OCTOBER-2024

NEWSLETTER

DEPARTMENT OF TRANSFUSION MEDICINE & BLOOD BANK

BLOOD TRANSFUSION REACTIONS

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- TRANSFUSION OF BLOOD& ITS PRODUCTS IS TO CORRECT HAEMATOLOGICAL DEFECTS.
- ADVERSE EFFECTS OCCURING DURING OR AFTER TRANSFUSION ARE CALLED BLOOD TRANSFUSION REACTIONS.
- TWO TYPES OF BTR.

(1)IMMUNE MEDIATED
(2)NON IMMUNE MEDIATED
IN BOTH THE TYPES ACUTE & DELAYED REACTIONS

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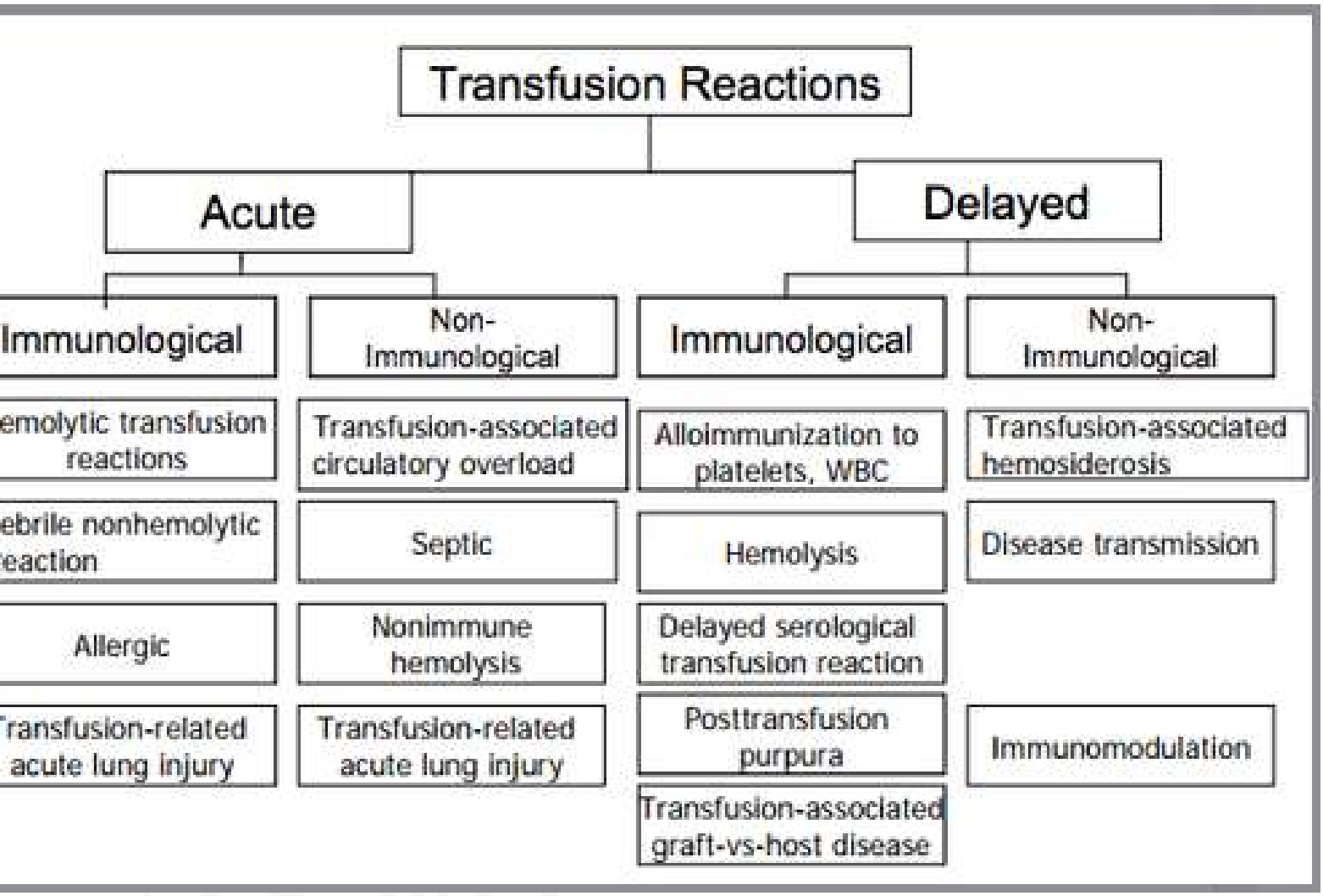

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3 Types of Blood Transfusion Reactions

Type	Symptoms
Febrile	• Fever • Chills • Tachycardia • Tachypnea • Hypotension
Hemolytic	• Mild → fever, chills, headache • Chest pain • Tachycardia • Tachypnea • Hypotension • Hemoglobinuria • Apprehension • Severe → DIC, circulatory collapse
Allergic	• Urticaria/rash • Itching • Bronchospasm • Anaphylaxis

Caused by blood type or Rh incompatibility

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ACUTE FEBRILE REACTIONS (during or <24 hrs from transfusion; presenting with fever)				
Reaction/*Incidence*	**Presentation; *Diagnosis***	**Common Mechanism**	**Treatment**	**Prevention**
Acute Hemolytic (AHTR); *1:76,000, 1 in 1.8 million are fatal*	Fever/chills (most common), back/flank pain, HGBemia/uria, bleeding, DIC, "doom"; *clerical errors, free HGB, repeat x-match*	ABO-incompatible red cells given to patient (rarely from incompatible plasma hemolyzing patient RBCs)	Pressure and volume support, fluids, diuretics if necessary (urine output > 1 mL/Kg/hr); may need PLT/FFP/Cryo if DIC	Careful attention to detail and processes
Febrile Nonhemolytic (FNHTR); *< 1%*	Fever/chills only (>1 C/2°F); *negative workup*	Cytokines (e.g., IL-6, TNF) from unit or recipient; HLA antibodies	Antipyretics; meperidine if chills are violent	Leukoreduction. Pretransfusion antipyretics used but may not work.
Bacterial Contamination (Septic reaction); *1:3000 PLTS (much fewer reactions)*	**Rapid high fever**, rigors, shock, GI symptoms; *gram stain (50%), culture is conclusive*	Bacteria in donor's blood or through collection site	As for sepsis; antibiotics and pressure support as necessary	Donor Center precautions, possible leukoreduction contribution
Transfusion-related Acute Lung Injury (TRALI); *1:1300-1:190,000 (obviously unclear)*	Acute lung injury ≤6 hours after transfusion. Bilateral CXR infiltrates, hypoxemia. No cardiac dysfunction. *Difficult; donor HLA/HNA abs, consensus criteria*	1. Transfused anti-HLA and/or anti-HNA Abs activate PMNs or 2. Lung endothelial and PMN priming by physiologic stress, then activation by blood substances	Aggressive supportive care (may include intubation); most resolve but close to 20% fatal	Don't transfuse! Preferential male plasma use for decreased HLA/HNA antibodies. HLA antibody screening of female PLT donors. If + antibodies in implicated donor, donor should be deferred.
ACUTE AFEBRILE REACTIONS (during or <24 hrs from transfusion; presenting WITHOUT fever)				
Reaction	**Presentation/*Diagnosis***	**Common Mechanism**	**Treatment**	**Prevention**
Urticarial (mild allergic reaction); *1-3%*	Localized or diffuse hives/redness; *if localized, no workup necessary*	IgE-mediated hypersensitivity to transfused protein	Antihistamines	Pretransfusion antihistamine; may wash product if necessary
Anaphylactic/-oid (severe allergic reaction); *1:20,000-50,000*	Severe hypotension very early in transfusion, GI symptoms, rare fever; *anti-IgA, check IgA levels*	Recipient IgA deficiency with anti-IgA antibodies, haptoglobin deficiency, latex or PCN allergy	Epinephrine (0.2-0.5 mL of 1:1000 given IM or SC; use IV if necessary), pressure support	Washed RBCs/PLTs or IgA deficient donor-derived products
Transfusion associated circulatory overload (TACO); *1:350-5000 reported*	Dyspnea, hypoxia during or after transfusion; *+/- elevated BNP, JVD, hypertension*	Cardiopulmonary disease with too rapid blood infusion; very old and very young most at risk	Diuretics, slow infusion	Divide products into aliquots, slow infusion, monitor I/O's
Premedicated Febrile	Chills; occurs in premedicated pts	As for FNHTR; fever is blocked	Meperidine if chills are violent	As for febrile nonhemolytic
DELAYED FEBRILE REACTIONS (>24 hrs from transfusion; presenting with fever)				
Reaction	**Presentation/*Diagnosis***	**Common Mechanism**	**Treatment**	**Prevention**
Delayed Hemolytic (DHTR); *1:2500-11,000*	Fever, anemia ≥ 1 week after transfusion; *+DAT, hyperbili, new antibody (Jk, Fy, K especially)*	Anamnestic response to re-exposure to red cell antigen; rarely 1° response	Supportive; as for acute hemolytic if severe	Previous records (honor previous antibodies), patient history, some use ID tags/cards
TA-GVHD; *Risk varies widely by locale, but is generally rare*	Fever, diarrhea, skin rash 7-10 days post transfusion; *skin biopsy, bone marrow, flow cytometry, molecular*	Cellular immune response by transfused T-lymphocytes vs host	Supportive, immunosuppress; usually in vain (>90% fatal)	Irradiation of cellular products transfused to at-risk recipients
DELAYED AFEBRILE REACTIONS (>24 hrs from transfusion; presenting WITHOUT fever)				
Reaction	**Presentation/*Diagnosis***	**Common Mechanism**	**Treatment**	**Prevention**
Post-transfusion Purpura (PTP); *rare*	Dec PLTS +/- bleeding 1 week after transfusion (RBCs +/- PLTs); *clinical dx, platelet antibodies*	Recipient antibody vs. absent PLT antigen (HPA-1a 70%)	IVIG 1st choice, plasma exchange second; avoid platelet transfusion	Antigen-negative platelet transfusions if necessary
Iron Overload; *typically after >100 units received*	Liver, pancreas, cardiac dysfx; *serum iron/ferritin, LFTs*	Iron deposition from multiple Tx	Iron chelators like deferoxamine, deferasirox	Judicious transfusion

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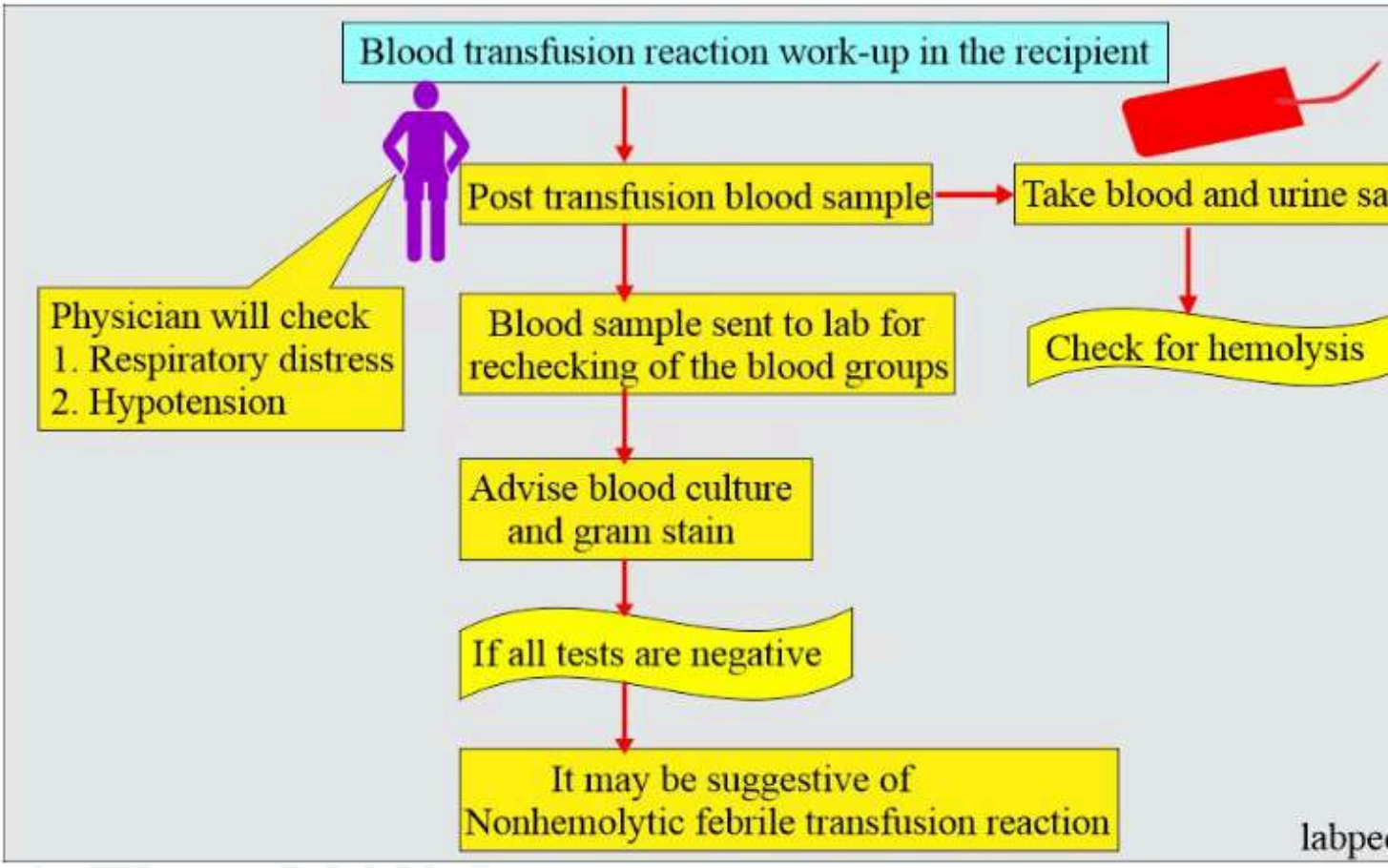
Work-up of the blood transfusion reaction in the recipient:



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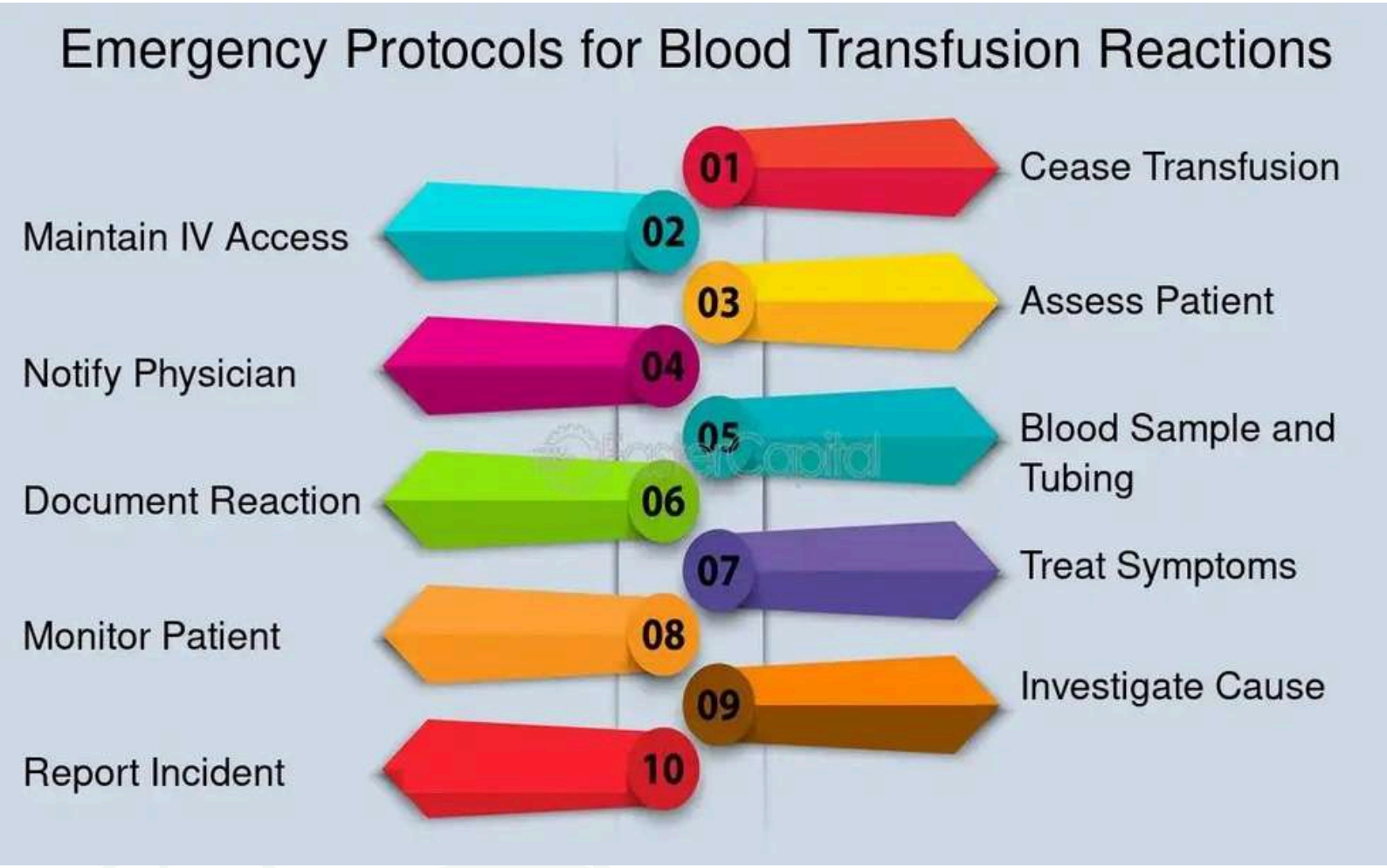

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INTIAL MEASURE BEOFRE THE INVESTIGATIONS AND TESTS

STOP THE TRANSFUSION

↓

KEEP IV LINE OPEN FOR ADMINISTRATION OF EMERGENCY DRUGS IF REQUIRED.

↓

THE PATIENT SHOULD THEN BE ASSESSED AND SUPPORTED AS NECESSARY WHILE THE PATIENT'S PHYSICIAN AND TRANSFUSION SERVICE ARE NOTIFIED.

↓

A RESPONSIBLE PHYSICIAN WILL NEED TO EVALUATE THE PATIENT AND GIVE APPROPRIATE CLINICAL CARE

↓

THE BLOOD UNIT WITH ATTACHED TRANSFUSION SET SHOULD BE RETURNED TO BE BLOOD BANK, ALONG WITH 1PLAIN+1EDTA SAMPLE OBTAINED FROM THE OPPOSITE ARM AND FIRST VOID URINE SAMPLE POST-REACTION SHOULD BE SENT

↓

THE REACTION SHOULD BE DOCUMENTED IN PATIENT'S CHART

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Samples to be sent to blood bank post reaction:

1. Post Transfusion reaction samples (from opposite arm)-1 plain +1 EDTA
2. Blood bag with Transfusion set in-situ
3. First void urine sample post reaction
4. Samples to biochemistry and microbiology for serum Heptoglobulin and blood culture respectively.
5. Specialized tests if other than hemolytic transfusion reaction is suspected.

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LABORATORY INVESTIGATIONS OF BLOOD TRANSFUSION REACTIONS

AFTER THE INITIAL MEASURE, 3 BASIC PRELIMENARY STEPS:

VISUAL CHECK → CLERICAL CHECK → SEROLOGICAL CHECK

PURPOSE: TO DETERMINE THE LIKELIHOOD OF HEMOLYTIC TRANSFUSION REACTION

If there is any evidence of haemolysis, or if the clinical situation suggests something severe and unusual, additional tests to rule out **TACO (Transfusion Associated Circulatory Overload) or TRALI (Transfusion Related Acute Lung Injury)** should be performed.

Tests performed at blood bank:

1. BGRH of pre and post transfusion sample
2. DCT / ICT of pre and post transfusion sample
3. Re-crossmatching of the returned blood unit with patient samples.

Tests performed at Microbiology:

1. Culture of blood bag sent with transfusion set in-situ
2. Culture of blood sample of patient.

Tests performed by Biochemistry:

1. Serum direct and indirect bilirubin
2. Serum Heptoglobulin

Other tests like urine examination, serum LDH, etc. can also be performed.

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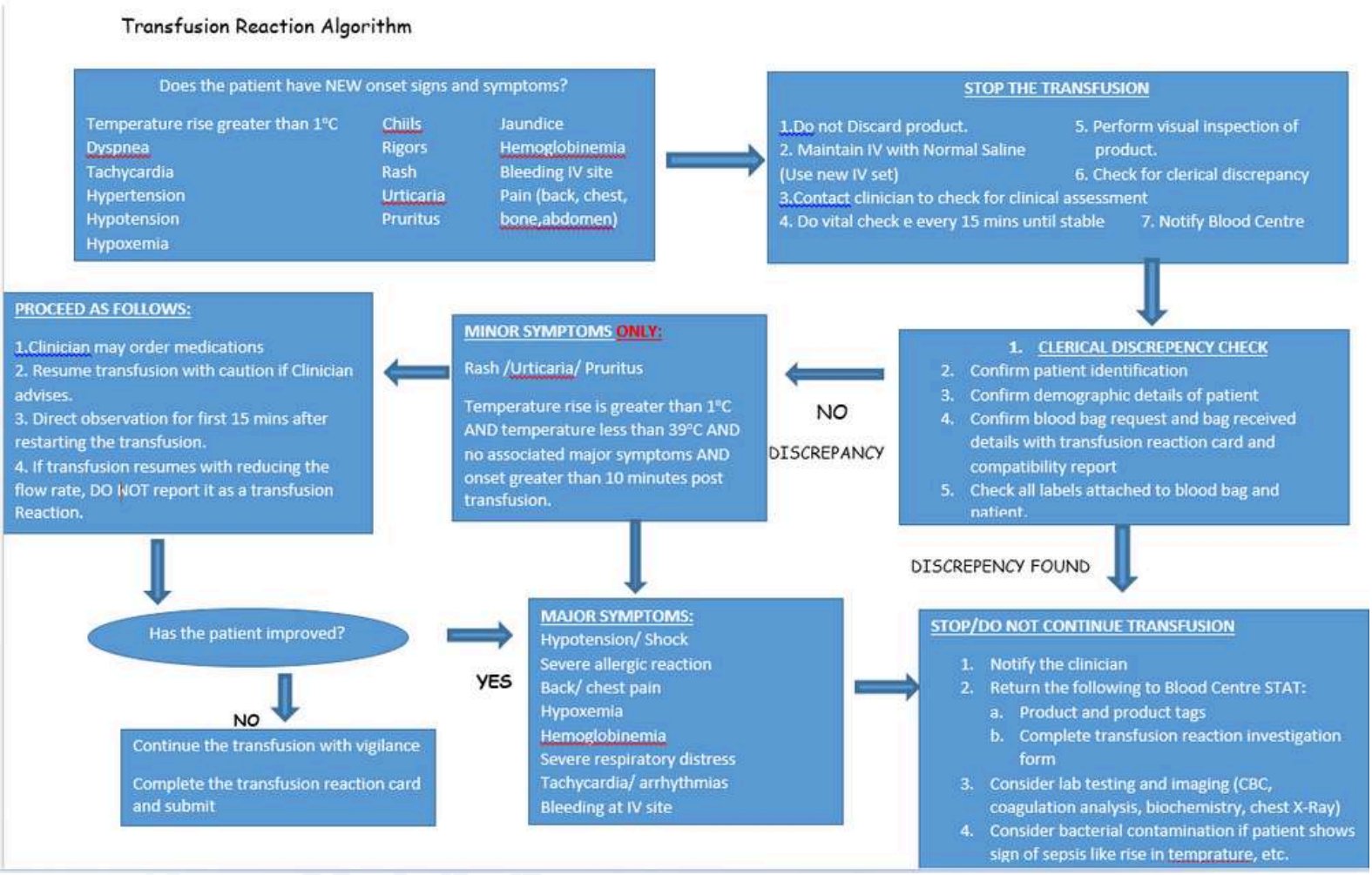

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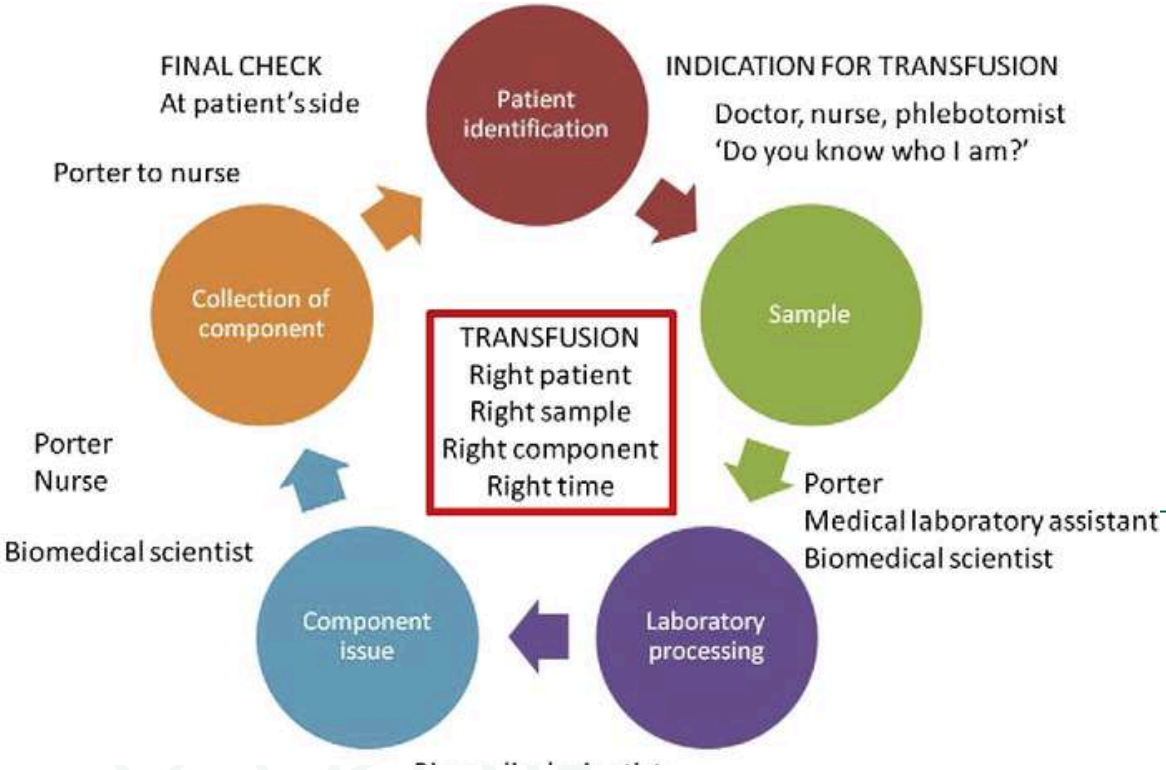
Haemovigilance Programme of India (HvPI)

National Coordinating Centre,
National Institute of Biologicals, Ministry of Health and Family Welfare, Government of India

Hemovigilance: A set of surveillance procedures to monitor transfusion reactons is mandatory in India



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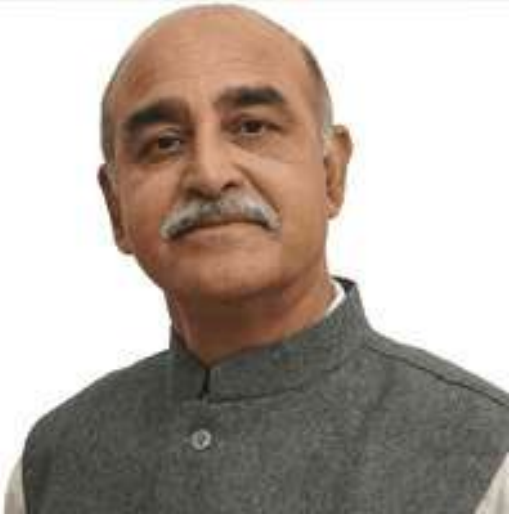
Message from Respected Executive Director sir



Blood transfusion should be a very watchful and rational decision and any type of reactions encountered during or post transfusion should be reported and informed to bring out the best and safest transfusion practices in the Institute.

I congratulate the department to bring out very much needed information on Blood Transfusion Reactions.

-Dr. (Col)CDS Katoch

Dr. (Col.) Ashwini Aggrawal
Dr. Tarang Patel
Dr. Spruha Dholakiya
DR.Vikram Rojasara

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