roidism has been described although mention is made of parathyroid gland hyperplasia at operation or autopsy (MacMahon 1950, Benedict 1962).

The premature appearance of secondary sex characteristics, advanced skeletal maturation and accelerated linear growth are clearly manifestations of endocrine activity. As there have been clinical effects from and pathological changes reported in other endocrine glands, there appears to be a pluriglandular disturbance in polyostotic fibrous dysplasia. The absence of demonstrably elevated levels of gonadotrophins and œstrogens in the presence of obvious clinical changes is suggestive of increased target gland and tissue sensitivity to circulating hormones. In this situation target glands such as adrenal cortex, thyroid, gonads and breast tissue would have an enhanced response to normal prepubertal or minimally elevated levels of pituitary hormones.

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Dr Hugh Jolly (*Charing Cross Hospital, London*) asked for views on the reasons for the different sex frequency of Albright's syndrome. So much greater was its frequency in girls that Albright in his original description believed it to be confined to the female sex. Since that time a very few cases had been described in boys, including one in Dr Jolly's own study (1955, Sexual Precocity, Oxford), which he had shown to Dr Albright who agreed it was the same condition.

Dr Harris, in reply, said that the increased frequency of Albright's syndrome in girls was similar to the preponderance of constitutional precocious puberty in females. It is not uncommon to find signs of precocious puberty in the latter without demonstrable levels of FSH in the urine. It is worth making a very thorough search for stigmata of Albright's syndrome particularly the café au lait spots in these patients.

Stomatocytosis

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Stomatocytosis is a descriptive title first used by Lock *et al.* (1961) to describe the red cells of a mother and daughter who have a distinctive type of congenital nonspherocytic hæmolytic anæmia. It is a very rare condition; the present patient appears to be the fourth recorded case.

Case History

D W, girl born 25.6.60

History: Attacks of jaundice in June 1963, November 1963 and February 1964, each preceded by a cough, fever and malaise. The jaundice was marked for three to four days only. In February 1964, at the age of 3 years 8 months, she was admitted to the Royal Alexandra Hospital, Brighton, towards the end of the third attack of jaundice. She was pale and slightly jaundiced; spleen grossly enlarged and firm; liver moderately enlarged.

Investigations: Hb 50%. RBC 2,600,000/c.mm. Reticulocytes 30%. Nucleated cells 11,500/c.mm (neutros. 53%, eosinos. 4%, lymphos. 23%, monos. 4%, erythroblasts 15%, plasma cells 1%). Direct Coombs' test negative. Marked increase of osmotic fragility: hæmolysis 50% in 0·75% saline, 90% in 0·4% saline. Serum bilirubin 2 mg/100 ml (direct 0·6, indirect 1·4 mg/100 ml).

Because of these results and a report that spherocytes were present in the blood film a diagnosis of congenital spherocytosis was made.

Family history: No history of jaundice or anæmia. Investigation of the blood of both parents, her two sisters and one brother has shown normal red cells with normal osmotic fragility.

Splenectomy (April 1964): Spleen grossly enlarged (histology compatible with congenital hæmolytic anæmia); no accessory spleens found; liver enlarged.

April-October 1964: Following operation the hæmoglobin rose, but never became higher than 78%; usually it fluctuated between 60% and 75%. The reticulocyte count remained high, between 11% and 24%.

Further investigations of blood (Professor J V Dacie, October 1964): Hb 73%. Reticulocytes 19·6%. Many of the red cells had a translucent slit-like area in the centre. There was a marked increase in osmotic fragility; after incubation for twenty-four hours at 37°C:

0·85% saline 63% hæmolysis (normal 0)
0·8% saline 78% hæmolysis (normal 0)
0·7% saline 88% hæmolysis (normal 0–5%)
0·6% saline 90% hæmolysis (normal 0–40%)

Marked increase in autohæmolysis: after forty-eight hours at 37°C, 51% (with added glucose, 5%). Red cell pyruvate kinase 4·46 units (normal 1·1–1·9 units).

October 1964 to March 1966: Hb 60–75%. Reticulocytes 20–34%. The abnormal red cell appearance has persisted. She has had occasional bouts of jaundice, usually preceded by respiratory infection.

Other investigations (March 1966, age 5 years 9 months): Serum iron 88 µg/100 ml. Hæmoglobin electrophoresis normal; alkali denaturation showed no hæmoglobin F; no sickling (Dr J L Raven, Guy's Hospital). Red cell glucose-6-phosphate dehydrogenase 383 mU/10^9 red cells (normal 120–240). Autohæmolysis after forty-eight hours at 5°C, 2%; at 37°C, 31% (normal 0·4–3·5%). Red cell glutathione 42·8 mg/100 ml; after two hours' incubation with 5 mg acetyl phenylhydrazine it had fallen to 21·6 mg/100 ml (Professor T A J Prankerd, University College Hospital).

Other findings: In addition to the hæmolytic anæmia this child suffers from psoriasis and has a cardiac murmur believed to result from a ventricular septal defect.

Discussion

Stomatocytes are red cells which in the stained film have a linear area of pallor in the centre. It is as if there is a slit or mouth-like opening into the cell (Fig 1). One or two cells of this appearance may be seen in films of normal blood, but in some films from this patient as many as 30–40% of the red cells have this appearance.

Apart from the 2 cases recorded by Lock (Lock *et al.* 1961), the only other published case is that of an 18-year-old boy reported by Miller (Miller *et al.* 1965); he had certain dissimilarities from the others. D W appears to be the fourth example of stomatocytosis. All had a history which would have fitted in with congenital spherocytosis. As with D W, the hæmolytic crises were preceded by upper respiratory tract infections. All have greatly increased osmotic fragility and an increase in autohæmolysis. Miller's patient had a greater degree of autohæmolysis at 5°C than at 37°C, but not so this girl.

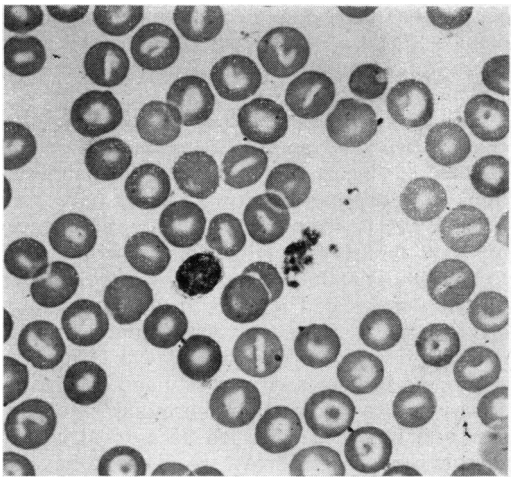

Fig 1 *Peripheral blood film showing several typical stomatocytes; these are the red cells with the pale slit-like area in the centre.* ×740

Lock's 2 cases had splenectomy before the diagnosis of stomatocytosis was made, which produced only partial improvement. D W similarly had a splenectomy, with incomplete recovery, before her blood was examined by Professor J V Dacie, who made the diagnosis.

It is not certain what stomatocytes represent. By definition they are red cells with a distinctive appearance when stained. There is some evidence from Lock's cases that the stomatocytes are abnormally fragile cells; centrifuging the blood caused stomatocyte-like cells to be in the top layer and this top layer had a greater osmotic fragility than the lower layers. In general, reticulocytes and young cells tend to gravitate to the top layer of blood, and this raises the possibility that the patients have a dual population of red cells and that the stomatocytes are not just their ageing red cells, but are a distinct type of young but fragile red cell. Osmometric studies (Lock *et al.* 1961) suggested that the stomatocyte had a brittle inelastic membrane, though the actual defect was presumed to be an unknown metabolic disturbance leading to a membrane defect.

Although stomatocytes have now been seen in 4 different people, it cannot be certain that they all have the same defect of red cell metabolism which renders them susceptible to hæmolysis. It may be that stomatocytes are a secondary feature of different primary defects.

There is no close correlation between the limited enzyme studies that have been done on

these cases. For instance, Lock's 2 cases had low levels of glucose-6-phosphate dehydrogenase, Miller's case had a normal level, and D W a rather high level (possibly explained by a high reticulocyte count at the time of the estimation). Miller's case had a low level of reduced glutathione, Lock's case a normal level and D W a slightly raised level, which was markedly unstable. Therefore, there is no agreement about the nature of the metabolic abnormality in patients who have an excess of stomatocytes.

It is impossible to classify stomatocytosis with other hereditary nonspherocytic hæmolytic anæmias. Dacie's Type I & II classification is often used, Type I being a heterogeneous collection of disorders, while Type II cases belong to a more homogeneous group in which all have a deficiency of red cell pyruvate kinase. The 4 cases of stomatocytosis have a normal or high pyruvate kinase level and therefore might be expected to belong to the Type I disease though, in general, cases in that group do not have as great a fragility or as great a degree of autohæmolysis as have the cases of stomatocytosis.

Splenectomy cures most cases of hereditary spherocytosis and yet it does not cure stomatocytosis. This suggests that the cells must be broken down in sites other than the spleen. Lock and his associates tagged red cells of their patient with radioactive sodium chromate. They found that red cells in the post-splenectomy patient had a mean life of only ten days; a high surface count was recorded over the liver, suggesting that the cells were being broken down there. They also found that the red cells from their patient when given to a healthy recipient had a mean life of only twenty-four hours and that the maximum site of breakdown was in the spleen of the healthy person. This may explain both the partial improvement after splenectomy and the hard fact that hæmolysis continues after splenectomy. The hæmolysis probably continues for life; at the age of 40 the mother of Lock's patient was still having occasional hæmolytic episodes although neither as frequent nor as severe as when younger.

We have called this condition a congenital hæmolytic anæmia. Admittedly in Lock's 2 cases and this one stomatocytes were not reported before splenectomy. However, they were seen before splenectomy in Miller's case, and the fact that osmotic fragility was greatly increased before splenectomy in the other cases and that there is some evidence that stomatocytes are the most fragile type of cell, suggests that stomatocytes were present before surgery.

If the stomatocytes were missed before surgery in these cases, are they being missed in others also? This may well be so. The condition may not be as rare as its documentation suggests and it will certainly be worth looking critically at the red cell appearance of any case of congenital spherocytosis which fails to respond to splenectomy.

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Gastroschisis

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Gastroschisis is an uncommon condition and Moore (1963) could find only 32 cases in the literature. However, Stolowsky (1952) estimated the incidence at 1 in 17,000 births, so it is clear that the condition is not exceedingly rare. Despite the forbidding appearance this treatable condition is usually an isolated defect, unlike exomphalos where there is a high incidence of other anomalies. Two infants are presented, who were admitted within twenty-four hours of each other and illustrate many of the points in management of gastroschisis.

Case Histories

Case 1 A S, boy born 15.1.66
Admitted under Mr G H Macnab
Birthweight 2·94 kg. Temperature normal, although his 65-mile road journey had been prolonged by falling snow. Baby had gastroschisis with 4 cm defect on right. Distal half of stomach, small and large bowel to lower sigmoid level were prolapsed. Bowels matted together, reddish blue colour and wall markedly thickened with meconium staining between the loops of bowel. At operation prolapsed bowel was cleaned, adhesions were divided, Ladd's procedure (Ladd & Gross 1941) and gastrostomy performed and the bowel then placed in the abdominal cavity and skin closure achieved.

Respiratory attempts post-operatively were very feeble. A Rees tube was passed through the nose to the trachea and the baby ventilated by Bird respirator for five hours. Thereafter spontaneous breathing was adequate. Feeding was commenced on the second post-operative day. Discharged on 22nd day and on 4.3.66 was well, weighed 4·08 kg and had a large ventral hernia.