tortuous. After the operation the patient did not complain of any more pain, and the tenderness disappeared gradually. The symptoms may have been due to the abscess between the colon and the abdominal wall. A Wassermann test proved negative, and she was discharged on April 4.

Comment

The possibility of ruptured splenic aneurysm is not usually considered in the diagnosis of an obscure acute abdominal condition occurring during pregnancy or otherwise. As several of the recorded cases show, the fatal haemorrhage is often preceded by a comparatively innocuous rupture limited to the lesser sac. If the latter condition were recognized and appropriate treatment undertaken some lives would be saved. The case recorded was unusually fortunate in that the second haemorrhage did not prove immediately fatal; a second chance was thus given to atone for the failure to make the correct diagnosis in the first instance. The striking feature in this case was that the well-marked symptoms of sudden acute abdominal pain and collapse contrasted with the comparative absence of the usual physical signs of an acute abdominal catastrophe. In the first instance the fact that the patient was eight months pregnant confused the issue, and the diagnosis of concealed accidental haemorrhage seemed reasonable until the onset of uterine contractions failed to result in any external haemorrhage. On the second occasion, although the symptoms were even more marked, the physical signs were inconclusive. The tenderness and rigidity were not sufficient to suggest perforation of a peptic ulcer, the absence of vomiting or retching and a negative Loewi's test were against a diagnosis of intestinal obstruction or acute pancreatitis, and the persistence of active peristalsis did not favour an infective peritonitis. In this case experience of a similar set of circumstances led to a tentative diagnosis of torsion of the omentum.

The aetiology of aneurysm of the splenic artery remains uncertain, and it would be interesting to hear of any suggestions as to why it should occur with disproportionate frequency during pregnancy. It is a remarkable fact that after the initial bleeding the interval of quiescence should have persisted in spite of the strain of labour and the ordeal of treatment for acute dilatation of the stomach, either of which might have been expected to initiate a recurrence. This would seem to indicate that in a case of arterial haemorrhage, once clotting has occurred, external factors have little influence on the recurrence of haemorrhage. It suggests that a stage is reached in the autolysis of the clot when the latter is no longer capable of performing the haemostatic function, and gives food for thought on the aetiology of secondary haemorrhage.

Summary

A case of aneurysm of the splenic artery with rupture during the later months of pregnancy is recorded. It illustrates two facts of some importance, in which it resembles previously recorded cases. First, that rupture often occurs in two stages; the initial bleeding into the lesser sac is not fatal, and if recognized the appropriate treatment by splenectomy gives an excellent chance of curing the condition: in most cases the second rupture, occurring about a fortnight later, has proved fatal before treatment could be undertaken. Secondly, that this unusual condition is liable to complicate the later months of pregnancy.

REFERENCES

- Anderson, W., and Gray, J. (1929). *Brit. J. Surg.*, **17**, 267.
 Brockman, R. St. L. (1930). *Ibid.*, **17**, 692.
 Machemer, W. L., and Fuge, W. W. (1939). *Arch. Surg.*, **39**, 190.
 Parsons, C. G. (1937). *Brit. J. Surg.*, **24**, 708.
 Pasternack, J. G., and Shaw, J. R. (1939). *New Orleans med. surg. J.*, **92**, 94.

THE ARM-TO-TONGUE CIRCULATION TIME IN CHRONIC ASTHMA

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It is at times very difficult to decide the cause of attacks of nocturnal dyspnoea, especially when it is necessary to rely on descriptions given by the patient or onlookers. The difficulty is accentuated in patients who at the time of examination present the raised blood pressure, enlarged heart, and crepitations at the lung bases of left ventricular failure, but whose clinical state or known allergic constitution makes a diagnosis of bronchial asthma appear more probable.

Several authors (Fishberg, 1937; Bernstein and Simpkins, 1939; Tarr, Oppenheimer, and Sager, 1933) have suggested that a determination of the time taken for the blood to flow from the arm to the tongue is of great help in distinguishing between cases of "cardiac asthma" and bronchial asthma. This time is spoken of as the arm-to-tongue circulation time. Changes in this circulation time are usually brought about by variation in the rate of flow of blood through the lungs.

It is generally agreed that in patients suffering from attacks of nocturnal dyspnoea due to left ventricular failure the arm-to-tongue circulation time is persistently raised during and between attacks to above 18 seconds, and may be double or treble the normal rate. Hitzig, King, and Fishberg (1935) state that they have found this so in over eight hundred cases. The range of times varied from 18 seconds to 60 seconds, and the average was 33 seconds. They also report an occasional exception with all the signs and symptoms of left heart failure and a normal circulation time. The explanation they offer is that "the right ventricle is sufficiently powerful to maintain a normal velocity of the blood flow through the lungs despite the increased resistance due to the insufficiency of the left side of the heart."

So far as we can discover, studies of the pulmonary circulation time in asthma have not been very extensive, and usually have been incidental to a general study of circulation times in various conditions.

Bernstein and Simpkins (1939) report an accelerated arm-to-tongue circulation time in seven cases of bronchial asthma, and also state that in two cases with "heart disease and bronchial asthma cardiac decompensation was excluded by the rapid circulation times obtained." They suggest that the arm-to-tongue time should be of great value not only in separating bronchial and cardiac asthma, but also in the presence of emphysema with symptoms—exertional dyspnoea, cyanosis, etc.—in helping to decide whether or not there is an element of cardiac failure. Tarr, Oppenheimer, and Sager (1933) report a further small series of circulation times in bronchial asthma.

It was decided to attempt a rather more extensive investigation into the arm-to-tongue times in bronchial asthma. Owing to the departure of one of us (J. D. C.) on active service, it was possible to obtain the results in only twenty-one cases of uncomplicated asthma. There are also three cases of bronchial asthma plus an apparently symptomless hypertension, and one case thought to be that relatively rare condition of cardiac failure secondary to chronic asthma and emphysema.

Method of Determining the Arm-to-Tongue Circulation Time

The patient should recline as flat as possible on a bed or couch, and must relax and not hold his breath. Five c.cm. (or 6 c.cm. in a few large individuals) of a sodium dehydrocholate solution are injected as quickly as possible, using a needle of not less than 20 gauge. The patient is instructed to raise the opposite hand sharply as soon as he notices a bitter taste, and the time from the beginning of the injection until the hand flies up is taken with a stop-watch. The bitter taste gives a sharp end-point, and the period recorded represents the time the sodium dehydrocholate takes to travel in the circulation from the arm to the tongue. The normal time for this method is usually stated to vary between 9 and 16 seconds. For clinical purposes a watch with a good seconds hand would probably suffice.

The sodium dehydrocholate employed in this investigation was in the form of either decholin or suprachol. Other substances can be used, and Bernstein and Simpkins suggest 10% magnesium sulphate, which causes a "hot sensation" and has the merit of simplicity and cheapness in preparation.

Results

The arm-to-tongue circulation times (using decholin) in our asthmatic cases varied from 10 to 15 seconds. The results of our observations are set out in Table I. It will be

TABLE I.—Cases of Bronchial Asthma with Normal Blood Pressure and presenting None of the Clinical Features of General Congestive or Left Ventricular Heart Failure

Case No.	Age and Sex	Duration in Years	Severity	Arm-Tongue Time in Seconds	Remarks
1	27 F	8	Chronic, with exacerbations	Under 12	Emphysema. Tachycardia
2	47 F	Many	Varies, but always wheezy	12	During mild paroxysm
3	63 M	2	Chronic, with exacerbations	11	Chronic cough for years
4	50 M	Many	Chronic	12	During mild paroxysm
5	43 M	Since childhood	Very severe	10	During moderately severe attack
6	15 M	7	Chronic, with frequent exacerbations	13	
7	69 F	18	Moderately severe	13	
8	29 M	Many	Moderate	13	Emphysema and hay-fever
9	50 F	35	Chronic, becoming worse	15	
10	55 F	6	Chronic, with frequent severe attacks	11	
11	38 M	18	Mild	15	Improved with injections of house dust
12	52 M	4	"	13	Emphysema
13	48 F	Recent origin	Moderate	13	Bronchitis for years
14	47 F	Many	"	10	Also has hypochromic anaemia
15	52 M	11	Mild	14	
16	25 M	22	Chronic, with exacerbations	12	During mild paroxysm
17	19 F	9	Mild	13	
18	63 F	10	"	11	
19	39 F	15	Moderate	12	
20	16 M	6	Mild	8	
21	39 M	3	Moderate	11	

seen that the times taken were always normal both in attacks and in the intervals between attacks. In four instances of typical bronchial asthma (Table II) there was a high blood pressure, but no evidence at all of left ventricular or general congestive heart failure. In all of these the arm-to-tongue circulation time was normal. Nevertheless, an arm-to-tongue circulation time of 15 seconds was twice met with in cases of bronchial asthma, and it should be definitely raised before it is used as evidence favouring the diagnosis of "cardiac asthma" or other complicating cardiac failure.

TABLE II.—Cases of Bronchial Asthma with High Blood Pressure and presenting None of the Clinical Features of General Congestive or Left Ventricular Heart Failure

Case No.	Age and Sex	Duration in Years	Severity	Arm-Tongue Time in Seconds	Remarks
1	68 F	10	Moderate	12	B.P. 170/110
2	65 F	10	Chronic	15	B.P. 175/100. Bronchitis for 20 years
3	65 F	Recent origin	Very severe	11	Severe nocturnal dyspnoea not fully relieved by adrenaline. On examination, signs typical of spasmodic asthma, and B.P. 170/100
4	58 F	Many	Moderate. Worse in last year	14	B.P. 180/110. No evidence of congestion

In the only case with heart failure, secondary to chronic asthma and emphysema, the arm-to-tongue circulation time when first taken during the early phase of the failure was 20 seconds. Two months later, when all clinical evidence of heart failure was gone, it was still 17 seconds. It would be interesting to collect circulation times in a further series of these cases and, by means of the ether-circulation time, find out what proportion of the delay is in the peripheral circulation and what proportion is in the pulmonary.

Comment

Our results, so far as they go, indicate that the arm-to-tongue circulation time in uncomplicated bronchial asthma cases is normal both during and between attacks, whereas from numerous observations many authors agree that it is prolonged both in left ventricular failure (Table III) and in

TABLE III.—Cases with No Bronchial Asthma but with High Blood Pressure and presenting a Typical Clinical Picture of Left Ventricular Heart Failure

Source	No. of Cases	Average Arm-to-Tongue Time
Personal	10	26 seconds
Hitzig, King, and Fishberg	Over 800	33 "

general congestive heart failure. We have often employed the circulation time in doubtful cases, and from the subsequent progress of these patients it seems to us that this method of study is of great practical value.

REFERENCES

- Bernstein, M., and Simpkins, S. (1939). *Amer. Heart J.*, **17**, 218.
 Fishberg, A. M. (1937). *Heart Failure*, p. 44, Kimpton, London.
 Hitzig, W. M., King, F. H., and Fishberg, A. M. (1935). *Arch. intern. Med.*, **55**, 112.
 Tarr, L., Oppenheimer, B. S., and Sager, R. V. (1933). *Amer. Heart J.*, **8**, 766.

On July 17, 1941, a special meeting was held at the Royal Berkshire Hospital to commemorate the centenary of the Reading Pathological Society. The proceedings began with a service in the chapel, after which the President, Dr. G. Halpin, received the members and their guests in the library, where the chairman of the board of management of the hospital presented the books in the library of the hospital to the society as a centenary gift, and the President announced that the hon. secretary, Mr. G. T. Willoughby Cashell, had given a loving-cup to mark the occasion. Dr. G. O. Lambert, consulting librarian of the society and senior physician to the hospital, delivered the centenary oration entitled "The Reading Pathological Society—One Hundred Years in Retrospect." The address, with portraits of the first two presidents and lists of past and present office-bearers, etc., is printed in full in a pamphlet which will be valued by all who have taken part in the work of this venerable institution.