

ABSTRACTS

THE SCHILLING HAEMOGRAM

by W. J. LAMOND '37

The Schilling modification of Arneith's differential white blood cell study is of greatest diagnostic and prognostic significance.

We know that in acute inflammation there is an increase in the number of leucocytes, especially the polymorphonuclears, in the peripheral blood stream which have emigrated from the bone marrow and the central blood stream in an effort to combat the presence of the irritant which is usually pathological bacteria. This elevation in the number of leucocytes is called leucocytosis. As the inflammatory process continues many of the leucocytes are used up, in an attempt to localize the infection or they fall prey to the invading organisms. Thus there is an outpouring of immature cells from the bone marrow to meet the defensive demands. This gives rise to a greater leucocytosis. In the presence of an overwhelming infection there may be a failure of leucocytic response with a resulting leucopenia or diminution in the number of white cells. Thus the mere estimation of the number of leucocytes present in any stage of the inflammatory process leaves much to be desired.

The normal differential white blood cell count consists of the following forms: Basophiles 0—1%; Eosinophiles 2—4%; Monocytes 2—6%; Lymphocytes 20—30%, and Neutrophiles 60—70%. The significance of the Schilling haemogram lies with the neutrophile group of cells. He further differentiates this group into Juvenile cells (normally absent); Stab or Band cells, which are single-lobed neutrophiles (normally 3—5%, and segmented neutrophiles (normally 50—65%). The significant dividing line in the Schilling count lies between the Stab or Band cells and the segmented neutrophiles. So that in the Schilling differential count the following cells are observed:

Basophiles, Eosinophiles, Myelocytes, Juvenile cells, Stab or Band cells, segmented neutrophiles, Lymphocytes and Monocytes.

In acute inflammation we have noted the emigration of mature (segmented) neutrophiles to the scene of the conflict raging between the defences of the body and the invading host of micro-organisms. As time goes on the supply cannot meet the demand for these cells, consequently immature cells such as the band forms

first and then the juveniles are thrown into the blood stream from the bone marrow before they have a chance to reach their fullest development. This is called "the shift to the left" of the Schilling count. The number of immature cells varies directly with the severity of the infection so that, instead of, for example, the normal 3—5% of band cells we may see as many as 50%. In milder degrees of infection there may be a slight "shift to the left" in the absence of any leucocytosis. On the other hand a marked "shift to the left" invariably means severe infection, probably suppurative, if the band cells are 20% or over.

The following series of haemograms of a case of acute cellulitis of the scalp serve to illustrate their usefulness.

Preoperative picture:

Leucocytes	16,000
Segmented neutrophiles....	21%
Band forms	54%
Juveniles	19%
Myelocytes	5%
Lymphocytes	1%
Eosinophiles	nil

This haemogram shows a high leucocytosis with a great "shift to the left", absence of eosinophiles and reduction of lymphocytes which indicates a severe infection. Surgical drainage was carried out and next day the blood smear showed:

Leucocytes	9,000
Segmented neutrophiles ...	22%
Band forms	54%
Juvenile forms	11%
Myelocytes	nil
Lymphocytes	13%
Eosinophiles	nil

Here there is a gradual shift back to the right, the least mature cells, (the myelocytes and the juvenile forms) disappearing first.

The third day postoperative:

Leucocytes	7,000
Segmented forms	62%
Band forms	19%
Juvenile forms	1%
Monocytes	nil
Lymphocytes	16%
Eosinophiles	2%

This interesting series enables one to follow the course of the infection beginning at its onset and showing a progressive "shift to the left" until surgical intervention, when there was a swing back in the opposite direction as the cells gradually assumed normal proportions. Important prognostically was the reappearance of the eosinophiles, which disappear

in the presence of acute infection, with a coincidental fall in the neutrophils. This is always indicative of recovery.

For practical purposes and when experience in differential white cell study is lacking, an estimation of the unsegmented neutrophils (juvenile and band forms) into one grouping, calling them all band cells, is recommended. The nuclei of these cells assume such letter-like characters as "s", "v", "u", etc., and make them very conspicuous. Even if only the band cell count is made it will always throw light on the severity of the infection shown by the degree of "shift to the left" that is present.

To conclude, the practice of supplementing the routine leucocyte count with a Schilling haemogram will foster the cause of better surgery.

References:

- A. Piney—Recent Advances in Haematology.
N. S. Medical Bulletin—January, 1935.

TREATMENT OF SPRAINS BY INTER-LIGAMENTARY INJECTION OF NOVOCAINE.

Rene Leriche and G. Arnulf
American Journal of Surgery, April, 1936;
31, 4, pp. 45-47.

Now that the football season has started, a new and somewhat radical method of treating sprains justifies further investigation. The treatment is based upon conception that local anesthesia of the irritated, complex nervous elements of injured articular ligaments, quickly restores the functional state and greatly reduces the otherwise prolonged convalescence. The best results are obtained in: (1) simple sprains with articular impotence but when no fracture or torn ligaments are found; (2) patients suffering from the after-effects of sprains, namely, pain and muscular atrophy; and (3) orthopedic cases where surgical maneuvers may have strained the ligaments about a joint resulting in what we have termed an "operation sprain".

The technique is as follows: the injection of 10 to 20 c.c., according to the importance of the articulation, of a 1 per cent solution of novocaine in the region of the traumatized ligament. The point designated for the injection is the spot of maximum tenderness, but care is also taken to inject the ligament itself. The results are immediate and the attempts of the patient at mobilization in the first quarter of an hour indicate if the injection is sufficient. If the pain and disability still persist, another injection in the region remaining painful is made, so that the total quantity injected does not

exceed 25 or 30 c.c. After several moments the patient is asked to move the joint, as quite generally he is astonished to find an almost normal painless movement. Ordinarily a single injection suffices, but if not, repeated infiltrations during the subsequent days are made. Accidents in using this technique have never caused alarm, for the puncture of a blood vessel, which should rarely happen, is quite harmless.

The authors believe that this method effectively suppresses the troubles which lead to prolonged functional weakness of a joint.

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THE ERYTHROCYTE SEDIMENTATION TEST

Wintrobe, M.M., International Clinics.
1936: Vol. II: 34.

The blood is a suspension of corpuscles in plasma. In the sedimentation test the stability of this suspension is measured. An anti-coagulant is mixed with the blood and the rapidity with which the red corpuscles settle to the bottom of the tube containing the blood, is determined.

The history of the sedimentation test is traced. Most evidence seems to indicate that increases and decreases in plasma fibrinogen and globulin are responsible for variations in the suspension stability of the red corpuscles. The technique of the test is described and a chart published showing correction for alterations due to anemia.

The sedimentation rate when corrected to a volume of packed cells of 47 cc. per 100 cc. of blood, ranges between 0—6 mm. at the end of one hour in the ordinary healthy person. A decrease in the suspension stability of the blood is one of the most common general reactions of the organism in disease comparable with pyrexia, tachycardia and leucocytosis. It is a non-specific reaction affording information covering the presence and intensity of the morbid process. It is more sensitive than temperature, pulse and leucocyte count and may show disorder when these do not. It is of value in all infections, particularly so as a guide to progress in rheumatic fever and pulmonary tuberculosis, and activity is shown as long as sedimentation rate is increased.

It is also of some value in the differential diagnosis between benign and malignant tumors, the latter usually being associated with increased rate.

One of the main values of the sedimentation reaction is in calling attention to more or less occult disease. Cutler reviewed a series of 1,000 cases in the Henry Phipps Institute in Philadelphia. 328 of them were considered healthy or

suffering from trivial ailments. In 177 of these the sedimentation rate was increased. Re-examination revealed basal non-tuberculosis lesions in 96, latent apical tuberculosis in 32, positive Wassermann in 35, pelvic inflammatory disease in 5, and possible carcinoma of the lungs in 1. Only eight cases showed no abnormality.

The test is now routine in the Johns Hopkins Diagnostic Clinic. Among 444 cases with a rate of 10mms. or less there were only 8 cases in which organic dis-

ease was found. It must be remembered:

- (1) the test is non-specific.
- (2) slight differences in technique may cause great differences in result.
- (3) corrections for anemia may sometimes be misleading.
- (4) repeated tests are of more significance than isolated ones.
- (5) normal sedimentation velocity may occasionally be found in the presence of disease.

R. O. JONES '37.

Dalhousie Students' Medical Society

The Dalhousie Medical Society is at present one of the most flourishing and active of student organizations. Some years ago student interest in this, as in many other university institutions, was at rather a low ebb. In fact the society seems to have been subject to periodic phases of depression such as characterize our present economic system. However, the last two years have shown an ever increasing interest and enthusiasm among the students, and support by the faculty. The members of the executive have been exceedingly active and progressive, and the greater part of the society's success can be credited to them.

Last year the society had a membership of almost one hundred per cent of the student body. Meetings were held at frequent intervals and were very well attended. Interesting lectures were delivered both by local and outside speakers. Refreshments were served after almost every meeting. Several instructive medical films were shown.

The new executive, recently appointed, consists of:

President—Carl Trask.

Vice-President—George Murphy.

Secretary—Clarence Gosse.

Treasurer—Bill Embree.

It is expected that this new regime will endeavour to an even greater extent to make the Student Medical Society a shining example of what unity and a common ideal can achieve for the mutual advantage of the whole group.

In their efforts they can feel sure they are performing a task which will receive the highest commendation from all students.

Medical students may look with pride upon an active student organization which bids well to live long in their memories as a truly fine asset to the excellent medical training they received at a benevolent Dalhousie University.