Proficiency Testing in Bone Marrow Morphology

John Sioufi

Protecting patients
Agenda

- Background

- Pilot Bone Marrow survey
  - Results
  - Feedback

- Structure of the Bone Marrow module 2016
Background

- RCPAQAP Haematology officially began in 1963
  - Dr Shoobridge
  - Offering peripheral blood morphology survey

- 1974 - Prince Henry Hospital
  - Dr Grace

- 1978 – Royal Perth Hospital
  - Dr Jackson
  - Expanded to include other Haematology modules
Background

- 1983 - 2008 Westmead Hospital
  - Morphology Program – peripheral blood smears and bone marrow smears occasionally offered.
  - Number of subscribers increased, making it difficult to supply bone marrow

- 2008 – Introduction of virtual microscopy
  - Introduction of Malarial Parasite module 2009

- 2012 – moved to St. Leonards
  - Introduction of Paediatric Morphology module 2012
Bone Marrow Morphology Pilot

- A BM Morphology pilot was sent out in 2015 to all laboratories enrolled in the Morphology module.

- Laboratories that examine and report on bone marrow biopsies were asked to participate.

- Case Study was from a patient with Essential Thrombocythaemia

- Participants were supplied with digital (virtual) images of a peripheral blood film, bone marrow aspirate and trephine.
Bone Marrow Morphology Pilot

- Differential count on the bone marrow aspirate
- Diagnostic Interpretation
- Follow up investigation
- Questionnaire (Survey Monkey)
- From the 536 labs enrolled in the Morphology module, 40 laboratories participated
BM Morphology Pilot - results

Differential count

BM Differential Count

Values excluded from statistics

BM Differential Count

Blasts
Promyelocytes
Myelocytes
Band Forms
Mature Neutrophils
Eosinophils
Basophils
Monocytes
Erythropoiesis
Lymphocytes
Lymphoblasts
Prolymphocytes
Plasma Cells
Histiocytes
Non-Haemopoitic Cells

0
10
20
30
40
50
60

%
## BM Morphology Pilot - results

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### Sum of band forms and mature neutrophils

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BM Morphology Pilot - results

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Sum of promyelocytes and myelocytes

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Sum of myelocytes and metamyelocytes

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BM Morphology Pilot - results

Diagnostic Interpretation

ET
MPN
Myeloid + lymphoid neoplasms with eosinophilia
Atypical CML
No abnormality detected
Primary myelofibrosis
No diagnosis
BM Morphology Pilot - results

Title vs. Examination/Reporting of Bone marrow

- Pathologist: Yes (35 responses), No (0 responses)
- Scientist: Yes (1 response), No (0 responses)
- Registrar: Yes (0 responses), No (0 responses)

Protecting patients
BM Morphology Pilot - results

Ease of Loading

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Ease of Navigation

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BM Morphology Pilot - results

Enrol in BM Program?

Yes: 30 responses
No: 5 responses
Will consider: 2 responses

Preferred number of surveys per year:
- Two: 8 responses
- Three: 14 responses
- Four: 5 responses

Preferred method of delivery:
- Online: 20 responses
- DVD: 5 responses
2016 BM Morphology module

- Will be introduced as a module in 2016
- 2 surveys sent within a survey year
- 1 case study per survey
  - Donated by laboratories, stained using their routine stain.
- Each survey case study will at least include virtual images of a
  - peripheral blood
  - bone marrow aspirate - low power (to assess megakaryocytes & cellularity)
  - bone marrow aspirate - high power
  - Bone marrow trephine
  - Other special stains if relevant and/or available.
- Digital images will be supplied on-line, however DVDs are available on request.
2016 BM Morphology module

- Each case study will be presented with clinical notes with FBC parameters
- Split into 4 components
- Requesting
  1. Bone marrow differential
  2. Description of the bone marrow aspirate and trephine, which will follow the format of the RCPA’s Bone Marrow Specimen Proforma
  3. Diagnostic Interpretation
  4. Follow up investigation
- Results will be reviewed & assessed by the Morphology advisory committee.
## 2016 BM Morphology module

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<td><strong>PC computer</strong>*</td>
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<td>Plasma cells</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>%</td>
<td></td>
</tr>
</tbody>
</table>

**M:E Ratio**: %
2016 BM Morphology module

- BM Aspirate Morphology – tick box
  - Cellularity of particles
  - Cellularity of trails
  - Cellularity of imprint
  - Erythropoiesis quantitation
  - Erythropoiesis morphology
  - Granulopoiesis quantitation
  - Granulopoiesis morphology
  - Megakaryopoieses quantitation
  - Megakaryopoieses morphology

- Lymphocytes - number
- Lymphocyte - morphology
- Plasma cells - number
- Plasma cell - morphology
- Iron stores
- Ring * abn. sideroblasts
- % ring sideroblasts
- Other cells
2016 BM Morphology module

- BM Trephine Morphology – tick box
  - Cellularity
  - Architecture
  - Erythropoiesis
  - Granulopoiesis
  - Granulopoiesis maturation
  - Megakaryocytes
  - Megakaryocytes distribution
  - Megakaryocytes morphology

- Lymphocytes
- Plasma cell numbers
- Plasma cell morphology
- Non haematopoietic infiltration
- Granuloma formation
- Other abnormalities
2016 BM Morphology module

- **DIAGNOSTIC INTERPRETATION**
  - To be selected from the BM section of the RCPAQAP Master Code Booklet
  - Codes have been revised by the Morphology committee
  - If your preferred code/diagnosis is not listed please use the “best fit” and contact the RCAPQAP to request adding new code in future lists
**2016 BM Morphology module**

- Areas of the survey to be assessed are the BM differential and the diagnostic interpretation.
- BM differential will use the standard deviation of the set of results returned by participants.
- Diagnosis will use the scoring system employed in the Morphology module.
- Description is for own review

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No submission or a diagnosis not consistent with the features present.</td>
</tr>
<tr>
<td>1</td>
<td>A diagnosis with minimal consistent features present.</td>
</tr>
<tr>
<td>2</td>
<td>A diagnosis indicating recognition of some of the features present.</td>
</tr>
<tr>
<td>4</td>
<td>A diagnosis with the majority of the expected features present.</td>
</tr>
<tr>
<td>5</td>
<td>Most likely diagnosis(es)* based on morphological features.</td>
</tr>
</tbody>
</table>
Currently enrolled

- Currently enrolled = 85
  - Australian subscribers = 55
  - Overseas subscribers = 30
Dr Katherine Marsden  Chairperson, RCPAQAP Haematology
John Sioufi  Discipline Manager, RCPAQAP Haematology
Fernando Estepa  Senior Scientist, RCPAQAP Haematology
Gail Earl  Scientist, RCPAQAP Haematology
Nae Ali Pour  Queen of Admin

HAEMATOLOGY MORPHOLOGY ADVISORY COMMITTEE
Dr Janine Campbell  Royal Children’s Hospital, VIC
Dr George Chan  Auckland Hospital, New Zealand
Dr Peter Davidson  QML Pathology, QLD
Cathy Durkin  Dorevitch Pathology, Heidelberg, VIC
Dr Wendy Erber  University of Western Australia, WA
Dr John Giannoutsos  Nepean Hospital, NSW
Dr Surender Juneja  Royal Melbourne Hospital, Melbourne, VIC
Dr Tee Beng Keng  Sullivan Nicolaides Pathology, Taringa, QLD
Dr Poomhal Kumar  Royal North Shore Hospital, NSW
Prof Stephen Mulligan  Mayne Health Pathology, Nth Ryde, NSW
Gillian Rozenberg  Prince of Wales Hospital, Randwick, NSW
Robert Short  St Vincent’s Hospital, NSW
Dr Lesley Survela  Royal North Shore Hospital, NSW
Robyn Wells  Pathology Queensland-PAH, QLD
Dr Paul Whiting  Capital Pathology, ACT, NSW
Thank you