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Retrospective Study on Prevalence of Weak D Antigen (D^u) In Blood Donors in a Tertiary Care Hospital of Tripura, North-East India.

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Abstract:
Introduction: *The study on prevalence of weak RhD(D^u) antigen among Rh negative ABO blood groups in healthy blood donors at blood bank of Tripura Medical College & DR BRAM Teaching Hospital, Tripura, over a period of last 4 years (January 2015 to February 2019).*
Methods and Materials*: it is a retrospective study over last 4 years(2015 January to 2019 February) done at blood bank of Tripura Medical College among voluntary blood donors. Blood samples that were negative for RhD by immediate spin tube method were tested for weak D by indirect antiglobulin test.*
Result*: Among the total 172 RhD negative blood donors 3 were weak D antigen positive*
Conclusion: *weak D antien detection is important as it is immunogenic and responsible for producing alloimmunisation, if transfused to RhD negative individuals. Moreover it s necessary to detect weak D antigen in individuals who are negative with saline anti D.*
Keywords: *D^u positive blood, Rh negative ABO blood group.*

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I. Introduction

The major discovery in immunohaematology is the discovery of the ABO blood groups by Landsteiner in 1901 followed by discovery of Rh antigen by Levine and Stetson in 1939. The human race was divided into, those who possessed the Rh antigen (Rh positive) and those who did not (Rh negative)[1]. The main antigen in the Rh blood group is the 'D' antigen expressed by the Rh D protein.

A weakly reactive Rh antigen was first described by Stratton in 1946[2]. It was then called the D antigen. The difference between D and D antigen is that the latter is weakly immunogenic and difficult to detect. "*Weak D*" RBCs demonstrate reduced quantities of the D antigen. As a result weak or no agglutination reaction is demonstrated by these RBCs with the anti D reagents at the immediate spin phase. some individuals with Weak D found to produce anti-D and some with Partial D antigens phenotypes led to no anti-D production as the epitope expression was very weak. According to the recent recommendations the term Abnormal D is introduced, taking Weak D and Partial D types under its umbrella[3].

Weak D phenotypic expression arise by three mechanisms. Suppressive effect of C gene when in trans to D gene, when the part of D antigen is missing(partial D) or due to presence of aberrant form of D[4].

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II. Methods and Materials

A retrospective study is done at blood bank of Tripura Medical College, Tripura, over a period of last 4 years (2015 to 2019, February). The data based on Rh negative blood group of donors of either sex are studied. The donors with more than one entry are included once for the study.

The immediate spin tube technique was used for routine Rh typing. All samples found Rh negative,were further processed for weak D antigen .samples showing agglutinations after incubation or addition of AHG serum were considered to be weak D. Equal volume each of anti D serum and 2-5% washed red cell suspension were taken in a clean test tube,mixed and incubated at 37^0C in a water bath for 15-20 minutes and checked for agglutination with appropriate control. If the test red cell were agglutinated but not in the negative control tube the test was considered to be positive and the test was made to proceed to antiglobulin test phase.in case of doubtful result the cells are washed 3-4 times with large volume of normal saline. After that the saline

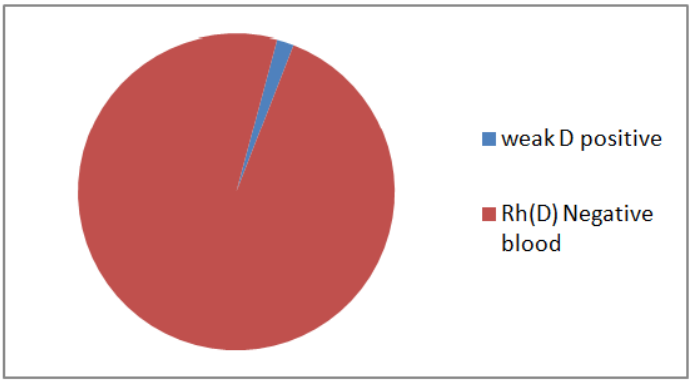
was decanted and 2 drops of antiglobulin serum was added. Following this the tube was centrifuged at 1500 rpm for one minute, gently resuspended and observed for agglutination. All negative results are confirmed under microscope.

III. Result

Total 172 Rh negative cases are found in blood donors and among it 3(1.74%) cases are found weak D positive.

Table 1: Distribution of D^u positive blood among donors.

Blood group	**Number**	**D^u positive**
A group Rh negative	35	0
B group Rh negative	57	1
AB group Rh negative	12	1
O group Rh negative	68	1
Total	**172**	**3**



IV. Discussion

The incidence of Weak D antigen is different in different geographical areas.A study done by Krishna et al reported prevalence of Weak D antigen to be 0.06% in Indian population[5]. Our study is showing (1.74%) cases of weak D positive may be due to difference in epidemiology i.e demographic profile and social melieu of the region.

***Table 2*:** Prevalence of D^u positive blood according to various study

Uttarakand[6]	0.005%
Lahore[7]	1%
Karachi[8]	0.8%
Europe[9]	0.59%
USA	3%
Brazil[10]	0.8%

As D antigen is highly immunogenic, a significant antibody response can take place when a D negative patient receives weak D positive blood. For this reason recipients with weak D are considered D negative and must be given D negative blood and donors are considered as D positive. If the mother is Rh negative and fetus has weak D phenotype, then the mother must receive Anti-D prophylaxis as this may result in sensitization and causes Hemolytic Disease of Fetus and Newborn[11].

V. Conclusion

The incidence of weak D varies worldwide. It becomes relevant in cases of pregnant females where the presence of an undetected weak D antigen may cause transfusion reactions as well as reaction in the next pregnancy. D^u positive patients present as a problem for the blood banker and a curiosity to the clinician. Although uncommon, all health care workers should be aware of this entity to avoid anti D alloimmunisation.

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