Shennan (1934), however, pointed out that most dissections begin in areas relatively free from atheroma. Atheromatous degeneration is seldom very severe in the first part of the aorta, where dissection most often begins. Cystic degeneration of the media, frequently found in aortic dissection, is now generally accepted as the initial lesion. Some writers have stressed the importance of sudden strain in initiating the tear, but such a history is often absent. In none of the above five cases was sudden strain an important factor.

Clinical Picture

A wide diversity in the presenting symptoms is manifest in these cases, ranging from complete absence of pain, as in Case 4, to the classical picture of severe chest pain radiating to the groin in Case 5. In the latter, however, the symptoms were of momentary duration only.

Silent dissection may not be so uncommon. Baer and Goldburgh (1948), in reviewing a series of 44 cases, found 24 which gave no history whatever of pain. There does not seem to be any very obvious reason why some cases should be painful. It may be that rapidity of dissection is a related point. In Case 4, in which there was no history of pain, the post-mortem findings pointed to a recent dissection, and from a clinical aspect dissection had extended from the origin of the left subclavian artery to the coeliac axis in 24 hours—that is, the time between the onset of symptoms and death.

The experience of these cases certainly does not support the view of Paullin and James (1948), who consider that pain may be absent when dissection proceeds slowly. In Cases 1, 2, and 3 pain was a prominent feature in the history, yet the pathological findings pointed to chronic dissection. Cases 1 and 2 are instructive in demonstrating how slight may be the incapacity resulting from chronic dissection. In Case 1, in view of the absence of peptic ulceration at necropsy, it is most probable that symptoms in the later two to three years of life were due to the aortic disease, yet her disability was never severe enough to warrant hospital admission up to the time of her last illness. Case 2 made light of his two-years history of left-sided abdominal pain, yet there can be no question that his symptoms were due to the dissection of the aorta.

That dissecting aneurysm of the aorta can simulate primary disease in other systems is readily understood on anatomical grounds. Extensive dissection to the carotid vessels may show as cerebral symptoms, to the subclavian arteries as vascular lesions in the arms, to the coeliac axis and renal vessels as abdominal emergencies or renal disease respectively. When, in addition, pain is minimal or absent the clinical diagnosis may become still more obscure. Cases 2 and 5 bear this out.

Renal involvement was the presenting feature in Case 2 and a later manifestation in Case 5. Blain, Glynn, and Hiratzka (1945) have reviewed the literature up to that time bearing on the question of renal involvement in aortic dissection.

From the neurological aspect Weisman and Adams (1944) have commented on the frequency of neurological symptoms in this disease. They mention that 30% of such cases coming to necropsy at the Boston City Hospital had such symptoms. In addition the combination of neurological and vascular lesions in a limb in any patient should immediately arouse the suspicion of aortic dissection.

Electrocardiographic Findings.—These are not infrequently a further source of confusion in reaching a diagnosis. The coronary blood flow is said to be obstructed by extension of the dissection to the coronary ostia or by compression of the vessels from pericardial haemorrhage, thus giving rise to the electrocardiographic picture of cardiac infarction. Bourne and Mills (1946) have reported two cases in which neither of the above explanations sufficed to explain the electrocardiographic findings. There the serial changes compatible with cardiac infarction were found in life, but at necropsy there was no evidence of cardiac infarction.

Oram and Holt (1950) have reviewed the literature on this aspect, and suggested some features which might be helpful in the differential diagnosis.

Summary

Five cases of dissecting aneurysm of the aorta are described. It is suggested that less importance should be attached to the history of severe thoracic pain than in the past. Aortic dissection may often be a silent process or present with the minimum of symptoms over a prolonged period. The tendency to simulate other diseases is a prominent feature.

I am indebted to Dr. J. K. Rennie, Bradford Royal Infirmary, for permission to publish Cases 1–4, to Dr. W. G. A. Swan, Newcastle General Hospital, for Case 5, to Mr. C. L. O. Macalister for his notes of the cystoscopy and operation on Case 2, and to Drs. R. Turner and B. Smith for access to their necropsy reports.

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LEAKING ABDOMINAL ANEURYSMS TWO UNUSUAL CASES

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Aneurysm of the abdominal aorta is an uncommon condition whose mode of presentation is unusually varied. The two cases presented here are recorded for their similar and misleading clinical features. They presented as strangulated inguinal herniae.

The importance of recognizing that aortic aneurysm may present as an acute abdominal emergency lies in the fact that unnecessary operation may thereby be obviated. Both the ruptured and the unruptured aneurysm present these difficulties of diagnosis.

Case 1

A man aged 69 was admitted as an emergency case on December 2, 1948, with a provisional diagnosis of strangulated right inguinal hernia. When seen after admission he was complaining of severe abdominal pain, which had come on suddenly the previous afternoon. He complained of nausea, and had vomited.

On examination he had a temperature of 100° F. (37.8° C.) and a pulse rate of 100. Examination of his abdomen revealed a tender irreducible swelling in the right inguinal region. His abdomen presented generalized rigidity, and bowel sounds were absent on auscultation. A provisional diagnosis was made of incarcerated right inguinal hernia, with probably strangulation and peritonitis.

Laparotomy (B.C.R.) revealed diffuse retroperitoneal extravasation of blood involving both the posterior and the anterior abdominal parietes. A large non-pulsatile mass was felt in the position of the abdominal aorta. It was then realized that the case was one of ruptured abdominal aneurysm, the external swelling being due to extravasated blood escaping through the inguinal canal.

After operation the patient's general condition deteriorated, and he died suddenly in the early hours of the morning of December 4.

Necropsy.—**Heart:**—The anterior descending branch of the left coronary artery showed extensive atheroma with ulceration and calcification. There was evidence of an old infarction at the apex of the heart. **Abdomen:**—The retroperitoneal tissues of the posterior abdomen showed a massive haemorrhage extending into the root of the mesentery. The haemorrhage was most pronounced on the right side, and in all there appeared to be approximately 3 pints (1.7 litres) of soft clot. The aorta showed extensive atheroma with ulceration and calcification, and in its lower part there was a large aneurysmal sac extending forwards. The sac measured approximately 10 cm. from above down, 6 cm. laterally, and 8 cm. antero-posteriorly. Its lining appeared to be continuous with that of the aorta, with superimposed masses of dense fibrin showing considerable calcification. Rupture had occurred on the right side of the sac, accounting for the greater haemorrhage in the retroperitoneal tissues on that side. The blood had tracked down along the iliac vessels on the right side through the femoral canal and along the spermatic cord. The aneurysmal bulge was entirely to the front of the aorta, and there was no evidence of any erosion of the vertebral bodies. It did not appear to be a dissecting aneurysm.

Case 2

On April 7, 1952, a man aged 76 was admitted to hospital as a surgical emergency with a diagnosis of strangulated left inguinal hernia. He gave a history of a painful lump in the left groin which had appeared for the first time only twenty-four hours previously. At the same time as the lump appeared he had some pain in the left iliac fossa. There was no nausea or vomiting. He was known to be hypertensive and subject to encephalopathic attacks.

On examination he was pale. His temperature was 98° F. (36.7° C.), pulse 114, and respirations 20. The abdomen was obese and moved well on respiration. No mass was felt, but there was deep tenderness in the left iliac fossa. Bowel sounds were normal. A tense, tender, irreducible swelling was presenting at the left external inguinal ring. A diagnosis of strangulated left inguinal hernia was made.

At operation (J. W. B.) the swelling was found to be an extravasation of blood into the layers of the cord, and on following this up a massive retroperitoneal haematoma was apparent. The patient made a good recovery from operation. While he was sitting up having his tea the following day he suddenly collapsed, and died within a few minutes.

Necropsy.—Post-mortem examination showed hypertrophy of the left ventricle and some atherosclerosis of both coronary arteries. The thoracic aorta showed scattered atheromatous ulcers and calcification of the wall, this condition extending into the abdominal part, where just above the bifurcation there was a large aneurysmal sac 6 by 4 by 4 in. (15 by 10 by 10 cm.). The wall of this had ruptured on the left side, causing a massive retroperitoneal haemorrhage extending from the diaphragm to the pelvis.

Pathology of Abdominal Aneurysm

Of aneurysms of the aorta those occurring in the abdominal part form only a small proportion. Thus Bryant (1903), searching the post-mortem records of Guy's Hospital covering 46 years, found that only 54 of 325 cases of aneurysm of the aorta had occurred in the abdomen. In reporting four cases of abdominal aortic aneurysm Jennings (1941) quotes Kampmeier (1936) as finding 386 cases reported in the literature.

The chief aetiological factors in the formation of abdominal aneurysms are syphilis, arteriosclerosis, and trauma. Syphilis is the most common cause in all the large series of aortic aneurysms reported, but a smaller series of cases in the older age group is associated with arteriosclerosis.

Males predominate, and heavy manual work is a precipitating factor. The upper part of the abdominal aorta is the site of preference for the syphilitic cases, which are usually saccular. The arteriosclerotic aneurysms occur just above the bifurcation and may be fusiform or saccular in type.

The factors which predispose to aneurysm formation are a weakening of the arterial wall together with an increased pressure inside the lumen. Such increased pressure may be intermittent, such as occurs in sudden violent exercise, or it may be due to a persistent hypertension. The saccular aneurysm causes an out-pouching of the vessel at one point, whilst in the dissecting type the blood penetrates between the vessel coats and separates them.

Matas enumerates the terminal complications of abdominal aortic aneurysm as follows: (1) rupture of the aneurysmal sac; (2) disturbance of peripheral circulation, leading to gangrene of extremities; (3) fatal involvement of intestinal or renal circulation; (4) multiple small extravasations, leading to death from anaemia; (5) infection of the sac, with secondary haemorrhage; and (6) rupture into the inferior vena cava, with formation of an arteriovenous aneurysm and death from sudden arterial depletion.

However, whether of dissecting or saccular type, the aneurysm most commonly ends fatally with rupture. In the former type the rupture occurs suddenly, when the outer coat of the aorta is penetrated. The rupture of the saccular type occurs gradually, multiple small haemorrhages perhaps preceding the fatal massive rupture by several months.

Symptoms

Pain.—A dissecting aneurysm of the abdominal aorta may manifest itself suddenly with severe abdominal pain. The pain is generalized, but if the dissection extends into the iliac or femoral vessels it is commonly referred to both the lower limbs. If the dissection involves the lumbar arteries the pain will radiate to the loins. Similarly, extension of the dissection upward may cause radiation of the pain to the region of the chest and neck. After intra-peritoneal rupture of a saccular aneurysm death ensues rapidly, and pain is not a prominent symptom. If, however, it should rupture extraperitoneally, as in the two cases reported, the pain may simulate that of a dissecting aneurysm in severity and distribution.

Haematemesis and Melaena.—This may occur in the dissecting type of aneurysm if the gastric or mesenteric vessels are involved. In the saccular type, involvement of and rupture into the intestinal tract may similarly produce the same symptoms. A case was recently reported by Barrett (1949).

Uraemia.—This may occur if the renal vessels are involved either by dissection or by propagation of intravascular thrombosis.

Signs

The clotting of small repeated extravasations, and intravascular clotting within the sac of the saccular aneurysm, may produce a mass which is palpable per abdomen. Intra-peritoneal leaking may produce signs of peritonitis. In the case of a dissecting aneurysm involving iliac and femoral vessels there may be signs of bilateral circulatory insufficiency in the lower limbs. The downward extravasation in the retroperitoneal tissues of blood from a rupture of an aneurysm of either type may eventually reach the hernial orifices, as occurred in these two cases.

The only reference to similar cases in the literature is that reported by Eckert and Baker (1931), in which an extravasation into the right femoral canal led to the incorrect pre-operative diagnosis of psoas abscess.

Diagnosis

The only incontrovertible physical sign of an abdominal aortic aneurysm is a pulsatile swelling. In the presence of such protean manifestations as those mentioned, diagnosis can seldom be unequivocal.

The acute pain of the dissecting aneurysm and the leaking saccular aneurysm is the pain most likely to be misdiagnosed as one of the more usual types of acute abdominal emergency. The intense abdominal pain may mimic that of acute pancreatitis, perforated peptic ulcer, or mesenteric vascular occlusion. In such a case radiation of the pain into the loins, neck, or lower extremities may be significant. Previous symptoms of cardiovascular disease are usually absent, although the presence of hypertension may be suggestive.

The problem of the case which presents with extravasation at the hernial orifices is well illustrated in our two cases.

The concomitant occurrence of severe abdominal pain, lower-limb pain, and the presence of lower-limb vascular insufficiency may indicate a dissecting aneurysm, although similar signs may occur in a case of abdominal embolism.

Summary

Two cases of ruptured abdominal aortic aneurysm are recorded which presented clinically as incarcerated herniae.

The pathological and clinical features of abdominal aortic aneurysms are discussed.

The diverse modes in which these aneurysms, both ruptured and unruptured, may present are stressed and the differential diagnosis is indicated.

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FOOD SUPPLY, BODY WEIGHT, AND ACTIVITY IN GREAT BRITAIN, 1943-9

BY

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Between 1943 and 1949 a survey of the body weight of the population of Great Britain was made for the Ministry of Food with the object of providing an independent check on the adequacy of the national food supply. On certain broad assumptions a fall in body weight would have been a warning that food supplies were inadequate. Only gross changes in weight were being looked for, and none were found. There were, however, certain well-defined trends, and the opportunity has therefore been taken to determine whether these might themselves be related to trends in the energy value of the food consumed. The validity of such a comparison is bound to be influenced by changes in bodily activity such as those that might be associated with increased industrial productivity. As is shown below, attempts were made to arrive at an assessment of such activity, but without success. Nevertheless, the results recorded are so striking that it was felt that they warranted publication.

Experimental

The method of sample selection and the initial measurements of the Ministry's Body Weight Survey have already been described by Kemsley (1950, 1952), and a further paper describing the changes which occurred during the course of the survey is in the press. The survey was originally designed to cover the principal sections of the civil population over school age; as it continued, certain groups were omitted. The data used in this note refer to the two groups for which continuous records are available—industrial workers (male and female) in small firms and housewives. The former group was fairly well spread over the light industries, including some wholesaling and retailing trades. The latter group comprised working-class women who spent most of their time looking after their homes. For the present purpose only adults between 25 and 54 years have been included, because at ages outside these limits it is likely that growth or senescence will directly affect weight. Those individuals included in successive quarterly samples were compared, the weight changes thus obtained being averaged. These average changes, based on between 3,000 and 4,500 individuals, have been added cumulatively from the beginning of the survey, taking April, 1943, as the zero base-line. This quarterly index is shown by the dotted line in Figs. 1 and 2.

There are several sets of data referring to food consumption which might be compared with these graphs. Total supplies of foods as published in the various reports on Food Consumption Levels (Ministry of Food, 1949, 1951a) are not suitable, because they are complicated by changes in retail and household stocks and therefore do not adequately reflect current consumption. Changes in the ration scales are not realistic because they do not include unrationed foods or foods which were sold against points. For the present purpose, therefore, data from the Ministry of Food's National Food Survey have been used. These recorded the actual domestic food consumption of urban working-class households. The relevant results, together with details of the method of sampling and the techniques used, have already been published (Ministry of Food, 1951b). The data were based on actual purchases of foods and changes in larder stocks, and from these the average energy values of the food consumed could be calculated for comparison with the results of the body weight survey. No allowances have been made for food eaten in catering establishments, or for certain items, such as sweets, ice-cream, alcoholic and some soft drinks, for which the housewife could not readily provide complete data. Nor, on the other hand, are allowances made for food eaten in the home by visitors. These omissions do not, however, invalidate the figures for the present purpose, since on the average their energy values did not vary appreciably during the years under review.

Fig. 3 shows the resulting estimated changes in food consumption between 1943 and 1949, based on some 20,000 to 30,000 individuals per year. The dotted line shows changes in quarterly averages of the energy value of the food available for consumption in the home per head per day. It has been constructed on the same basis as the graphs in Figs. 1 and 2, changes being recorded from an arbitrary zero base-line starting at April, 1943.

In all three figures the medium-term trend line has also been calculated, based on a centralized moving average of four successive readings. The purpose of this, shown as a thicker continuous line on the graphs, has been to eliminate seasonal fluctuations.* Both body weight and calories varied seasonally in a fairly regular manner, but such variations were regarded as extraneous to the present purpose, which is to consider medium-term trends.

The simpler statistical methods of correlation are not applicable to time series without modification, and it is not

*It is known that under normal circumstances seasonal, and roughly parallel, fluctuations occur in body weight and food consumption. It was important, therefore, to eliminate these in considering longer-term trends.