slit shapes of some lumina are artefactual due to collapse: the degree of stenosis at necropsy is therefore greater than in life, and the degree of collapse will vary according to the proportion of the wall which is free of disease; this chart can only be used as a rough guide in these cases. Pressure fixation would be required to circumvent this problem.

Requests for a chart on A4 size paper can be made to Dr Champ.

CS CHAMP,*
SB COGILL
Departments of Pathology,
*Kettering and District General Hospital,
Rothwell Road,
Kettering,
Northamptonshire NN16 8UZ
Northampton General Hospital,
Cliftonville,
Northampton NN1 5BD

References


Elimination of parallax error in haematocrit readings using reflexion haematocritometry

The precision of haematocrit readings can be improved by using a magnifying glass. Unfortunately, the precision resulting from magnification may be undermined by the parallax error. The consequence of the parallax error is easily recognised if the eye or the lens is moved along the axis of the microhematocrit tube; the readings of the erythrocytes, buffy layer and plasma concentration will be completely changed. The respective error of the haematocrit increases with decreasing haematocrit and cytocr.

To avoid the parallax error, a reflexion haematocritometer was developed according to the following principle. A transparent scale was mounted on a surface mirror and covered by a glass layer. This reflecting unit was provided with a screw driven fixation device for the microhematocrit tube so that the bottom of the red cell column could be gently adjusted to the zero line of the scale (figure). When observed by a magnifying glass, the real and reflected cell and plasma layers can be adjusted to a common level, indicating the reading position of the eye and the lens, thus avoiding the parallax error. Coefficients of variation were assessed with whole blood anticoagulated with edetic acid or leucocyte poor erythrocyte suspensions in anticoagulated plasma or in buffer.

Ten microhaematocrit capillaries of 75 mm in length were filled to a 60 mm mark and sealed. Between each filling procedure the blood tube was closed and mixed by hand. The 10 capillaries were centrifuged together for five minutes (12500 × g at the bottom of the tubes). After centrifugation they were kept in vertical position until the reading. In experiments 8–17 repeated readings of single capillaries were performed. In experiments 1–6 haematocrit measurements were performed with the instrument placed horizontally; experiment 17 was done with the instrument in vertical position. A 10 × eye piece of a microscope was used for all the readings because this is available in most haematological laboratories. The table shows the coefficients of variation of the haematocrit of whole blood and of erythrocyte suspensions in plasma or buffer. At high concentrations of haematocrit all the coefficients of variation were around or below 0.5%. For those around 0.07, the coefficients of variation averaged 2.5%. In experiment 1 the buffy layer was read in addition to the plasma and red cell layers and the cytocr (sum of the red plus white cell columns divided by the length of the whole column) was also calculated and was 0.478 ± 0.001 and the coefficient of variation 0.21%. In experiments 8–17, 10 repeated readings of single capillaries were performed. In experiments 8–13 coefficients of variation were obtained similar to those in experiments 1–7. This was due to the fact that manipulation between readings led to some crowding of the uppermost erythrocytes layer after four to six readings (table). In experiments were elimination of the reflexion parallax was reduced to the necessary minimum, the coefficient of variation was zero for whole blood and erythrocytes suspended in buffer at a low haematocrit. (experiments 14, 15). At a higher concentration of erythrocytes in buffer, however, some crowding also occurred (experiment 16) but could almost be suppressed when the instrument was in vertical position (experiment 17).

The high precision of the readings obtained with this instrument compared with those obtained with a non-reflexion scale was due to (1) the elimination of the reflexion parallax error and (2) the mechanical adjustment of capillaries to the instrument scale.

Figure Reflexion haematocritometer with haematocrit capillary and eye piece in position and screw (a) for driving the capillary holder (b) and light source (c).
Letters to the Editor

Table Coefficients of variation of haematocrit readings

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Sample</th>
<th>Haematocrit</th>
<th>Coefficient of variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Whole blood</td>
<td>0.472</td>
<td>0.46</td>
</tr>
<tr>
<td>2</td>
<td>Whole blood</td>
<td>0.406</td>
<td>0.44</td>
</tr>
<tr>
<td>3</td>
<td>Whole blood</td>
<td>0.430</td>
<td>0.26</td>
</tr>
<tr>
<td>4</td>
<td>Erythrocytes in plasma</td>
<td>0.396</td>
<td>0.36</td>
</tr>
<tr>
<td>5</td>
<td>Erythrocytes in buffer</td>
<td>0.497</td>
<td>0.28</td>
</tr>
<tr>
<td>6</td>
<td>Erythrocytes in plasma</td>
<td>0.065</td>
<td>2.54</td>
</tr>
<tr>
<td>7</td>
<td>Erythrocytes in buffer</td>
<td>0.064</td>
<td>2.29</td>
</tr>
<tr>
<td>8</td>
<td>Whole blood</td>
<td>0.481</td>
<td>0.32</td>
</tr>
<tr>
<td>9</td>
<td>Erythrocytes in buffer</td>
<td>0.574</td>
<td>0.26</td>
</tr>
<tr>
<td>10</td>
<td>Erythrocytes in buffer</td>
<td>0.072</td>
<td>2.87</td>
</tr>
<tr>
<td>11</td>
<td>Whole blood</td>
<td>0.361</td>
<td>0.23</td>
</tr>
<tr>
<td>12</td>
<td>Erythrocytes in buffer</td>
<td>0.492</td>
<td>0.36</td>
</tr>
<tr>
<td>13</td>
<td>Erythrocytes in buffer</td>
<td>0.070</td>
<td>2.38</td>
</tr>
<tr>
<td>14</td>
<td>Whole blood</td>
<td>0.493</td>
<td>0.00</td>
</tr>
<tr>
<td>15</td>
<td>Erythrocytes in buffer</td>
<td>0.076</td>
<td>0.00</td>
</tr>
<tr>
<td>16</td>
<td>Erythrocytes in buffer</td>
<td>0.504</td>
<td>0.25</td>
</tr>
<tr>
<td>17</td>
<td>Erythrocytes in buffer</td>
<td>0.505</td>
<td>0.09</td>
</tr>
</tbody>
</table>

1-7: means of 10 microhaematocrit capillaries in each experiment.
8-17: means of 10 readings of single microhaematocrit capillaries.
8-10: the capillary was removed from the haematocritmeter between readings.
11-13: the capillary was moved by the screw mechanism between each reading and readjusted to the scale for reading.
14-17: the capillary was only moved if readjustment to the scale was necessary.
Experiment 17 was performed with the instrument and (hence) the microhaematocrit tube in vertical position.

The precision is higher than that achieved without specialised equipment, giving precise values even below haematocrits of 0.1. Although the reading precision is the same at high and low haematocrits (± 0.1 mm) the coefficient of variation increases with decreasing haematocrit (table) because of the decreasing absolute value of the numerator in the haematocrit calculation. The instrument is commercially available.

M STÄUBLI
Medical Division,
Neumünster Hospital,
8125 Zollikerberg,
Switzerland

Epithelioid haemangioendothelioma of terminal ileum after therapeutic irradiation

Epithelioid haemangioendothelioma is a vascular tumour with biological behaviour intermediate between a haemangioma and an angiosarcoma. Its vascular origin was recognised on the basis of the ultrastructure of the tumour cells and subsequently confirmed by factor VIII related antigen immunoreactivity in the tumour cells. The tumour, first described in the lung, was designated "intravascular bronchioalveolar" tumour (IVBAT) and considered to be of epithelial origin. Reports of similar tumours have been described in various organs, but with the exception of the liver where the association with oral contraceptives have been noted, aetiological associations have not been discussed.

A 72 year old caucasian widow, who had had radiotherapy for carcinoma of the cervix 22 years ago, presented with bowel obstruction. A laparotomy showed that she had a stenosed segment of terminal ileum, and this was resected. Her symptoms recurred nine months later and a second laparotomy showed stenosis of the previous anastomosis and multiple "sugar icing" depositions on the mesentery and pelvic peritoneum. She died several months later and permission for necropsy was refused.

A 6 cm terminal ileum specimen with a central 2 cm stenosed segment was received, fixed in 10% formal saline. Representative sections were routinely processed and slides stained with haematoxylin and eosin, van

References