "the size of a thumbnail." Six months later, at operation, it was as large as "a goose's egg." The patient died a year later.

Where the clinical histories of gastric carcinoma cases have been analysed, it has been found possible to divide the latter into two main groups: (1) those in which the symptoms have arisen recently and suddenly in previously apparently healthy persons; and (2) those in which there has been dyspeptic trouble over a long period of time. It is estimated that there are five or six patients in the first group to every one in the second.² Other figures³ show that by the time the cases reach the surgeon, which practically corresponds to that of the x -ray demonstration of the presence of cancer, about 50 per cent. are obviously inoperable, and of the other 50 per cent., where laparotomy appears to be justified, it is found impossible, in one-half of the instances, to resect the growth. If these figures are approximately correct they indicate that, under present conditions, in only about one-quarter of the cases of cancer of the stomach is there, at the time of discovery, any chance of cure.

The crux of the situation would seem to be primarily the latent period between the initiation of the malignant process and the onset of symptoms, at an estimate of which there seems to be no way of arriving; and, secondly, the difficulty of getting the patient to the physician with the least possible delay. The latter factor is intimately bound up with the problem of the education of the public in the matter, its advisability or otherwise, and is outside the scope of this paper. It might be mentioned, however, referring to the major group with sudden onset of symptoms, that estimates have been published⁴ showing that the average interval between such onset and the x -ray examination (or operation) is approximately eight to ten months. It would appear, therefore, that here there is precious time to be saved, time that might make all the difference between possible cure and hopeless inoperability.

Radiological Detection of Early Cancer

This is altogether a different problem from that of the early diagnosis of cancer, just discussed. The main factors in regard to the latter are those of getting the patient to the physician, and from the physician to the radiologist, with the least possible delay. The radiological discovery and demonstration of early cancer, on the other hand, is a technical problem for the radiologist, involving the ascertaining of its earliest recognizable radiological signs, and the devising of apparatus, methods, and procedures for observing and recording such changes.

Peristalsis: Its Disturbance as an Early Sign of Cancer

As the practice of radiology advanced and equipment improved, the search for, and demonstration of, direct evidence of organic lesions of the stomach met with more and more success. The result, however, tended towards neglect and forgetfulness of the various indirect signs and functional disturbances that were exploited so ably by many of the earlier masters of the art.

In the primary stages of carcinomatous involvement there may be nothing beyond narrowly limited infiltration of the stomach wall by cancer cells with localized induration. During peristaltic action this area tends to remain fixed in shape. The peristaltic wave jumps it. Single films, each made with the patient in a different position, can fail entirely to demonstrate this phenomenon. It is easily missed at fluoroscopic examination. One method of demonstrating it⁵ is by taking a series of films at short intervals with the patient's posture unaltered. Careful comparison of tracings of the various films may then show one particular section (usually in the lesser curvature) presenting a stereotyped, fixed, or straight line appearance.

All stages may be observed from the earliest local invasion, disclosing itself only by one small area not entering into the peristaltic wave movement, through more extensive involvement with changes in contour, size, and general flexibility, with the stomach ultimately becoming generally infiltrated and contracted, and occupying a correspondingly higher position in the abdominal cavity. Throughout the progress of this infiltrating, scirrhous type there may be no irregular projections of the malignant tissue into the lumen of the stomach, and therefore none of the classical "filling defects."

The Mucosal Pattern: Its Diagnostic Value

When outlined by a small quantity of suitable opaque medium the folds or rugae of the lining mucosa of the stomach (along with that of the rest of the alimentary canal) form a striking pattern, the study of which has been recognized for many years as an essential part of any properly conducted x -ray investigation.

The involvement of the mucosa in the vicinity of local organic lesions produces various well-known signs. Around the more or less acute simple ulcer the inflamed mucosa becomes greatly swollen, falling away gradually in all directions to normal thickness. As the swelling subsides, so does the depth of the so-called ulcer crater. Hence the rapid healing with deturgescence of the mucosa, resulting from suitable medical treatment; also the frequent impossibility of demonstrating an ulcer unassociated with mucosal swelling, as after recent haematemesis. In contradistinction to the above is the local, irregular, heaped-up margin of neoplastic tissue around the malignant ulcer, and, again, the convergence of the rugae to the chronic cicatrizing ulcer or the old, healed scar.

Of main interest on the present occasion, however, are the changes of the mucosal pattern associated with early

malignancy—the erasure of the folds over an area of infiltration in the scirrhus type, and their abrupt discontinuity at the edges of a fungating mass. How early are these manifest and pathognomonic? What is their value in this respect, as compared, for instance, with the disturbances of peristalsis just discussed? What is the best method for their demonstration?

Åkerlund,⁶ in Sweden, and Berg,¹ in Germany, have devised special apparatus for applying local pressure to various small portions at a time of the stomach and duodenum, enabling films to be secured with the pressure, and therefore the fluoroscopic appearance, still maintained. They both claim considerable success in thus demonstrating various pathological conditions. Gregory Cole and his collaborators, on the other hand, maintain that they “have yet to see a single case where localized pressure has established the diagnosis of any ulcer of the cap or any other organic lesion of the stomach where the diagnosis had not already been established by our own serial routine method of examination.” It is also of interest that an authority such as Case,⁸ in a short review of this book, quotes the above passage almost verbatim, referring to it as a “significant statement.”

There is another side to these various attempts at discovering cancer in its earlier stages. They may lead on occasions to the error of diagnosing the probable presence of carcinoma when, as a matter of fact, the observed variations from the normal are due to other factors. This danger, however, would appear to be small compared with the alternative of missing cases in the operable stage. It would be minimized by the more general adoption of the principle of re-examination. A statement has recently emanated from the Mayo Clinic⁴ to the effect that “early diagnosis of cancer can be made on repeated examinations.”

Problems Peculiar to One or Other End of the Stomach

THE PARS CARDIACA OR FUNDUS

Many inherent difficulties present themselves in the search for pathological conditions, especially cancer, in this area. The rugal pattern is coarse and complicated, and the part beyond reach of palpation. With a carcinoma in this region there may be only very slight clinical symptoms, especially if there be no involvement of the oesophagus. A critical inspection of the lower end of the latter must be considered an essential element in the examination of this portion of the stomach.

An excellent summary of the various radiological indications of cancer of the fundus is given by Stewart and Illick,⁹ who enumerate as many as eleven different diagnostic signs, based mainly on involvement of the oesophagus, derangement of the mucosal pattern, interruption to the ingress of the opaque meal, and the direct visualization of the tumour.

THE PARS PYLORICA OR ANTRUM

Just as the cardiac end of the stomach presents its own peculiar problems, so does the immediately prepyloric segment. Usually, in a stomach free from organic disease or functional disturbance, the pars pylorica when distended presents a terminal wall parallel to the base of the duodenal cap, separated from the latter by the pyloric valve.

What, however, are to be the radiologist's interpretations of all the various divergencies from this simple, symmetrical appearance? More or less localized irregularities in the form of the prepyloric gastric lumen, general narrowing of this segment, and widening of the sphincteric zone, often with a loss of the normal parallelism

between the opposed base of the duodenal cap and the pyloric end of the stomach, are frequently observed, either singly or in combination. Under palpation this distal segment can perhaps be manipulated into more or less its conventional shape. This is generally accepted as excluding carcinoma or ulcer and the case let go at that, the differences from the usual form being accepted as anatomical variations.

But have these deformations no significance? Surgeons have noted stiffening and congestion of the stomach in this area—for example, in association with cholecystitis.¹⁰ Examination of the tissue removed from the pyloric end of stomachs of the type discussed is said to show the presence of round-cell infiltration and fibrosis. Is it proper, then, that the whole matter be dismissed in the radiologist's report with the remark “no organic lesion detected”? May not the x-ray appearances in certain cases be indicative of localized gastritis, and is it possible to determine when this is so? All variations, however slight, from the normal shape of the prepyloric segment must be regarded as important, because of the preponderating incidence of carcinoma in this part of the stomach.

It is general knowledge how difficult may be the demonstration of a prepyloric ulcer, or of an early scirrhus carcinoma; how reactions associated with the former can cause changes in the lumen suggestive of the presence of the latter¹¹; and how various other intrinsic and extrinsic conditions can simulate either or both. Here particularly consideration of the clinical data and the probabilities may have to play a relatively large part in arriving at a diagnosis.

Space does not permit discussion of the various forms of gastritis and their possible diagnosis from observed variations in the mucosal pattern, or of less debatable matters such as polyposis, innocent tumours, syphilis, etc.

The Duodenum

Consideration will be limited to the bulbus duodeni or “duodenal cap,” which may be regarded morphologically as part of the stomach. One problem is that of the significance of deformation. In the presence of suggestive clinical symptoms, deformation is frequently proffered as evidence of associated ulceration, even if no ulcer crater be demonstrated. On the other hand, after the disappearance of symptoms, perhaps for some considerable length of time, deformation may still be present. The explanation then is that the ulcer is healed, but that the irregularity persists because of the formation of cicatricial tissue. As has been said¹² in effect, the radiologist cannot have it both ways. He cannot use the deformation in the first place as evidence of actual ulceration and then later explain the persistence of the same deformation as due to scarring. The demonstration of a crater, either *en profile* or *en face*, as in the stomach, is frequently possible with good technique, and is practically pathognomonic.

Are there any other signs of value? This leads naturally to the question of duodenitis and the “irritable cap.” It would appear that normally the cap has little or no intrinsic peristaltic activity. It frequently is observed to remain consistently full, its contents overflowing from its apex into the more distal segments of the duodenum only as more food is forced into its base, through the pylorus, by the peristaltic action of the stomach. This persistent state of fullness appears to be its normal condition, at least shortly after a meal, and may be a device for breaking up the jets that spurt through the pylorus, thus preventing them from constantly impinging on to more or less the same spot of the duodenal wall and so possibly producing ulceration.

In many cases, however, the cap does not thus remain filled. It may, on the contrary, show all degrees of "irritability" up to the point of refusing to retain practically any of the food received from the stomach, immediately passing it on to the next segment. It may present also every degree of spastic deformation.¹³ Frequently, with the aid of palpation, the radiologist is able, in the milder cases, to restrain the onward passage of the opaque foodstuff and fill the cap out until it assumes the normal size and shape. He may, if a "realist," concerned mainly with the demonstration of definite organic lesions, baldly report "no ulcer," ignoring the fact that the cap does not altogether maintain its normal convexly pyramidal, symmetrical shape.

Then, again, there is the appearance of the mucosal pattern, on which, along with that of the stomach, more attention recently has been focused. With duodenitis the mucous membrane is described¹³ as presenting a coarse and irregular reticulation, perhaps attributable, however, to puckering of the mucosa by spastic contraction of its muscularis.

On the surgical and pathological sides of the case there is the hyperaemia and stippling of the serosa, with the locally or diffusely inflamed mucosa, unbroken but bleeding easily on manipulation,^{13 10} and, clinically, the "duodenal syndrome." Are radiologists in general paying enough attention to the demonstration of duodenitis, and to what extent is this possible?

The Design of the Radiological Investigation

As has already been pointed out, most of the radiological signs for the detection of pathological conditions of the stomach and duodenum and a determination of their nature have been known and discussed for many years, though with sometimes one aspect and sometimes another receiving the greater attention. The question of how the trained radiologist can best elicit and demonstrate these signs is mainly one of technique, conditioned by the economic factors of apparatus required and time and material consumed. It will always remain a problem for consideration and review.

It may be accepted, perhaps, as axiomatic that a comprehensive gastric examination must embrace: (1) the scrutiny and, if necessary, a photographic record of the rugal pattern from end to end; (2) an examination from various angles and in different postures of the stomach and duodenum, along with the adjacent segment of the oesophagus, in successive stages of filling; including (3) observation of its functional behaviour. Any discussion, then, should endeavour to decide how each of these can be carried out most satisfactorily. In detail it would include the choice of opaque material for the various techniques; the most suitable methods of fluoroscopic examination, including posture of patient, manipulation, application of pressure, etc.; the best way of securing permanent radiographic records or films; and the apparatus necessary or most suitable for these purposes. These factors must also be considered as they apply to the various postures of the patient and to the different sections of the upper alimentary tract under review, the latter falling naturally into three divisions: (1) the lower end of the oesophagus and fundus of the stomach; (2) the body or pars media; and (3) the pars pylorica and bulbus duodeni.

If the above thesis holds, it is suggested that fundamental matters for determination by radiologists would be: (1) the constitution of a sufficient and not over-elaborate routine method for the radiological examination of the stomach and duodenum; (2) the additional technique to be made available for determining, as fully as possible, the nature and extent of equivocal abnormalities detected at the first examination, or for further investigating

doubtful cases; (3) the ancillary apparatus most suitable for these respective purposes.

As just indicated, a rational solution of the problem would appear to be the institution of two types of examination. The first might be called the "standard" one, resembling that employed by the average present-day expert radiologist; this should be sufficient to disclose most peptic ulcers and the all too frequent advanced carcinomata. The second or "special" examination would be more elaborate, designed to demonstrate those early elusive signs already discussed, and using special fluoroscopic and recording apparatus. This arrangement would seem to be the most suitable for two reasons. In the first place it would be impracticable in a busy x-ray laboratory to arrange a time-table for the gastric work, when it was never known whether the various individual cases were going to be subjected to a comparatively expeditious standard examination or to the longer special one. It would also be uneconomical, since it would be unnecessary to put all patients through the more elaborate routine. Under this scheme each patient would be investigated by the "standard" method, the subsequent comparison of his films and the fluoroscopic observations determining whether any definite pathological process were revealed, and, if so, whether sufficient evidence had been obtained to determine its nature and extent.

Where the evidence was considered inconclusive or insufficient, even to the extent of there being only a slightly suspicious appearance in one small area, the patient should be recalled for the special investigation, when, for instance, a meticulous scrutiny of the gastric mucosa would be made, and special serial films obtained for a study of the peristaltic movements. Cases with a significant clinical history but no positive x-ray gastric findings at the "standard" examination should also be included in this group for re-examination. Here, in particular, the oesophagus should be subjected to a thorough scrutiny, a procedure to which some of the specialized fluoroscopic apparatus does not readily lend itself; and where the original request from the physician was for a report on the upper part only of the alimentary tract, the examination should be extended to the small and large intestine. Not infrequently gastric symptoms may arise from lesions situated lower down in the alimentary tract, even to carcinoma of the rectum!

In an organization of sufficient size it might be well to have two gastro-intestinal rooms, one equipped for the simpler general routine investigation, and the other with suitable special apparatus for the more elaborate re-examination of selected cases. For every worker the adoption of some one or other definite routine is essential.

The Cost of Radiological Investigation

This is always a factor that has to be considered. Radiological work is inherently expensive because of the apparatus required and the materials used. This is particularly so in Australia, where the cost of equipment is so much greater than on the other side of the world. As technique improves and new methods of examination are developed so must the fee for a thorough investigation tend to rise. The value of the evidence derived therefrom, however, increases in a much greater ratio. Taking it all in all, the amount paid for an x-ray examination by a competent radiologist, having regard to the results achieved and the information elicited, is probably the best investment a patient ever makes in the realms of medicine. It is the duty of the radiologist, however, both to the physician and to his patient, to see that these examinations are not made over-elaborate, and it is with this principle in mind that the above method of procedure is advocated.

Summary

The paper treats of various aspects of radiological investigation in general, and of gastric and duodenal conditions in particular. They are dealt with largely from the point of view of the physician and patient, though several technical problems also are propounded and discussed. At the same time it is pointed out how a general acquaintance on the part of the physician with these difficulties of the radiologist can help towards a mutual understanding between the two, to the greater benefit of both, and especially also of the patient, who, after all, is the cardinal member of the triangle and the one most concerned.

An attempt has been made to reconcile the necessity for the most thorough and exhaustive investigation in certain cases with the need for keeping *x*-ray costs in general within reasonable economic limits. Re-examinations play a large part in the procedure suggested as a solution, and the necessity for these should be recognized by the physician.

Distinction has been drawn between the problem of the early, or at least earlier, diagnosis of cancer on the

one hand, and that of the diagnosis of early cancer on the other. The latter is, in the light of our present knowledge, mainly an affair of radiological technicalities and the interpretation of *x*-ray evidence. The earlier diagnosis of cancer, however, would appear to depend mainly on the general principles enunciated. It rests not so much with the radiologist as with the medical profession as a whole and society in general.

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A CASE OF DERCUM'S DISEASE AND ITS TREATMENT BY DEEP X RAYS

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Case History

The patient was a married woman of 50 years, who for five years had suffered continuous and intense pain in her legs, which had for the previous eighteen years been involved in a generalized obesity. Twenty years previously she had weighed 136 lb. In 1914, just at the beginning of the war, her third child was born; she was alone on a farm when the child came, and altogether it was a time of great mental strain. When the child was three months old she had a complete breakdown, and for two years suffered from what appears to have been a post-puerperal melancholia. Her weight fell to 100 lb. In 1916 she began gradually to recover; as she recovered she became stout, and in the course of a couple of years arrived at her present state of obesity. Her weight now varies round about 240 lb. She had no pain in the fatty tissue until five years ago, when her legs became sore all over, the right being worse than the left. She was never free from pain, which prevented her from sleeping at night. In her own words she describes the pain as "worse than childbirth" and "like a thousand teeth aching." It was "in the flesh, not in the bones."

Other points in the history were that she had always lived a normal sexual life since marriage, and had had a son and two daughters. The periods had always been regular, not excessive, and without pain until two years before, when for six months there had been flooding. She then had a subtotal hysterectomy and unilateral ovariectomy for fibroids. Micturition had always been normal and never excessive. Just after the operation she had had a little difficulty in holding the urine.

Lactation had been normal. The only unusual feature was that since the birth of the first child in 1905 (twenty-nine years ago) there had always been some secretion in the breasts, even apart from pregnancy. This persisted to the present time. She did not complain of headache or of any visual disturbance, but was, however, liable to attacks of nose-bleeding. On questioning she said that she had never been very hairy, but when the pain came on she completely lost all hair from the legs. A further leading question caused her husband to say that

he thought that, at the time of her breakdown, just before the onset of the obesity, there had been some protrusion of the eyes and tremor of the hands. This was, however, only in answer to the direct suggestion that such was the case.

There was no glycosuria, which is stated by Leyton³ to be associated with acidophil and basophil but not with chromophobe tumours. There was no evidence of diabetes insipidus. We did not have the opportunity of estimating the basal metabolism, but there was no sign of hypo- or hyper-thyroidism. Nor did we investigate the blood sugar or the blood calcium, but there was nothing to suggest impaired parathyroid secretion. The obesity, loss of hair, and pains in the limbs might have suggested myxoedema, but there was no loss of memory or mental torpor, no dryness or thickening of the skin, and no dryness or brittleness of the hair of the head. Moreover, the pain in the limbs was severe, and not just the aching which occurs in some cases of myxoedema.

Diagnosis

The patient was regarded as a case of Dercum's disease—adiposis dolorosa. Dercum originally thought that this syndrome was due to a depression or perversion of the thyroid function, but more recent investigations^{1,2} have shown in quite a large proportion of cases which have come to post-mortem some morbid condition of the pituitary gland.

In this case the only points in the history suggestive of a pituitary origin are (1) the obesity, such as is seen in dystrophia adiposo-genitalis (Fröhlich's syndrome) and in Cushing's syndrome (basophil adenoma); and (2) the lactation apart from pregnancy, which has been described as associated with tumours of the pars nervosa.³ Corner⁴ and Riddle and his associates⁵ have, however, brought forward convincing evidence that there is a special lactogenic hormone with its origin in the anterior part of the pituitary. Radiographic examination of the skull showed some changes in the sella turcica. The pituitary fossa was enlarged, the floor a little depressed, and the dorsum sellae thinned and thrust slightly backward. Radiographs of the thighs show great increase of the subcutaneous fat outside the muscle layers.

Treatment

The question of treatment then arose. No endocrine treatment had apparently been devised which would rid the patient of the pain which is the really troublesome