### Specialist Working Group for Haematology

#### Proposed changes to the *Criteria for the clinical use of intravenous immunoglobulin in Australia, Second Edition*

| **ITEM** | **CRITERIA FOR THE CLINICAL USE OF INTRAVENOUS IMMUNOGLOBULIN IN AUSTRALIA, SECOND EDITION (CRITERIA)** | **PROPOSED REVISIONS TO THE CRITERIA** | | | **SWG RATIONALE FOR PROPOSED CHANGE**  **(A) Administrative)**  **(B) Progressive**  **(C) Programmed** |
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| **Condition Name** | **Foeto-maternal/neonatal alloimmune thrombocytopenia (FMAIT/NAIT):** | **Feto-maternal/neonatal alloimmune thrombocytopenia (FMAIT/NAIT)** | | | Up to date spelling of feto |
| **Specialty** | Haematology | Haematology | | |  |
| **Chapter** | 5 | 5 | | |  |
| **Specific Conditions** |  |  | | |  |
| **Level of Evidence** | Small case studies only; insufficient data ([Category 4a](http://www.blood.gov.au/pubs/ivig/development-and-maintenance-of-the-criteria.html#el-4a)). | Small case studies only; insufficient data ([Category 4a](http://www.blood.gov.au/pubs/ivig/development-and-maintenance-of-the-criteria.html#el-4a)). | | |  |
| **Justification for Evidence Category** | Evidence from randomised trials (Berkowitz et al 2006, Bussel et al 1996), case series (Kiefel et al 2006, Yinon et al 2006) and a review (Spencer and Burrows 2001) shows that IVIg modulates the course of this condition. A 2004 Cochrane review (Rayment et al 2005) reported on one randomised controlled trial (RCT) comparing IVIg plus dexamethasone with IVIg alone. This RCT was methodologically sound, but too small to detect differences among comparison groups. | Evidence from randomised trials (Berkowitz et al 2006, Bussel et al 1996), case series (Kiefel et al 2006, Yinon et al 2006) and a review (Spencer and Burrows 2001) shows that IVIg modulates the course of this condition. A 2004 Cochrane review (Rayment et al 2005) reported on one randomised controlled trial (RCT) comparing IVIg plus dexamethasone with IVIg alone. This RCT was methodologically sound, but too small to detect differences among comparison groups. | | |  |
| **Description and Diagnostic Criteria** | FMAIT/NAIT develops because of maternal sensitisation to foetal platelets that possess a paternally inherited antigen. In Caucasians, the antigen is human platelet antigen (HPA) 1a in 80% of cases and HPA-5b in 15%, but other antigens are also implicated. The mother’s antibodies cross the placenta and coat the baby’s platelets, with accelerated platelet clearance leading to thrombocytopenia. This may result in serious and potentially life-threatening bleeding in the foetus or neonate. Pathogenesis is analogous to that of haemolytic disease of the newborn due to red cell antigen-antibody incompatibility.  The aim of management of the thrombocytopenic foetus or neonate is to increase the platelet count.  If foetal blood sampling reveals thrombocytopenia, IVIg may be administered weekly to the mother, with or without steroids, until delivery. Recent studies using IVIg weekly from around 20 weeks gestation, without foetal blood sampling, have shown reduced foetal and neonatal morbidity. This approach may be used for current pregnancies where the condition in a previous pregnancy was not associated with a foetal death or severe haemorrhage. Testing on maternal blood for foetal DNA or early genetic testing of the foetus (for platelet genotype) may predict the need to use IVIg.  Management of this condition is a specialised area and may include administration of HPA-compatible intrauterine and/or neonatal platelet transfusions. Further information regarding specialised platelet support is available from the Blood Service. Random (non-HPA-matched) platelets may be of benefit in the neonatal setting when matched platelets are not available (Kiefel 2006). | FMAIT/NAIT develops because of maternal sensitisation to fetal platelets that possess a paternally inherited antigen. In Caucasians, the antigen is human platelet antigen (HPA) 1a in 80% of cases and HPA-5b in 15%, but other antigens are also implicated. The mother’s antibodies cross the placenta and coat the baby’s platelets, with accelerated platelet clearance leading to thrombocytopenia. This may result in serious and potentially life-threatening bleeding in the fetus or neonate. Pathogenesis is analogous to that of haemolytic disease of the newborn due to red cell antigen–antibody incompatibility.  The aim of management of the thrombocytopenic fetus or neonate is to increase the platelet count.  Instances of neonatal thrombocytopenia can occur in situations where the mother has idiopathic (autoimmune) thrombocytopenic purpura (ITP).  If foetal blood sampling reveals thrombocytopenia, IVIg may be administered weekly to the mother, with or without steroids, until delivery. Recent studies using intravenous immunoglobulin (IVIg) weekly from around 20 weeks gestation, without foetal blood sampling, have shown reduced foetal and neonatal morbidity. This approach may be used for current pregnancies where the condition in a previous pregnancy was not associated with a foetal death or severe haemorrhage. Testing on maternal blood for foetal DNA or early genetic testing of the foetus (for platelet genotype) may predict the need to use IVIg.  Management of this condition is a specialised area and may include administration of HPA-compatible intrauterine and/or neonatal platelet transfusions. Further information regarding specialised platelet support is available from the Blood Service. Random (non-HPA-matched) platelets may be of benefit in the neonatal setting when matched platelets are not available (Kiefel et al 2006). | | | Update to diagnostic description to address the occasional instance where neonate will present with thrombocytopenia due to maternal ITP. This requires one-off treatment. |
| **Diagnosis is required** |  | No | Which Speciality |  |  |
| **Diagnosis must be verified** |  | No | Which Specialty |  |  |
| **Exclusion Criteria** |  |  | | |  |
| **Indication for use** | Prevention or treatment of foetal or neonatal thrombocytopenia or haemorrhage. | **Prevention or treatment of fetal thrombocytopenia or haemorrhage.**  **Prevention or treatment of neonatal thrombocytopenia or haemorrhage.** | | | Indication has been split due to the  differing eligibility criteria and evidence  requirements for the relevant patient  populations. |
| **Qualifying Criteria** | Clinical suspicion of FMAIT in antenatal or neonatal setting based on clinical and laboratory features, including:   1. Thrombocytopenia or spontaneous haemorrhage in the foetus;   OR   1. Thrombocytopenia with or without haemorrhage in the neonate;   OR   1. Unexplained foetal death in a previous pregnancy and the presence of maternal platelet-specific alloantibodies that are known or suspected to cause this condition (most commonly HPA-1a or HPA-5b). | **Prevention or treatment of foetal thrombocytopenia or haemorrhage.**  Clinical suspicion of FMAIT in the antenatal setting based on clinical and laboratory features:   * Evidence of foetal thrombocytopenia   OR   * Evidence of spontaneous foetal haemorrhage   OR   * Unexplained foetal death in previous pregnancy and maternal platelet-specific alloantibodies known or suspected to cause this condition (most commonly HPA-1a or HPA-5b).   **Prevention or treatment of neonatal thrombocytopenia or haemorrhage.**   * Evidence of thrombocytopenia <30 x 109/L in a neonate with NAIT or where a diagnosis of NAIT is highly suspected.   OR   * Evidence of thrombocytopenia <30 x 109/L in offspring of a mother with ITP. | | | Criteria are largely consistent with existing  criteria, with the addition of  acknowledgement of the unusual instance  of neonates becoming thrombocytopenic  due to maternal ITP. While an infrequent  occurrence, it does occur and is treated  under the current indications. |  |
| **Review Criteria** | * Foetal or neonatal morbidity and mortality in the context of maternal alloantibodies. * Occurrence and severity of thrombocytopenia in the neonate. * Maternal HPA-1a antibody level (if assay is available). Note that the strength/titre of maternal antibody level, even if available, is not proven clinically relevant and not able to be compared readily between laboratories at this time. | **Prevention or treatment of foetal thrombocytopenia or haemorrhage.**  Review is not mandated for this indication however the following criteria may be useful in assessing the effectiveness of therapy.  Review criteria for assessing the efficacy of IVIg treatment:  **Outcome data to be measured**   * Evidence of fetal/neonatal morbidity and/or mortality in the context of maternal alloantibodies.   AND   * Evidence of thrombocytopenia in the neonate.   Neonates with NAIT are eligible under the indication for prevention or treatment of neonatal thrombocytopenia or haemorrhage.  **Prevention or treatment of neonatal thrombocytopenia or haemorrhage.**  Review is not mandated for this indication however the following criteria may be useful in assessing the effectiveness of therapy.  Review criteria for assessing the efficacy of IVIg treatment:  **Outcome data to be measured**  • Occurrence and severity of thrombocytopenia in the neonate.  • Maximum platelet count achieved within 72 hours of Ig treatment. | | | Data on fetal or neonatal outcome will be collected and maternal alloantibodies.  Script added to advise prescribes that neonates are also eligible under a different indication, if required.  This is one-off treatment - outcome data can be collected but will not be mandatory. |
| **Dose** | Maternal dose: 1 g/kg weekly throughout pregnancy, with starting time tailored to individual risk profile and history if relevant. Other doses and schedules have been used and some studies have used IVIg in conjunction with steroids.  Treatment of the neonate: 1 g/kg. Occasionally more than one dose is required if thrombocytopenia persists.  **Refer to the current product information sheet for further information.**  **The aim should be to use the lowest dose possible that achieves the appropriate clinical outcome for each patient.** | **Prevention or treatment of foetal thrombocytopenia or haemorrhage.**  **Maternal dose:** 1 g/kg (up to a maximum weight of 100 kg) weekly throughout pregnancy, with starting time tailored to individual risk profile and history if relevant. Other doses and schedules have been used and some studies have used IVIg in conjunction with steroids.  The aim should be to use the lowest dose possible that achieves the appropriate clinical outcome for each patient.  Refer to the current product information sheet for further information.  **Prevention or treatment of neonatal thrombocytopenia or haemorrhage.**  **- Treatment of the neonate** - 1 g/kg. Occasionally more than one dose is required if thrombocytopenia persists.  The aim should be to use the lowest dose possible that achieves the appropriate clinical outcome for each patient  Refer to the current product information sheet for further information. | | | Dosing is unchanged.  SWG recommends a maximum maternal weight of 100Kg be introduced due to the high incidence of obesity on the pregnant population. |

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| **BIBLIOGRAPHY** |
| Berkowitz, RL, Kolb, EA, McFarland, JG, et al 2006, ‚Parallel randomized trials of risk-based therapy for fetal alloimmune thrombocytopenia’, *Obstetrics & Gynecology*, vol. 107, no. 1, pp. 91–6.  Bussel, JB, Berkowitz, RL, Lynch, L, et al 1996, ‘Antenatal management of alloimmune thrombocytopenia with intravenous immunoglobulin: a randomised trial of the addition of low dose steroid to intravenous gamma globulin’, *American Journal of Obstetrics & Gynecology*, vol. 74, no. 5, pp. 1414–23.  Kiefel, V, Bassler, D, Kroll, H, et al 2006, ‘Antigen-positive platelet transfusion in neonatal alloimmune thrombocytopenia’, *Blood*, vol. 107, no. 9, pp. 3761–3.  Rayment, R, Brunskill, SJ, Stanworth, S, et al 2005, ‘Antenatal interventions for fetomaternal alloimmune thrombocytopenia (Cochrane Review)’, in *The Cochrane Library*, Issue 1, John Wiley & Sons, Ltd, Chichester, UK.  Spencer, JA & Burrows, RF 2001, ‘Feto-maternal alloimmune thrombocytopenia: a literature review and statistical analysis’, *Australia New Zealand Journal of Obstetrics and Gynaecology*, vol. 41, no. 1, pp. 45–55.  Yinon, Y, Spira, M, Solomon, O, et al 2006, ‘Antenatal noninvasive treatment of patients at risk for alloimmune thrombocytopenia without a history of intracranial hemorrhage’, *American Journal of Obstetrics & Gynecology,* vol. 195, no. 4, pp. 1153–7. |
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