Indication guidance for washed and replaced platelets and their preparation (Version V)

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Purpose

In clinical settings, platelets are washed before administration to patients for the purpose of preventing side effects such as urticaria, fever, respiratory distress, decreased blood pressure and anaphylaxis from transfusion of platelet preparations. However, there are no clear guidelines for their indications, judgment of effects, composition of fluids used in washing, or washing methods, and no means of uniform evaluation for the prevention of side effects. The transfusion formulation subcommittee of our Society conducted a questionnaire survey on the use of washed and replaced platelet preparations in 2005 and 2006, and showed the effectiveness of washing and replacement of platelets in preventing side effects. These guidelines were prepared based on the results of that questionnaire survey, with the aim of safer and more appropriate preparation and use of washed and replaced platelets. Version V cites the references that support indication 1.

Indications

1: Cases in which side effects that cannot be prevented with preadministration of various drugs are observed two or more times[1,2,3].

Cases in which serious side effects such as anaphylactic shock are observed once.

2: Cases in which only ABO-mismached PC-HLA is available.

When anti-A or anti-B antibody titer is low, there may be no advantage of reducing plasma volume[4]. However, ①when antibody titer is ≥128x, or ②the patient is a small child, it is desirable to transfuse washed and replaced platelets.

Washing and replacement (preparation)

Acetate Ringer solution and physiological saline are the main solutions used in washed and

replaced platelet preparations. However, there is a difference in platelet function at 24 hours after washing and replacement,[5,6,7] and so it is desirable to use a preparation depending on the time since preparation. The composition of washing and replacement solutions actually used is described in Document 1, and the method of preparation in Document 2. Refer to Document 3 for actual replacement procedures.

1) Selection of washing and replacement solution

- M-sol, which contains sodium bicarbonate or electrolytes composed of ingredients similar to M-sol[8] is preferable when the transfusion is performed on the day following preparation. However, washing weakens the antimicrobial/microbicidal activity in plasma, and so when administering on the day following preparation, the start of administration should not be unnecessarily prolonged.
- When transfusion is conducted on the day of preparation, a solution other than M-sol that may be used is glucose acetate Ringer solution (G-sol).
- When used soon after preparation, in cases when neither M-sol nor G-sol are used, physiological saline with added anticoagulant (S-sol) or frozen blood wash solution No. 3 with added anticoagulant (B-sol) can also be used.

2) Washing method:

- Plasma replacement alone is sufficient.
- With plasma replacement, clearing of no less than 90% of plasma is possible, and sufficient side effect prevention effect may be expected.

Determination of transfusion effects

If the washed and replaced platelets are concentrated, a roughly equivalent effect can be expected. In judging the effects of transfusion, it is desirable to use the CCI value, of which an objective determination can be made.

According to “Use of blood preparations” (edited by the Ministry of Health, Labor and Welfare), when a platelet concentrate is transfused, the CCI value at 1 hour is normally ≥7,500/μl, and on the following day or after 24 hours ≥4,500/μl.

Informed consent

It is necessary to obtain informed consent in all cases prior to administration of washed and replaced platelets prepared in hospital.

Observation of clinical symptoms at time of transfusion

Close attention is needed for side effect prevention and whether there are adverse events.

References

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8) Oikawa S, Sasaki D, Kikuchi M, Sawamura Y, Itoh T. Comparative in vitro evaluation of apheresis platelets stored with less 100% plasma versus bicarbonated Ringer's solution with less than 5% plasma. Transfusion 2013; 53:655-660, 2013

Attachment 1

Electrolyte solution for preparation of M-sol		
1. Solacet F (acetate ringer solution)		500 ml
2. Meylon (7% sodium biocarbonate solution)		35 ml
3. ACD-A		85 ml
4. Diluted Mediject Mg (MgSO4 solution)		50 ml
(distilled water 460 ml+Mediject Mg 20ml)		

Electrolyte solution for preparation of G-sol		
1. Veen D (glucose acetate ringer solution)		100 ml
2. Meylon (7% sodium biocarbonate solution)		8 ml
3. ACD-A		30 ml
4. Distilled Water for Injection		102 ml

Coposition of additive solution

		G-sol(mM)	M-sol(Mm)
Sodium chloride		42.8	77.0
Potasium chloride		1.7	3.0
Calcium chloride		0.8	1.4
Calcium acetate		19.3	34.7
Glucose		115.7	15.3
Trisodium citrate		9.4	9.4
Citrate		5.2	5.2
Sodium hydrogen carbonate		27.8	41.7
Magnesium sulfate		0.0	1.6