RhD immunoglobulin (Ig) prophylaxis

Non-obstetric indications

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Introduction

RhD immunoglobulin (RhD Ig) is used primarily in the prevention of haemolytic disease of the fetus and newborn (HDFN) in individuals who are RhD negative and where they are carrying an RhD positive fetus or the RhD status of the fetus is unknown (Yoham and Casadesus 2023).

Recently there has been an update to the guideline for the prophylactic use of RhD immunoglobulin in pregnancy care <https://www.blood.gov.au/guideline-prophylactic-use-rh-d-immunoglobulin-pregnancy-care>. While use in obstetrics is well established and incorporated into protocols, use in other patients who are RhD negative and receive an RhD positive red blood cell (RBC) or platelet transfusion is another indication to consider, with internationally practice varying widely (Lu et al. 2024).

RhD negative patients receiving RhD positive blood components risk the development of RhD antibodies. This has the potential to cause haemolytic transfusion reactions with subsequent RhD positive transfusions, or for individuals with childbearing potential, the risk of HDFN. During trauma resuscitation, in patients of childbearing potential, the risk of fetal/neonatal demise from HDFN associated with RhD alloimmunisation is estimated to be 0 - 6.5% in comparison to the risk of dying from haemorrhagic shock of about 24% (Yazer, et al 2023).

RhD positive RBC may be transfused to an RhD negative recipient in:

- an emergency, as an informed decision in a resuscitative context
- or in error.

Platelets do not express RhD antigens, but platelet components contain residual intact RBCs or red cell fragments that can result in alloimmunisation to RBC antigens, including RhD (Dunbar 2020).

ANZSBT Guidelines for transfusion and immunohaematology laboratory practice 2020 <https://anzsbt.org.au/guidelines-standards/anzsbt-guidelines/> recommend that if a RhD negative patient receives RhD positive platelets, RhD Ig should be offered in accordance with institutional policy; this will be at the discretion of the patient's clinician. It is not normally necessary to offer RhD Ig to RhD negative males, postmenopausal women, or to patients (male or female) who are heavily immunosuppressed (e.g. due to haematological malignancy). If a thrombocytopenic patient requires RhD Ig, an intravenous (IV) preparation should be considered (ANZSBT 2020).

Lifeblood <https://www.lifeblood.com.au/> recommends prophylactic RhD Ig may be indicated when RhD positive platelets are transfused to an RhD negative patient, particularly in children or women of childbearing age (https://www.lifeblood.com.au/health-professionals/products/component-compatibility).

STIR has received reports that highlight variation in practice regarding RhD Ig prophylaxis indications and administration.

Use of RhD Ig in areas other than pregnancy

RhD Ig may be used for management of transfusions of RhD positive RBCs or platelets, to prevent alloimmunisation (production of a RhD antibody in a RhD negative individual).

While health services are moving to emergency use of uncrossmatched group O RhD positive red cells for first line use in keeping with the National Statement for the emergency use of group O red blood cells, this should only apply:

- in an emergency to save a patient's life and when there is no current valid pre-transfusion specimen
- for females >50 years and adult males >18 years
- when critical bleeding continues in females ≤50 years and males ≤18 years who have already received 4 units of O RhD negative RBC.

RhD positive RBC may need to be transfused to an RhD negative individual (regardless of age or sex of patient) in a critical bleeding situation, even when crossmatched RBC are given.

If RhD positive RBC are transfused to an RhD negative individual, consideration to administration of RhD Ig will be on a case-by-case basis by a multidisciplinary team, taking into account age and childbearing potential of the patient, any immunosuppression, volume of red cells transfused and the risks of administering a large volume of RhD Ig.

Special consideration should be given to children, considering prevention of antibody formation and a lifetime of needing antigen negative blood. The risk of RhD alloimmunisation in immunosuppressed patients, either due to disease, treatment, or trauma (trauma-induced immunosuppression), appears to be lower than other groups of patients (Titze et al. 2023). There is also a risk of haemolysis associated with high doses of RhD Ig.

The risk to benefit ratio of giving large doses of RhD Ig to prevent alloimmunisation is unclear. The very large doses required to offset one unit of RBC make the effectiveness of prophylactic RhD Ig in such circumstances uncertain.

Table 1. Use of RhD immunoprophylaxis in patients who have received an RhD incompatible blood component.

Component transfused	RhD Ig administration	RhD Ig dosage
Red cells	Consider in women of childbearing age and children	**Discuss with haematology team.** Consensus clinical opinion of STIR Expert Group is that RhD Ig is generally not recommended unless for small volume RhD incompatible RBC transfusion for example in discovery of an error in administering RhD positive RBCs to a RhD negative female of childbearing potential. In large volume transfusion of RhD incompatible RBCs, the risk: benefit ratio is unclear. Health services should also be aware of the risk of haemolysis that may be associated with the large doses of RhD Ig.
Platelets	Consider in women of childbearing age and children	The volume of RBCs in each platelet dose is quite small. Therefore, a 250 IU dose should provide prophylaxis for up to five transfusions of RhD positive platelets within a six-week period (Qureshi et al 2014). Given the low risk, some centres advocate the use of platelets without consideration of RhD status and without RhD Ig prophylaxis (https://www.lifeblood.com.au/health-professionals/products/component-compatibility).

FFP and Cryoprecipitate	Not required, no red cell contamination	

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