ABO Blood Group Discrepancies: A Key Consideration in Inborn Error of Immunity

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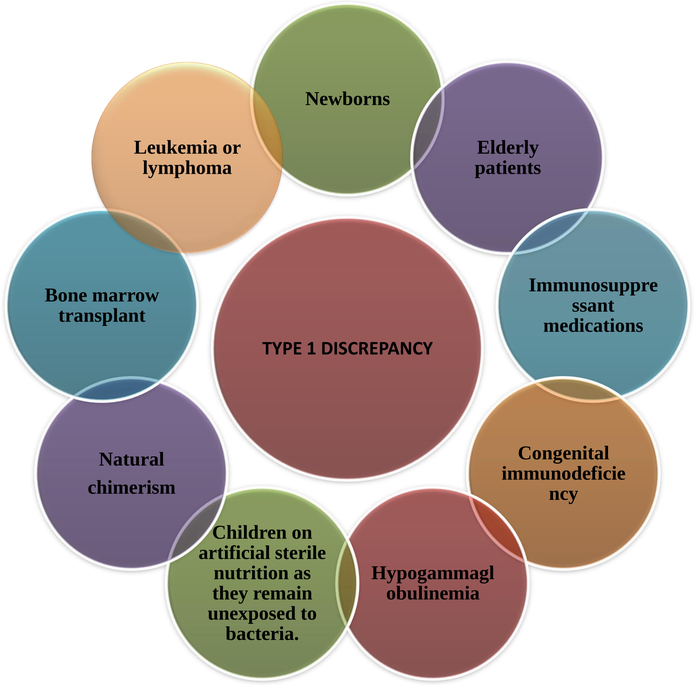
BACKGROUND

- Type 1 blood group discrepancies arise when reduced antibodies are in a patient's serum, resulting in a weak or absent reaction during reverse blood grouping.
- Inborn Errors of Immunity (IEIs) are conditions characterized by impaired immune function, which leads to abnormalities in antibody production, which may interfere with regular blood typing.



AIM AND OBJECTIVE

This study aimed to determine the number of Type I discrepancies among the pediatric population (> 4 months and <15 years) secondary to Inborn Errors of Immunity (IEIs).

MATERIALS & METHODS

A retrospective study was conducted in the Department of Transfusion Medicine and Immunohematology from January 2022 to July 2024.

The study included samples from newborns older than four months and children under fifteen who exhibited type I discrepancies (Strength of agglutination ≤ 2+ in reverse typing).

ABO blood grouping and Rh typing were carried out using a dual-platform approach that included both the manual tube technique and the Column Agglutination Technique, in accordance with departmental protocol.

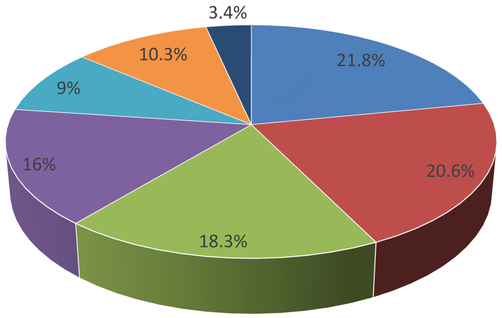
Data regarding demographics and immunohematological assessments were collected. Cases which were confirmed by Next Generation Sequencing (NGS) for IEIs were documented.

Various methods employed to resolve type 1 grouping discrepancies, included prolonged incubation, incubation at 4°C, and double serum volumes.

RESULTS

3,54,178 samples tested → Of the 3,54,178 samples tested 131 showed Type 1 discrepancy → Out of 131 samples, 87 (77%) were from children under 15 years of age and the rest from adults (23%). → Of the 87 samples, 18 (20.6%) were confirmed cases of IEIs.

Out of 87 samples, 8 (9%) had a strong suspicion of IEIs but were not confirmed with NGS.



DIAGNOSIS	NUMBER	PERCENTAGE(%)
Anorectal malformation Intussusception Hirschsprung disease	12 03 04	**21.8**
IEIs	**18**	**20.6**
Suspected IEIs	08	9
Infections	14	16
Surgery	16	18.3
Malignancy	03	3.4
Others	09	10.3

Spectrum of IEIs Diagnoses Identified

- Severe Combined Immunodeficiency (SCID) **X 4**
- Autoimmune Lymphoproliferative Syndrome (ALPS) **X 2**
- Wiskott-Aldrich Syndrome (WAS) **X 2**
- Familial Hemophagocytic Lymphohistiocytosis
- Lymphocyte Adhesion Deficiency.
- Griscelli Syndrome
- Bruton X-Linked Agammaglobulinemia
- Ataxia-Pancytopenia Syndrome
- Chronic Granulomatous Disease
- Central Adrenal Insufficiency
- Biotidinase deficiency
- PID-VUS

DISCUSSION AND CONCLUSION

- There is limited literature available on this topic.
- Addressing Type 1 blood group discrepancies in the context of immunodeficiency diseases requires a thorough understanding of both immunologic mechanisms and diagnostic techniques.
- Our study found that a significant number of pediatric patients (18/87, 20.6%) with samples showing type 1 discrepancies were subsequently diagnosed with IEIs. Additionally, 8/87 (9%) patients were strongly suspected of having IEIs.
- This study also revealed that 19/87 cases (21.8%) with type 1 discrepancy were linked to gut-related etiology, potentially leading to decreased antibody production.
- This study highlights the criticality of clinically correlating atypical immuno-hematological results, particularly Type I discrepancy in children. Also, consider the IEIs if clinical pictures suggest the same.

REFERENCES

- Sonker A, Dubey A, Singh A, Chaudhary R. A rare case report of chronic variable immunodeficiency divulged by ABO discrepancy. Transfusion and Apheresis Science. 2014 Apr 1;50(2):225-7.
- Julius CJ, Wade M, Waheed A, McNeil DL, Kennedy MS. Common variable immunodeficiency: diagnosis by absent ABO reverse type. Immunohematology. 1997 Jan 1;13(3):80-3