with the reabsorption of the water of intestinal secretions. Peritoneal dialysis is often complicated by overhydration, which is one of its many disadvantages. This first experience with hypertonic sulphate dialysis suggests that dehydration and salt loss may be a more likely complication. Since, however, the duodenum is intubated, it is possible, by means of saline or other solution during the night, to make good the losses produced by dialysis during the day.

Summary

Anuria may be caused by a failure either of the glomeruli to form filtrate or of the tubules to transmit the filtrate in the usual way. Although a circulatory upset would primarily affect the glomeruli the morphological changes in anuria are predominantly tubular, and it is still an open question whether glomerular or tubular functional impairment is the more important. This uncertainty is reflected in the confused opinion about the treatment of anuria. Some methods of treatment (paravertebral block, spinal analgesia) assume a circulatory disturbance to be the cause of anuria; other methods (low-protein diet, the artificial kidney, peritoneal and intestinal lavage) are designed to prolong life until reparative processes can take place in the tubules. At present it seems justifiable to employ suitable methods of the first type as soon as possible, and, if need be, to resort to the second type of method as well. A patient is described whose treatment illustrates some of the points discussed, in particular the use of intestinal lavage with hypertonic sodium sulphate solution.

We are grateful to Mr. H. Varley for the estimations on the dialysate and for the clearance results.

REFERENCES

Badenoch, A. W., and Darmady, E. M. (1947). *J. Path. Bact.*, **59**, 79.
Black, D. A. K., Powell, J. F., and Smith, A. F. (1941). *J. Physiol.*, **99**, 344.
Borst, J. G. G. (1948). *Lancet*, **1**, 824.
Bradley, S. E., and Bradley, G. P. (1947). *Blood*, **2**, 192.
Bywaters, E. G. L. (1944). *J. Amer. med. Ass.*, **124**, 1103.
—— *et al.* (1941). *British Medical Journal*, **1**, 427, 432.
Corcoran, A. C., and Page, I. H. (1947). *J. Amer. med. Ass.*, **134**, 436.
Dunn, J. S., Gillespie, M., and Niven, J. S. F. (1941). *Lancet*, **2**, 549.
Kolff, W. J. (1947). *New Ways of Treating Uraemia.* Churchill, London.
Lauson, H. D., Bradley, S. E., and Cournand, A. (1944). *J. clin. Invest.*, **23**, 381.
Lucké, B. (1946). *Milit. Surg.*, **99**, 371.
Maegraith, B. G. (1944). *Trans. R. Soc. trop. Med. Hyg.*, **38**, 1.
—— Havard, R. E., and Parsons, D. S. (1945). *Lancet*, **2**, 293.
Maluf, N. S. R. (1948). *Fed. Proc.*, **7**, 77.
Moon, V. H. (1947). *J. Amer. med. Ass.*, **134**, 425.
—— (1948). *Amer. J. Path.*, **24**, 235.
Odel, H. M., and Ferris, D. O. (1948). *Proc. Mayo Clin.*, **23**, 201.
Olson, W. H., and Necheles, H. (1947). *Surg. Gynec. Obstet.*, **84**, 283.
Oppenheimer, G. D., and Rosenak, S. (1948). *J. Mt Sinai Hosp.*, **14**, 908.
Smith, H. W. (1943). *Lectures on the Kidney.* New York.
Trueta, J., Barclay, A. E., Daniel, P. M., Franklin, K. J., and Prichard, M. M. L. (1947). *Studies of the Renal Circulation.* Blackwell. Oxford.
Van Slyke, D. D. (1948). *Ann. intern. Med.*, **28**, 701.

ADDENDUM

Marquis and Schnell (*Amer. J. med. Sci.*, 1948, **215**, 686) report sudden death in a patient after 10 days of intestinal perfusion; the serum potassium just before death was only 1.2 m.Eq./litre. The danger of death from potassium depletion, once recognized, can easily be avoided by using Ringer's solution rather than normal saline to replace fluid loss overnight.

The American Medical Association sponsored a Public Relations Conference in St. Louis recently. The theme was "Common Targets in Medical Public Relations." About 125 State and metropolitan county medical society leaders participated in the public relations meetings. The problems under discussion included: "Selling the Need for Public Relations to the Profession," "Using Public Relations to Aid Medical Prepayment Plans," "Handling Emergency and Night Calls," "The Rebate Problem," "Co-operating with Special Publics," and "Co-operating with Health Agencies."

SPLENIC ANEURYSM AND SPLENIC ENLARGEMENT IN PREGNANCY

BY

H. L. SHEEHAN, M.D., D.Sc., F.R.C.P.
Professor of Pathology, University of Liverpool

AND

NINIAN M. FALKINER, M.D., Sc.D., F.R.C.P.I. F.R.C.O.G.
Late Master, Rotunda Hospital, Dublin

Rupture of an aneurysm of the splenic artery is a well-recognized complication of pregnancy. In a previous paper (Lennie and Sheehan, 1942) four cases of rupture of splenic and renal aneurysms in pregnancy were described and a review was given of 20 previous cases in the literature. More recently Ogden (1948) recorded a ruptured splenic aneurysm in a woman 35 weeks pregnant and gave details from the literature of three additional cases (one splenic and two renal) in pregnant women. The following is a further example of rupture of a splenic aneurysm in the course of pregnancy.

Case Report

The patient, aged 32, was a 3-para at 36 weeks' gestation. One day, at 1 p.m., she had a sudden onset of abdominal pain, felt faint, and went to bed. Foetal movements ceased at this time. She vomited in the evening and was sent into the Rotunda Hospital with the diagnosis of concealed accidental haemorrhage. There was no vaginal haemorrhage or albuminuria, but foetal heart sounds could not be heard and the abdomen was resistant and slightly tender. Her general condition was poor: pulse 80, B.P. 105/80. At 6 a.m. next day she suddenly developed severe shock, which was treated with saline and blood transfusion. The os was dilated two finger-breadths, so the membranes were punctured and "pitocin" was given; the liquor amnii was not blood-stained. Labour did not begin, but at 8 a.m. she suddenly became very collapsed and a further blood transfusion was necessary. Soon afterwards a classical section was carried out; this showed no uterine haemorrhage, but a large retroperitoneal haemorrhage in the region of the pancreas and left kidney was found. This was diagnosed as a ruptured aneurysm of the splenic or renal artery, but the patient was considered to be too ill for a surgical exploration of these vessels. At 10 p.m. the patient suddenly collapsed again and in a few minutes she died. The time from the first symptoms to death was thus 33 hours. Post-mortem examination showed a rupture of a small aneurysm of the splenic artery; the blood had finally burst through into the peritoneal cavity.

Discussion

The case is fairly typical—the diagnosis of some intra-abdominal catastrophe, the operative discovery of the haematoma in the region of the pancreas, the latent period (which varies in different cases between one and seven days), and the terminal haemorrhage into the peritoneal cavity. The only hope for such a patient is heroic surgery by the operator who has opened the abdomen, usually the obstetrician who has performed caesarean section. The details have been discussed by Lennie and Sheehan (1942).

The aetiology of these aneurysms is not known. One peculiar aspect of the problem is that, of the cases so far recorded in patients below the age of 45, splenic aneurysms are much commoner in women (41 female, 12 male), whereas renal aneurysms are commoner in men (9 female, 21 male). What is of more direct interest here, 23 of the splenic aneurysms ruptured in connexion with pregnancy, nearly always at seven to nine months' gestation. This raises the question whether the rupture may possibly be related in any way to alterations of the blood supply to the spleen during pregnancy. No direct evidence is available on this subject, but some facts which may have a

possible bearing on it have been obtained from observations on the spleen in an unselected series of 163 routine obstetric necropsies. In the course of this work it became obvious that there was some relation between splenic enlargement and gross hyperplasia of bone marrow, so the details about the latter are included in this analysis.

In the normal adult the spleen has a mean weight of 150 g., with a range of from 80 to 200 g. The observations made by Turnbull (Vaughan, 1936) on the bone marrow in normal non-pregnant patients may be briefly summarized here. His data were obtained, as in the present cases, from longitudinal section of the whole length of the femur. He found that between the ages of 15 and 20 the marrow is fully red, with specific gravity over 1000, in the upper third to half of the femur. During the next three years this marrow becomes less in amount and also more fatty, so that its specific gravity is less than 1000. After the age of 24 there is usually no red marrow in the femur or only a few small islets in the upper end.

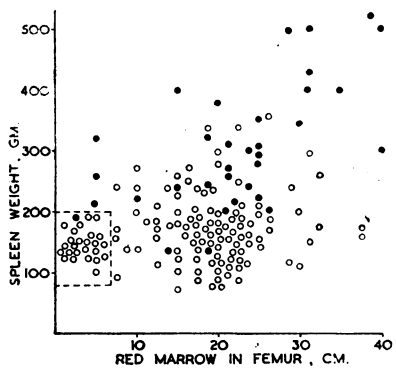

Chart showing weight of spleen and length of red marrow in femur in obstetric necropsies. ●=Severe anaemia of pregnancy, accidental haemorrhage, or uterine sepsis and thrombophlebitis. O=Other clinical conditions. The panel in the left lower corner encloses the normal range in non-pregnant adults.

Observation of obstetric patients reveals certain differences from the above figures. The spleen is of normal size in 60% of cases, but in the other 40% it has a weight range of from 200 to 550 g., so that the mean weight over the whole series is 200 g. The red bone marrow of the femur is usually hyperplastic, though it varies from only a slight amount at the head of the bone to a complete replacement of all the yellow marrow down to the condyles. The age of the patient is without influence on the marrow hyperplasia. On the average the upper 16 cm. is fully red marrow with a specific gravity of over 1000, and the next 6 cm. is partly red marrow with a specific gravity below 1000. For convenience the amount of red marrow is represented in this paper by a single figure—the length of the fully red marrow plus half the length of the partly red marrow.

The relation between the size of the spleen and the amount of bone marrow in the present series of obstetric necropsies is shown in the above Chart. Apart from the conditions specifically mentioned below, there were no diseases of the type which give rise to enlargement of the spleen and bone marrow in ordinary pathology—e.g., leukaemias, Banti's disease, tropical diseases, etc. The individual cases have been analysed in a search for significant factors. This analysis shows that in obstetric patients the following three clinical conditions are commonly associated with enlargement of the spleen and red marrow.

1. *Severe Anaemia of Pregnancy.*—In 9 cases the mean weight of the spleen was 360 g. and the mean length of the red marrow of the femur was 29 cm. It is possible that some of the other patients with enlargement of the spleen and red marrow were anaemic but were not noted as such in the clinical records; many of them were obstetric emergencies and had not been examined haematologically.

2. *Accidental Haemorrhage of Abruptio Type.*—In 10 cases the mean weight of the spleen was 275 g. and the mean length of the marrow 23 cm. Eclampsia and the other toxaemias of pregnancy and shock or haemorrhage did not appear to be associated with these pathological increases.

3. *Puerperal Thrombophlebitis or Gross Septic Endometritis.*—In 15 cases the mean weight of the spleen was 290 g. and the mean length of the marrow 18 cm. On the other hand, general peritonitis, empyema, pneumonia, pyelonephritis, and chronic valvular disease of the heart were not associated with enlargement of the spleen or marrow.

In the Chart these three clinical conditions are differentiated from the others. It will be seen that they account for most of the large spleens and red marrows, though they do not invariably cause such enlargement. Most of the small spleens in this group were in cases of septic endometritis without thrombophlebitis.

Two other findings from the analysis may be mentioned: (*a*) the pathological changes were not related to the age or parity of the patients, nor to whether the patient was still pregnant or had been delivered; and (*b*) there was some association between the enlargement of the spleen and the duration of pregnancy. The higher figures in the

Gestation	No. of Cases	Mean Size	
		Spleen	Marrow
0–20 weeks	16	145 g.	16·0 cm.
21–30 „	10	175 g.	18·5 cm.
31 weeks to term ..	137	203 g.	19·0 cm.

cases after the thirtieth week of gestation are partly due to the inclusion in this group of most of the patients suffering from the three significant clinical complications. It is, however, worthy of note that the largest spleen in the patients before the twentieth week of gestation weighed only 190 g.

The essential point that emerges from this analysis is that during the course of pregnancy a number of patients have considerable splenic enlargement, which develops in the second half of gestation and is usually associated either with anaemia or with accidental haemorrhage. This is presumably accompanied by some alteration of the blood supply to the spleen. There is as yet insufficient information to indicate whether or not this is related to the relatively high incidence of rupture of splenic aneurysms in late pregnancy, but this aspect should be considered in future cases of such aneurysms.

REFERENCES

Lennie, R. A., and Sheehan, H. L. (1942). *J. Obstet. Gynaec. Brit. Emp.*, **49**, 426.
Ogden, J. K. (1948). *British Medical Journal*, **1**, 389.
Vaughan, J. M. (1936). *The Anaemias*. Oxf. Med. Publ., London.

CALCIFIED CYST OF SPLEEN

BY

JOHN H. DONOVAN, F.R.C.S.Ed.

Honorary Surgeon, Camborne and Redruth Hospital

The following seems to be the seventh recorded case of calcified splenic cyst, and the second reported in this country. There is little to be found about cysts of the spleen in the textbooks. The literature of the condition was reviewed by Harmer and Chalmers (1946), and at that date 163 cases of splenic cysts of all types had been recorded. Different classifications of the types of cyst have been made, that of Fowler (1940) being the most comprehensive. For practical purposes it would seem sufficient to classify them as parasitic, true, and false. Hydatid disease accounts for approximately 2% of recorded cases. True cysts are of endothelial origin and are usually multiple—numerous daughter cysts surrounding a large mother cyst. Congenital