Malays J Pathol 2024; 46(2) : 339 – 340

LETTER TO EDITOR

Residual post-treatment rhabdomyosarcoma in bone marrow: A reminder of the continued importance of morphology

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To the Editor,

The advent of new diagnostic tools, including the expanding availability of specific immunohistochemical stains, has been a major driver in the advancement of diagnostic pathology. While these are powerful tools, the modern pathologist is often tempted to over rely on these studies at the expense of a diligent review of morphology. This can be risky, especially when pathologic findings are minimal or when dealing with specimens that consist of several components, such as bone marrow. The following is an example:

An 11-year-old male was diagnosed with *PAX3-FOXO1* rearranged rhabdomyosarcoma of the foot. At the time of initial diagnosis, bilateral bone marrow biopsies demonstrated significant involvement by metastatic rhabdomyosarcoma (35% and 50% involvement by tumour on the right and left core biopsies, respectively). Disease was also identified in bilateral aspirate smears and touch imprints (see Figure A).

The patient underwent chemotherapy with subsequent post-treatment bilateral bone marrow biopsies to assess for disease response. Per protocol, touch imprint slides were obtained and stained from each of the cores. A thorough morphologic examination showed four cells with morphologic features of post-treatment rhabdomyoblasts detected on one touch imprint slide from the left side. The latter cells were large, with large irregular nuclei and prominent multiple nucleoli (Figure B-arrowheads). A separate touch imprint had one additional cell which showed eosinophilic cytoplasmic structures consistent with myofibrils (Figure C-Arrow). This morphologic finding is well described in post-treatment rhabdomyosarcoma specimens and represents maturation following chemotherapy also referred to as cytodifferentiation.[1] The bilateral aspirate smears and touch imprints from the right side were negative for metastatic cells. Interestingly, the bilateral core biopsies were negative for metastasis on the H&E stains as well as by Desmin and Myogenin immunohistochemistry. Cytogenetics were also negative for *FOX01* rearrangement.

This unusual case of residual rhabdomyosarcoma, only identified on bone marrow touch imprints, underscores the value of adhering to the time-honoured tradition of performing a thorough morphologic examination of every specimen component. This is especially relevant in diseases such as rhabdomyosarcoma where bone marrow involvement has significant prognostic implications.[2] This case serves as a reminder that the availability of immunohistochemical stains, as well as molecular and genetic studies, should not undercut the value of a detailed morphologic examination.

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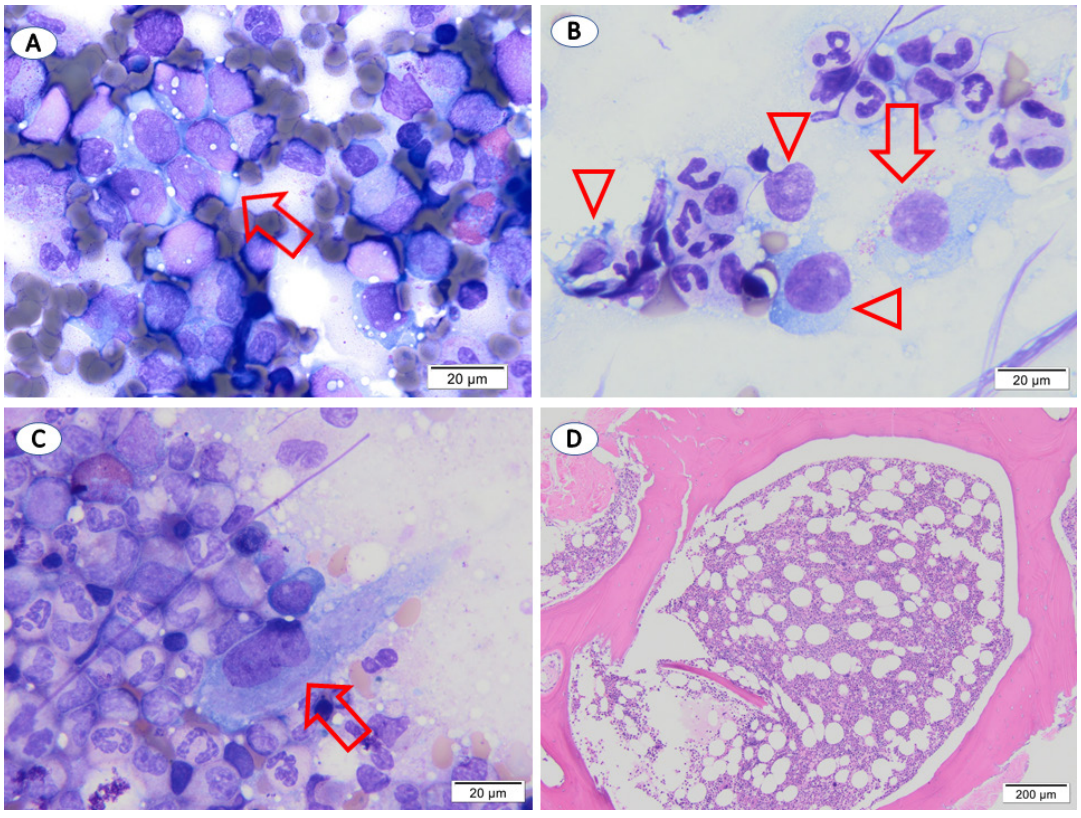

Figure: (A) Bone marrow touch imprint at initial diagnosis with an arrow indicating cluster of metastatic rhabdomyoblasts (arrow). (B) Post-treatment bone marrow touch imprint with rare residual rhabdomyoblasts including one cell with eosinophilic structures consistent with myofibrils (C). D, Post-treatment core biopsy was negative for metastatic disease, (A-C Wright-Giemsa, original magnification ×1000; (D) haematoxylin-eosin, original magnification ×100).

Authors' contributions: Dr. Abobarin performed a literature search and edited the manuscript. Dr. Kaumeyer reviewed and edited the manuscript and figure. Dr. Kahwash wrote the first draft, prepared the figure, and edited the manuscript.

Conflict of interest: The authors declare no conflict of interest.

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