LETTER TO THE EDITOR
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Megakaryocytes in Neonatal Peripheral Blood Smears

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Dear Editor,

Megakaryocytes (MKs) comprise 0.01% of all nucleated cells in the bone marrow (BM) [1]. Recent studies show that MKs play an important part in platelet production, inflammation, and immune function. As an"omnipotent"cell type, MKs participate in regulating coagulation, inflammation, and immunity [2]. MKs in peripheral blood smears (PBSs) may indicate hematological neoplasms, such as myelodysplasia, granulocytic leukemia, or other myeloproliferative disorders [3]. MKs are more rarely observed in PBSs of patients with non-hematological diseases, including Sheehan's syndrome, lumbar-disc herniation, and hypertension [4].

A total of 411 newborns were admitted to Qingdao Women and Children's Hospital Affiliated to Qingdao University from January 2024 to May 2024, were enrolled in this study. They are 0 to 30 days old. Here, we report on 80 cases of MKs discovered at the PBS's feathered edges of 411 children (Fig. 1). Three to five PBSs of each infant were made to detect MKs which were confirmed with blinded assessments by two experienced experts. The median age of the newborns was 4 days (range: 0 to 30 days), and 44 were boys. Thirty-four patients were diagnosed with hyperbilirubinemia, of whom all 34 had negative neonatal hemolysis test results and 20 were premature. Seventeen children were admitted to hospital because of infections, including pneumonia, enteritis, intrauterine infections and perinatal

infections. Ten of the children were healthy, whereas some children had multiple symptoms. Among the remaining 331 children without MKs, 80 cases were randomly selected for analysis. The baseline characteristics of the children with and those without MKs in the PBSs are summarized in Table 1.

In our study, the number of children with MKs in PBSs was higher than that of infants without MKs in PBSs among those with the following diseases: hyperbilirubinemia, premature birth, anemia, hypoglycemia, thrombocytopenia, sclerema neonatorum and hypoxemia. The causes of MKs in peripheral blood may be related to these diseases or other, unknown disorders. Quigley et al. demonstrated that erythropoietin (EPO) could stimulate EPO receptors presenting on erythroid precursors and MKs in the BM in patients with anemia [5]. Moreover, an increase in thrombopoietin during thrombocytopenia may promote MK differentiation. Both of these factors may cause an increase in MKs in PBSs. In this study, five patients with MKs in PBSs were diagnosed with anemia, whereas four without MKs in PBSs had anemia. Three patients with and two without MKs in PBSs were diagnosed with thrombocytopenia. According to previous reports, 20%-25% MKs derived from the BM migrate to pulmonary capillaries. Lefrancais et al. discovered that platelets were generated in the lungs of MK-specific PF4-Cre transgenic mice. MKs in peripheral blood may originate from pulmonary capillaries, and the lungs may have hematopoietic potential [6].

In conclusion, circulating MKs are common in newborns. Therefore, the clinical significance of MKs in neonatal PBSs is not yet clear, but it may indicate the presence of hyperbilirubinemia, premature birth, anemia, or other diseases mentioned in this study.

The number of Tables is 1.

The number of Figures is 1.

ETHICAL APPROVAL

The study protocol was approved by Qingdao Women and Children's Hospital affiliated to Qingdao University committee on human research.

AUTHOR CONTRIBUTIONS

Zhenni Wang provided the pictures, clinical data and designed the study. Xinping Liang designed the study, analyzed the data and wrote the manuscript.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

REFERENCES

1. Machlus RK, Italiano JE Jr. The incredible journey: from megakaryocyte development to platelet formation. J Cell Biol. 2013;201:785-796.
2. Tianzhen Hua, Fenghua Yao, Haitao Wang, Wei Liu, Xiaomei Zhu, Yongming Yao. Megakaryocyte in sepsis: the trinity of coagulation, inflammation and immunity. Critical Care. 2024;28:442.
3. Whitby L. The significance of megakaryocytes in the peripheral circulation. Blood. 1948;3:934-938.
4. Jianfeng Zhu, Wei Guo, Beili Wang. Megakaryocytes in peripheral blood smears of non hematological diseases. Japanese Society of Hematology. 2020;112:128-130.
5. Neha Garg, Rashmi Jain Gupta, Sunil Kumar. Megakaryocytes in Peripheral Blood Smears. Turk J Hematol. 2019;36:212-213.
6. Lefrançais E, Ortiz-Muñoz G, Caudrillier A, Mallavia B, Liu F, Sayah DM, et al. The lung is the site of platelet biogenesis and a reservoir for haematopoietic progenitors. Nature. 2017;544:105–9.

Table 1. The baseline of 160 children with（80） vs. without MKs（80） in PBSs enrolled in this study

Characteristic		Clinical value of 80 children with MKs	Clinical value of 80 children without MKs
Age		4	7
Sex			
	Male	44	48
	Female	36	32
Diagnostic results			
	Hyperbilirubinemia	34	16
	Premature birth	20	17
	Infection	17	32
	Healthy	10	22
	Neonatal asphyxia/respiratory distress syndrome	9	20
	Low birth weight	7	20
	Anemia	5	4
	Hypoglycemia	5	1
	Respiratory failure	4	11
	Thrombocytopenia	3	2
	ABO hemolytic disease	3	5
	Pneumothorax	1	1

	Granulocytopenia	1	1
	Intracranial hemorrhage	1	5
	Sclerema neonatorum	1	0
	Hypoxemia	1	0

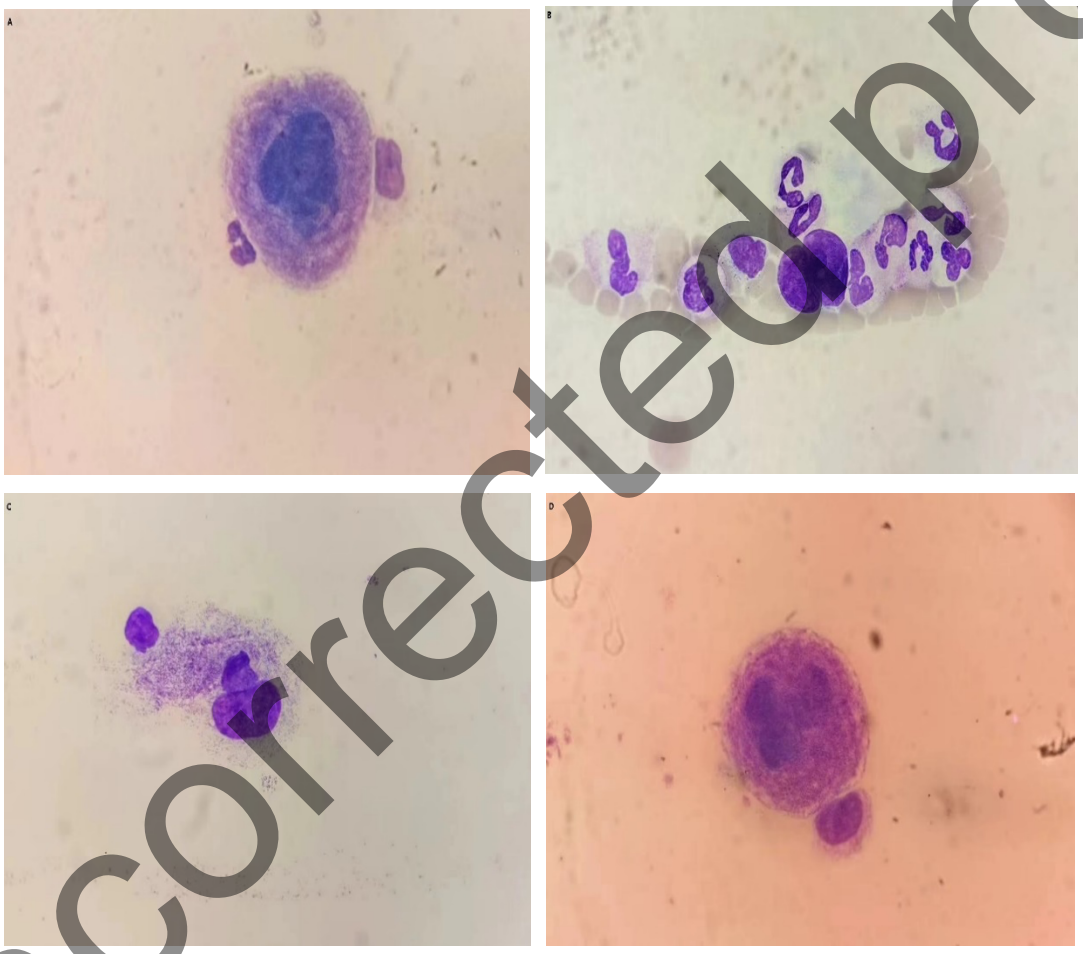

Figure 1. The Megakaryocytes found in neonatal peripheral blood smears, including granular megakaryocytes and naked megakaryocytes. (magnification 1000×, Wright–Giemsa staining).