"leuco-erythroblastic" anaemia. However, Tagnon, Whitmore, Schulman, and Kravitz (1953) and Swan *et al.* (1957) have reported cases of metastatic carcinoma of the prostate with fibrinolysis and thrombocytopenia, where the explanation of the latter is not clear. The clinical presentation of these two cases was very similar, and if operative procedures are contemplated this differentiation is important.

In Case 1 oestrogen therapy alone quickly abolished the patient's symptoms and the haemorrhagic diathesis, during which time a transurethral biopsy prostatectomy was performed with minimal bleeding. The resulting disappearance of fibrinolysis, improvement of the fibrinogen levels, and to a less extent the prothrombin activity can be seen from the Graph. There was no need to give corticotrophin or human fibrinogen in this case. Corticotrophin has been claimed to diminish the lysis, and the response was more rapid than with oestrogens (Stefanini *et al.*, 1953), but, if used, it should be given in conjunction with oestrogens. Tagnon, Schulman, Whitmore, and Leone (1953), however, showed that the addition of testosterone to a maintenance dose of oestrogens caused an increase in the patient's symptoms and serum acid phosphatase level, as well as the reappearance of fibrinolysis. Orchidectomy does not seem to be justifiable in Case 1 at the present time. However, if fibrinolysis and hypofibrinogenaemia should return, then bilateral orchidectomy, with probably the addition of human fibrinogen, may be required. Swan *et al.* (1957) have recommended fractionated fibrinogen or triple-strength reconstituted dried plasma as the only type of emergency therapy. This has not been necessary in Case 1.

Tagnon, Whitmore, *et al.* (1952), and Tagnon, Whitmore, Schulman, and Kravitz (1953) found no constant correlation between the occurrence of fibrinolysis and the level of acid phosphatase in the serum. There appears to be no satisfactory explanation for this. They also state that the test for the level of acid phosphatase in the serum cannot be replaced by that of fibrinolysis, since the latter occurs in only approximately 12% of patients with metastatic carcinoma of the prostate. In Case 1 the correlation between the serum acid phosphatase levels and the occurrence of fibrinolysis is variable (see Graph). This lack of correlation has still to be fully explained.

Summary

A case of metastatic carcinoma of the prostate with a haemorrhagic diathesis secondary to a circulating fibrinolysin (Case 1) is reported, and is contrasted with Case 2, with thrombocytopenia and bleeding secondary to bone-marrow involvement.

Therapy with stilboestrol alone caused the fibrinolysis to disappear in Case 1, with subsequent improvement of the fibrinogen level and prothrombin time. A transurethral biopsy prostatectomy was carried out during oestrogen control.

No correlation was found in Case 1 between the occurrence of fibrinolysis and the level of acid phosphatase in the serum.

We thank Mr. H. T. Cox for permission to publish Case 1, and Mr. William Lawson, F.I.M.L.T., for his help and technical assistance.

REFERENCES

- Biggs, R., and Douglas, A. S. (1953). *J. clin. Path.*, **6**, 15.
 — and Macfarlane, R. G. (1953). *Human Blood Coagulation and its Disorders*. Blackwell, Oxford.
 Huggins, C., and Vail, V. C. (1943). *Amer. J. Physiol.*, **139**, 129.
 McKay, D. G., Mansell, H., and Hertig, A. T. (1953). *Cancer (N.Y.)*, **6**, 862.
 Ratnoff, O. D. (1952). *J. clin. Invest.*, **31**, 521.
 Stefanini, M. (1953). *Amer. J. Med.*, **14**, 64.
 — Campbell, E. W., Pittman, G. I., and Salomon, L. (1953). *Bull. New Engl. med. Cent.*, **15**, 23.
 Swan, H. T., Wood, K. F., and Daniel, O. (1957). *Brit. med. J.*, **1**, 495.
 Tagnon, H. J., Levenson, S. M., Davidson, C. S., and Taylor, F. H. L. (1946). *Amer. J. med. Sci.*, **211**, 88.
 — Schulman, P., Whitmore, W. F., and Leone, L. A. (1953). *Amer. J. Med.*, **15**, 875.
 — Whitmore, W. F., and Shulman, N. R. (1952). *Cancer (N.Y.)*, **5**, 9.
 — Schulman, P., and Kravitz, S. C. (1953). *Ibid.*, **6**, 63.

ACUTE RADIATION NEPHRITIS IN CHILDHOOD

BY

J. SWANSON BECK, M.B., B.Sc., F.R.F.P.S.

Pathological Registrar, University and Western Infirmary, Glasgow

The following case of acute radiation nephritis associated with a uraemic haemolytic anaemia is reported because of the interest aroused by the annotation in the *British Medical Journal* of May 3, 1958 (p. 1053), on the effect of x-irradiation on the kidney.

Case Report

The patient, a pale normally developed girl of 2½ years, was first seen in January, 1957, when a large firm mass was found filling the whole of the left side of the abdomen. This was removed surgically and found to be a Wilms's tumour. She made an uneventful post-operative recovery, and a four-weeks course of radiotherapy (3,250 r) was given

FIG. 1.—Blood film showing "burr" cells, anisocytosis, and polychromasia. ($\times 500$.)

to the left renal area. She remained well until October, when a metastasis was discovered in the right perirenal fat. This could be treated only by a second course of radiotherapy (3,000 r) to the right renal area over a period of three weeks, after which the abdominal mass could no longer be palpated. On January 17, 1958, it was noted that the child, although still pale, was gaining weight, but when seen on February 7 she showed marked pallor, ankle and face oedema, full and bounding pulse, and enlargement of the heart in the transverse diameter. The B.P. was 130/85 mm. Hg. The urine showed albumin ++, R.B.C. ++, pus cells +, and a moderate number of granular and hyaline casts. The blood urea was 140 mg./100 ml. and the haemoglobin 6.2 g./100 ml. Blood films showed marked anisocytosis, polychromasia, and poikilocytosis with numerous "burr" cells of the type usually associated with the haemolytic anaemia of uraemia in childhood (Fig. 1). The white-cell count was 19,000, with a normal differential.

The child's condition deteriorated rapidly, and the blood pressure fluctuated between 135/80 and 170/110 mm. Hg. The blood urea rose progressively to 320 mg./100 ml., and she died on February 13, six days after the onset of the symptoms of acute nephritis.

Post-mortem Findings

The body was that of a pale, ill-nourished female child showing severe anasarca and extensive purpura. The heart (160 g.) showed marked left ventricular hypertrophy and

dilatation. The lungs showed severe pulmonary oedema and there were serous transudates in both pleural cavities and in the peritoneal cavity. The right renal pedicle was free from disease, and the right kidney (84 g.), which was somewhat larger than usual, was embedded in very fibrous perirenal fat containing an apparently encapsulated tumour (diameter 3.5 cm.) showing foci of haemorrhage and necrosis. The lower pole of the kidney was distorted by this mass. At the upper pole the capsule stripped easily, leaving a smooth speckled surface, but over the lower pole adjacent to the tumour it was densely adherent. The cortex was a little broader than normal and showed accentuation of its markings and prominence of the glomeruli. The medulla was congested and the intrarenal vessels were not unduly prominent. The pelvis was normal, but the upper part of the right ureter, although embedded in the sclerotic perirenal tissue, was patent. There was an irregular haemorrhagic speckling of the lower part of the right lobe of the liver overlying the right kidney. No other significant abnormality was seen.

Histology.—The renal capsule was somewhat thickened and there was a mild diffuse interstitial fibrosis, although the renal architecture showed no gross distortion. Glomeruli were present in the usual numbers, but most showed fibrinoid and haemorrhagic necrosis of isolated tufts (Fig. 2). The tubules showed minimal dilatation and were lined with a flattened epithelium which showed foci containing hyaline droplets. Occasional tubules contained hyaline casts. Many of the arterioles and a few of the interlobular arteries showed severe fibrinoid necrosis; the arcuate arteries were normal. These appearances are characteristic of acute radiation nephritis as described by Russell (1953). In the liver the foci of dilated blood-filled sinuses were thought to be the late effects of hepatic irradiation.

Discussion

The first course of radiotherapy was directed to the left renal area. However, the metastasis was in the area of the right kidney. This required to be included in the area of treatment of the second course, and this course would probably be responsible for the radiation nephritis. The latent period before the onset of symptoms of nephritis was 128 days, although in retrospect it appears likely that the gain in weight in January, 1958, was due to fluid retention. This latent period is appreciably shorter than that encountered in the cases recorded in young adults (Luxton, 1953), and in this respect the present case is similar to the three cases described in young children by Zuelzer *et al.* (1950) except for the extremely rapid onset of uraemia and the short duration of the terminal illness.

The present case showed a severe acute haemolytic anaemia with well-marked anisocytosis, polychromasia,

poikilocytosis, and abundant "burr" cells in the peripheral blood. This blood picture is similar to that described in children by Gasser *et al.* (1955) and Macfarlane (1958) in association with the azotaemia of acute renal disease. The association of this blood picture with acute radiation nephritis has not been described previously, but in this case it is considered to be merely another manifestation of the fulminating uraemia.

My thanks are due to Mr. W. M. Dennison for permission to publish the clinical findings in this case; to Dr. T. M. Young for information on the radiotherapy administered; to Professor D. F. Cappel and Dr. A. M. MacDonald for advice and criticism; to Mr. W. Mason for the photographs; and to Miss M. Malcolm for technical assistance.

REFERENCES

- Gasser, C., Gautier, E., Steck, A., Siebenmann, R. E., and Oechslin, R. (1955). *Schweiz. med. Wschr.*, 85, 905.
Luxton, R. W. (1953). *Quart. J. Med.*, 22, 215.
Macfarlane, P. S. (1958). *Arch. Dis. Childh.*, 33, 181.
Russell, H. (1953). *Edinb. med. J.*, 60, 474.
Zuelzer, W. W., Palmer, H. D., and Newton, W. A., jun. (1950). *Amer. J. Path.*, 26, 1019.

GENERALIZED VACCINIA IN INFANCY

A REPORT OF FOUR CASES

BY

W. H. GALLOWAY, M.B., F.R.C.P.Ed., D.C.H.

Consultant Paediatrician

AND

L. M. MacBEAN, M.B., Ch.B., D.C.H.

Senior House Officer, Aberdeen Special Hospitals Group
and the Department of Child Health, University of
Aberdeen

Cutaneous complications of smallpox vaccination include generalized vaccinia, eczema vaccinatum, accidental vaccination, progressive vaccinia, and the erythema multiforme syndrome (Burgoon and Burgoon, 1956).

The term "generalized vaccinia" should be restricted to cases in which the primary site heals normally but where vaccinal lesions erupt on the body between the sixth and fourteenth days after vaccination. These develop in the same way as the primary, but because of the development of antibodies they progress at an accelerated rate and heal at the same time as the primary, without scarring (Barbero *et al.*, 1955).

Case Reports

Case 1.—A healthy male infant was vaccinated at 5 months of age and admitted to hospital 16 days later with generalized vaccinia. Death ensued a few hours later. A report of the case has already been published (Galloway and MacBean, 1956). No electrophoretic or antibody studies were carried out.

Case 2.—A healthy male infant was vaccinated at 3 months of age and admitted to hospital seven days later with generalized vaccinia. His mother had not been vaccinated; his father had. There were no other children. On examination he was pale, alert, irritable, and ill-looking. His temperature was 101° F. (38.3° C.). Over the left deltoid region was a large black scab about 1 in. (2.5 cm.) in diameter surrounded by a wide area of inflammation and induration. There were a few minute vesicles round the edge of the scab and a small secondary one ½ in. (1.3 cm.) from the primary site. Scattered vesicles were found on the left side of trunk, right axilla, both forearms, palms of both hands, sole of the left foot, and the left temporal region. Some were umbilicated. On admission intramuscular penicillin was given, also 4 ml. (500 mg.) of ordinary

FIG. 2.—Kidney showing interstitial fibrosis, fibrinoid change in glomeruli and arterioles, with minimal tubular dilatation. (Mallory. $\times 80$.)