IMAGES IN CYTOLOGY

Neonatal Mimicker Cells in Cerebrospinal Fluid

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A 4-week-old premature baby girl with progressive hydrocephalus presented for surgical placement of a ventricular reservoir. Her peripheral blood counts had been stable and no blasts were observed. A cerebrospinal fluid morphologic evaluation demonstrated a background of numerous red blood cells with scattered and a single aggregate of immature-appearing mononuclear cells. These cells were large in size with fine reticular chromatin, indistinct nucleoli and scant amounts of cytoplasm consistent with germinal matrix cells (Figure 1A, 50× objective; and inset, 100× objective, Wright-Giemsa). Magnetic resonance imaging (MRI) showed an extensive left periventricular intraparenchymal hematoma/germinal matrix haemorrhage with adjacent cystic encephalomalacia, measuring approximately 3.5 × 1.3 cm in the greatest axial dimension (Figure 1B). At the 2-month follow-up status post-ventricular reservoir placement, the patient continued to exhibit symptoms of hydrocephalus with regularly scheduled reservoir taps to relieve intracranial pressure.

Germinal matrix (GM) cells are derived from the subependymal cell layer, which is prominent, highly vascular and prone to bleeding in premature neonates. GM cells appear immature or blast-like, with dispersed chromatin and scant cytoplasm. These cells might mimic malignant cells such as lymphoblasts, neuroblastoma or medulloblastoma. Careful morphologic evaluation and clinical/radiologic correlation are essential to avoid misinterpreting this interesting morphologic pitfall.

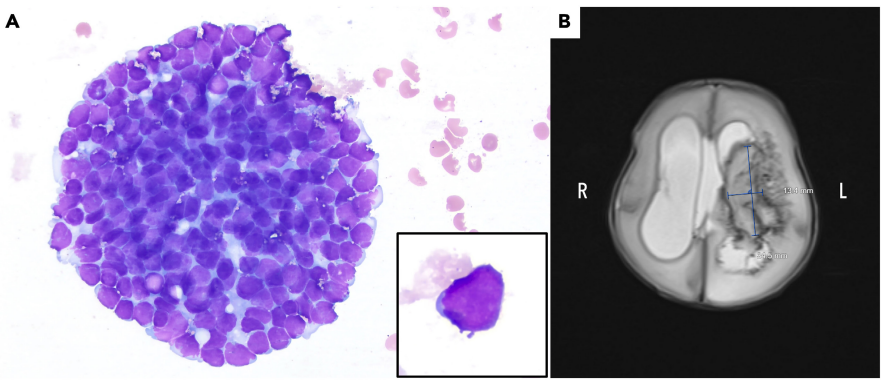

FIGURE 1 | Cerebrospinal fluid cytospin and brain magnetic resonance imaging. (A) Wright-Giemsa stained cytospin demonstrating an aggregate of immature-appearing mononuclear cells with slightly irregular nuclear contours with occasional indentation, dispersed chromatin, indistinct nucleoli and scant amounts of cytoplasm in the background of numerous red blood cells (A, 50× magnification; inset, 100× magnification). (B) Brain magnetic resonance imaging showing an extensive left periventricular intraparenchymal hematoma/germinal matrix haemorrhage (3.5 × 1.3 cm, greatest axial dimension).

Author Contributions

Catherine M. Alexander: writing – original draft preparation. **Catherine M. Alexander** and **Luis F. Carrillo:** writing – review and editing. **Luis F. Carrillo:** figure.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.