Five healthy young adults were used as subjects. From each, two pipettes were filled consecutively from a single finger-prick. One of the pipettes was treated according to the method described, but the second pipette was mixed and then allowed to stand for half an hour on the bench. It was then vigorously reshaken, and four counting chambers were filled. After five minutes a count was made. The results are given in the Table.

Results of Experiments

Case	Normal Count	After Standing ½ Hour in Pipette
1	164	167
2	66	72
3	388	342
4	176	162
5	133	141

Similar tests were performed, leaving the pipette for longer periods, but it was found that the eosinophils formed clusters which no amount of shaking would break up. This was also noted by Rud (1947), who used a diluting fluid of quite a different composition. These aggregates may produce errors in counting, so that it is not advisable to leave filled pipettes longer than half an hour.

Discussion

The disadvantages of Dunger's eosin-acetone diluent have been demonstrated by Henneman, Wexler, and Westenhaver (1949). It was shown that with this diluent the counting chambers have to be filled within five minutes of mixing in the pipette. If the pipette is left for longer periods the reshaking that is necessary before filling the counting chambers causes the breaking up of many of the eosinophils. Further, the relatively rapid evaporation of this fluid means that there can be no delay in performing counts. These factors introduce practical difficulties if the blood has to be taken in the wards.

The phloxine-propyleneglycol is an oily liquid which evaporates slowly and stains eosinophils pink, but also has some disadvantages. It has a high viscosity, which prolongs both the mixing process and the settling of the cells in the counting chamber. Some of the cells remain permanently in a different plane from the rest, necessitating repeated refocusing. It does not lyse leucocytes, and its refractive index makes unstained leucocytes stand out more prominently than they do when suspended in watery solutions. As the eosinophils are usually only about one in fifty cells, they are thus more difficult to count in this solution than they are in solutions in which other leucocytes are lysed. The ease with which an eosinophil count can be performed is of considerable importance, because four counting chambers are required for each investigation.

The phloxine–urea diluent described has none of these disadvantages. The high concentration of urea slows evaporation but raises the viscosity only slightly above that of water, so that mixing in the pipette and settling of the cells in the counting chamber are rapid. Other leucocytes are lysed, so that the eosinophils are easily distinguished and are all in the same plane; counting can therefore be done speedily and without fatigue. For these reasons the urea diluent is preferred to those generally used.

Summary

A diluting fluid for eosinophil counts is described. It evaporates slowly and mixes easily. It stains eosinophils pink, and does not lyse them. It lyses other leucocytes and erythrocytes.

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Medical Memorandum

Aleukaemic Myeloid Leukaemia Presenting as Aplastic Anaemia

Cases of aleukaemic leukaemia usually present a diagnostic problem which is solved by examination of the bone marrow. In one case we describe, the clinical diagnosis of acute leukaemia was not substantiated by the haematological findings, which suggested a diagnosis of hypoplastic anaemia, apparently confirmed by recovery after treatment. Five months later, however, the patient was again admitted to hospital and died of typical acute myeloid leukaemia.

The reported cases of aleukaemic leukaemia presenting as aplastic anaemia—for example, that of Parkes Weber (1932)—had recognizable early myeloid cells in the peripheral blood with the exception of that of Easton (1930). In Easton's case there is no mention of the sternal marrow findings or of thrombocytopenia. Only terminally did our case show identifiable precursor cells, and at no time was the spleen or liver palpable.

Case Report

A 14-year-old schoolgirl was admitted to hospital on March 17, 1949, having two weeks previously developed a sore throat, for which she had received penicillin lozenges and oral sulphadiazine (total 20 g.). After four days of this she was observed to be notably pale. For four days before admission she had vomited frequently, and on admission complained of headache, weakness, and nausea. There had been no obvious bleeding from the mucous membranes. She was extremely pale, with severe herpes labialis and a temperature of 104° F. (40° C.). Her gums were normal. The liver, spleen, and superficial lymph nodes were not palpably enlarged. Both ocular fundi showed fairly large circumscribed haemorrhages, reminiscent of subhyaloid haemorrhages seen in cases of subarachnoid haemorrhage. There were no other abnormal signs in any system, and acute leukaemia was diagnosed.

The blood count (see Table) showed Türk cells but no nucleated red blood cells or other abnormal cells. In view of the pancytopenia, the sternal marrow was examined and found to show gross hypoplasia (another puncture of the sternum gave identical findings):—reticulum cells, 2%; haemocytoblasts, 1.75%; myeloblasts, 8%; premyelocytes, 3.25%; n. myelocytes, 0.5%; n. metamyelocytes, 0.25%; segmented polymorphs, 0.25%; no eosinophil or basophil cells were seen; lymphoid cells, 56%; plasma cells, 1.5%; proerythroblasts, 5.5%; normoblasts: basophilic 6%, polychromatic 5.5%, orthochromic 8.5%. A diagnosis of hypoplastic anaemia, the result of sulphonamide therapy,

Summary of the Blood Counts

Date	Hb %	R.B.C.	C.I.	W.B.C.	Varieties of Leucocytes (%)										Reticulum Cells	Reticulocytes	Platelets (per c.mm.)
					N. Polys.	Eosinophils	Basophils	Lymphocytes	Monocytes	Türk	Metamyelocytes	Myelocytes	Premyelocytes	Myeloblasts			
17/3/49	36	1,750,000	1·03	600	11	—	—	76	5	8	—	—	—	—	—	0·2	8,800
21/3/49	—	—	—	1,300	1	—	—	94·5	3·5	1	—	—	—	—	—	0·1	7,000
22/3/49	63	3,150,000	1·00	1,200	—	—	—	94·5	4·5	1	—	—	—	—	—	—	—
23/3/49	52	2,690,000	1·00	1,100	—	—	—	—	—	—	—	—	—	—	—	—	Occasional
28/3/49	54	—	—	1,400	10	—	—	88·0	2·0	—	—	—	—	—	—	—	—
31/3/49	50	—	—	800	29	—	—	70·0	1·0	—	—	—	—	—	—	—	Occasional
4/4/49	63	3,130,000	1·00	—	—	—	—	—	—	—	—	—	—	—	—	0·6	51,000
5/4/49	63	3,150,000	1·00	1,200	86	—	—	53·0	7·0	4	—	—	—	—	—	0·9	25,000
6/4/49	64	3,180,000	1·00	—	—	—	—	—	—	—	—	—	—	—	—	0·7	83,000
7/4/49	66	3,360,000	1·00	4,000	85	0·5	—	53·0	7·5	5	—	—	—	—	—	1·1	71,000
9/4/49	64	3,340,000	1·00	—	—	—	—	—	—	—	—	—	—	—	—	1·2	100,000
11/4/49	65	3,250,000	1·00	4,800	17	1·5	—	78·0	1·5	1	1·0	—	—	—	—	3·3	195,000
20/4/49	70	3,520,000	1·00	5,100	42	—	—	32·0	5·0	1	—	—	—	—	—	8·8	217,000
28/4/49	80	4,060,000	1·00	5,100	41	9·5	0·5	42·5	6·5	—	—	—	—	—	—	7·4	230,000
4/5/49	80	4,010,000	1·00	5,400	28	11·5	0·5	50·0	8·0	0·5	1·5	—	—	—	—	6·8	280,000
7/6/49	98	5,100,000	0·96	5,000	43·5	2·0	1·0	48·5	5·0	—	—	—	—	—	—	—	242,000
29/10/49	58	2,960,000	0·96	12,800	—	—	—	9·0	—	—	—	0·5	0·5	88·5	1·5	—	15,000

was suggested. A marrow biopsy was rejected in view of the patient's condition and the hazard associated with the thrombocytopenia.

Treatment was begun with blood transfusions and systemic penicillin, 200,000 units every three hours. During the first three weeks she received in all 9 pints (5.1 litres) of compatible blood. She remained febrile. The haemoglobin level fluctuated between 50 and 60%, the total white count remained below 1,500 per c.mm., and the platelets could not be seen. Reticulocytes were absent.

On March 31 (see Table), two weeks after admission, the total white cell count was down to 800 per c.mm. On this day she was given 100 mg. of folic acid and a similar amount of pyridoxin daily by mouth, in addition to the systemic penicillin. There was considerable bruising at the sites of the penicillin injections and free oozing of blood from the herpetic areas on the lips. On April 4 reticulocytes were 0.6%. The total white count rose to 4,000 per c.mm. on April 7, and continued to rise until the time of her discharge. On April 20 her reticulocytes reached a maximum of 8.8% and then declined until her discharge on May 4. On her return from a month's convalescence she seemed well, apart from facial acne and alopecia.

When seen again on October 29 she said she had been feeling off colour for two weeks and had difficulty in eating because of soreness of the gums. She had vomited once or twice each day and had a tendency to bruise easily. She was pale, and there was some ulceration and bleeding of the gums. The submaxillary and axillary lymph nodes were palpably enlarged, but not tender. There was no enlargement of the other superficial lymph nodes, liver, or spleen, or other abnormal signs. Her blood count is given in the Table. Her sternal marrow showed a markedly increased cellularity:—reticulum cells, 1.25% ; haemocytoblasts, 0.5% ; myeloblasts, 67% ; premyelocytes, 12.5% ; neutrophil myelocytes, 1.25% ; lymphoid cells, 1.75% ; monocytes, *nil* ; plasma cells, 1.25% ; proerythroblasts, 1.75% ; normoblasts: basophilic 2.5%, polychromatic 4.5%, orthochromatic 3%.

Radiographs of various bones revealed no abnormalities. Symptomatic treatment only was given, and after 10 days the girl died with extensive purpura.

Post-mortem Findings.—A few small nodules—collections of myeloid cells, chiefly myeloblasts—were found on the anterior surface of the epiglottis. The spleen (200 g.) showed no gross abnormality, but a fine diffuse fibrosis and patchy infiltration with myeloblasts. The normal architecture was completely effaced, with an absence of Malpighian bodies. The liver weighed 1,500 g., with sparse myeloid infiltration. The mediastinal and mesenteric lymph nodes were also moderately enlarged, with myeloid infiltration. The right femur was examined, and almost throughout its length there was greyish cellular marrow, with a preponderance of myeloblasts.

Comment

The marrow of this patient when first seen showed diminished cellularity with a reduction of the myeloid series and a shift to the left. Since this result was given by two different sternal specimens it is unlikely, though not of course ruled out, that there was dilution with peripheral blood. A patchy distribution of the leukaemic process could explain this result. Some of the peripheral blood cells regarded as lymphocytes may have been micromyeloblasts, but in the presence of marked leucopenia a differentiation is difficult. Even the examination of smears made from the white-cell layer in the haematocrit may not help, as normal cells are easily distorted.

Increased cellularity of the marrow does not preclude a diagnosis of refractory anaemia. In a fatal case seen by one of us (M. J. M.), pancytopenia of the peripheral blood with a hyperplastic marrow occurred after contact with a hair dye. The preponderant marrow cells were myeloid, with arrest of maturation at the myelocyte stage. A preponderance of myeloblasts with diminishing numbers of more mature cells suggests aleukaemic leukaemia, whereas a maturation arrest with absence of adult and juvenile polymorphs suggests refractory anaemia. The identification of micromyeloblasts settles the diagnosis in favour of acute leukaemia.

We are indebted to Dr. Oscar Brenner for permission to record this case. We thank the technicians of the Clinical Pathology Department for help with the numerous blood counts and Miss M. N. Ellis for secretarial assistance.

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Africa will soon be served by a W.H.O. regional organization, according to a decision taken by the Executive Board of the World Health Organization. The next step will be the convening of the Regional Committee for Africa, which will formally establish the regional office, launch its activities, and recommend a site for its permanent headquarters. Africa has so far been served from Geneva by a temporary office under the direction of General François Daubenton. The establishment of the regional organization for Africa will bring to five the number of W.H.O. regional organizations. The others are for South-east Asia, the Eastern Mediterranean, the Western Pacific, and the Americas. Europe is served by a special office which is located in Geneva.