

CORD BLOOD ANTIBODY SEROPREVALANCE AGAINST DIPHTHERIA, PERTUSSIS, MEASLES, MUMPS & RUBELLA AMONG TERM HEALTHY INDIAN NEWBORNS

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BACKGROUND

- The resurgence of vaccine-preventable diseases in young infants is a matter of concern worldwide.
- It's worthwhile estimating protective antibodies seroprevalence against various vaccine-preventable diseases at regular intervals.

AIMS OF THE STUDY

- To determine the seroprevalence of protective antibodies against Diphtheria, Pertussis, Measles, Mumps and Rubella antigens in cord blood, among term healthy Indian newborns

MATERIAL AND METHODS

- Cross-sectional, observational study
- Study period: April 17 – March 19 (2 years)
- Apparently healthy term newborns, delivered at a tertiary care hospital in Northern India, were enrolled after taking informed written consent from their parents
- Institute Ethics Committee clearance was obtained, before enrolling subjects.
- Cord blood samples were tested for presence of antibodies against given antigens using commercial ELISA kits (IMMUNOLAB IgG).



RESULTS

A total of 160 newborns (M:F=86:74) were enrolled.

(I) Diphtheria:

- In our study, antibodies (IgG) against diphtheria toxin (DT) were ≥ 0.1 IU/ml in 44.4% (71/160), 0.01 to 0.1 IU/ml in 53.1% (85/160) and < 0.01 IU/ml in 2.5% (4/160). [Table-1]
- None of their mother's received Tdap vaccine in past.

Table-1: Antibody titers against diphtheria in cord blood at birth

Antibody titres (IU/ml)	Percentage (%)	Frequency (n=160)	Interpretation
< 0.01	2.5%	4	No protection
0.01 to 0.1	53.1%	85	Minimal protection
> 0.1	44.4%	71	Good protection

(II) Pertussis:

- Antibodies (IgG) against pertussis toxin (PT) ≥ 40 U/ml were seen in 41.2% (66/160). Out of these 66 children, 23 had titers ≥ 100 U/ml.
- Total of 58.8% (94/160) children had antibodies < 40 U/ml. Out of these 94 children, 48 had titers < 20 U/ml. [Table-2]

Table-2: Anti Pertussis toxin (PT) antibody titers in cord blood at birth

Antibody titres (U/ml)	Frequency	Percentage
< 20	48	30.0 %
20 – 39.99	46	28.8 %
40-99.99	43	26.9 %
≥ 100	23	14.3 %

(III) Measles:

- Antibodies against Measles antigen were > 12 IU/ml in 88.8% (142/160).
- A total of 11.2% (18/160) had titers < 12 IU/ml. Out of 18 children, 5 had titers < 6 IU/ml. [Table-3]

(IV) Mumps:

- Antibodies (IgG) against mumps antigen were ≥ 12 IU/ml in 83.1% (133/160).
- A total of 16.9% (27/160) had titers below 12 IU/ml. Out of these 27 children, 12 had titers < 6 IU/ml. [Table-3]

(V) Rubella:

- Antibodies (IgG) against rubella antigen were ≥ 12 IU/ml in 83.7% (134/160).
- A total of 16.3% (26/160) had titers below 12 IU/ml. Out of 26 children, 22 had titers < 6 IU/ml. [Table-3]
- None of the mother's gave any history of received any measles, rubella or MMR vaccine during their adolescence or adulthood.

Table-3: Antibodies against measles, mumps & rubella in cord blood at birth

	≥ 12 IU/ml	6 – 11 IU/ml	< 6 IU/ml
Measles (n=160)	142 (88.8%)	13 (8.1%)	5 (3.1%)
Mumps (n=160)	133 (83.1%)	15 (9.4%)	12 (7.5%)
Rubella (n=160)	134 (83.7%)	4 (2.5%)	22 (13.8%)
Interpretation	Protected	Borderline	No protection

CONCLUSIONS

- Only 44.4% of studied newborns were fully protected (≥ 0.1 IU/ml) against diphtheria, because of maternal antibodies.
- As correlates of protection for pertussis are not yet defined; those having anti-PT titers > 100 IU/ml i.e. 14.3% (23/160) were most protected; while those having titers < 20 U/ml i.e. 30% (48/160) were least protected.
- Antenatal Tdap vaccination to pregnant mothers could help in improving protective titres against diphtheria and pertussis at birth.
- Out of studied newborns, fully protected (> 12 IU/ml) against measles, mumps and rubella were 88.8%, 83.1% and 83.7% respectively.
- Protective antibodies against measles, mumps and rubella in newborns at birth were satisfactory; as majority of them were protected because of maternal antibodies

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