Specialist Certificate in Transfusion Science Practice; Unit Descriptors

Unit 1 - Transfusion Science Practice (Core)

Indicative Content

In this Unit, you will learn about:

- Human Immune Response with regard to blood groups and transfusion
- Major blood group systems
- Clinical Significance of blood group antibodies
- Basic overview of haemolytic disease of the fetus/ newborn with respect to red cell antibodies
- Processing, testing and issuing of blood components (including the selection of blood donors)
- Pre-transfusion testing undertaken in UK transfusion laboratories
- Hazards associated with transfusion of blood components and investigative/ preventative measures (including haemovigilance)
- Quality Management Systems (including Quality Assurance and Quality Control in the transfusion laboratory setting)
- British Committee for Standards in Haematology (BCSH) guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories
- Guidelines for the Blood Transfusion Services in the UK, European Blood Safety Directives, Blood Safety and Quality Regulations

Learning Outcomes

You will be expected to:

1. Determine, explain and classify antibody production with respect to blood group systems. Compare and contrast the major blood group antibodies.
2. Describe, explain and classify antibody– antigen reactions, the classical complement cascade and antibody-mediated red cell destruction. Examine and categorise causes of intravascular and extravascular red cell destruction.
3. Describe, explain and categorise the key features of the ABO, Rh and other major blood group systems (Kell, Duffy, Kidd, MNS, Lewis, Lutheran and P1PK)
4. Describe, explain, demonstrate, interpret and classify automated and manual serological laboratory tests performed in blood transfusion (to include patients and donors).
5. Examine and solve anomalous serological results for a range of laboratory tests
6. Describe, explain, justify and contrast the similarities and differences between patient-related and blood donor-related serological testing
7. Explain, determine and prioritise the principles and practice of Quality Management Systems including quality assurance and quality control in blood transfusion laboratories.
8. Determine, explain and predict the hazards associated with various aspects of blood transfusion. Examine the operation of the haemovigilance scheme in the UK
9. Describe, categorise and explain donor selection criteria in the UK
10. Describe, categorise and explain processing, testing, storage and specification criteria and issuing of routine blood components supplied by the UK blood services
11. Describe, explain, categorise and investigate the mechanism of haemolytic disease of the fetus/ newborn. Justify routine antenatal testing requirements

Unit 2 – Immunohaematology (Specialism)

Indicative Content

In this Unit you will learn

- Antibody screening, identification, crossmatching and red blood cell selection (including special requirements) in pre-transfusion testing
- Red cell antibody monitoring and blood provision in haemolytic disease of the fetus/ newborn; BCSH guidelines for blood grouping in pregnancy and antibody testing in pregnancy
- Blood group serological reactions in Autoimmune haemolytic anaemia
- Blood group serological reactions in a suspected transfusion reaction
- BCSH guidelines on the administration of blood components
- BCSH guidelines for the estimation of Fetomaternal Haemorrhage
- BCSH guidelines for the use of fresh-frozen plasma, cryoprecipitate and cryosupernatant
- BCSH guidelines for the use of irradiated blood components
- BCSH guidelines for neonates and older children
- BCSH guidelines for the specification and use of information technology (IT) systems in blood transfusion practice

Learning Outcomes

You will be expected to:

1. Outline and analyse variants associated with the ABO and Rh blood group systems. Determine and describe the implications for patients
2. Determine, explain, formulate and interpret the investigation of complex serological reactions, including recommendations for resolving unexpected anomalies, in patient testing.
3. Determine, describe and explain the design, operation and performance of serological techniques used in the investigation and management of haemolytic disease of the fetus/ newborn. Categorise and recommend management strategies for a range of blood group antibodies.
4. Determine and explain the serological problems associated with autoantibodies with respect to blood transfusion
5. Determine and describe the design, operation and performance of serological techniques used in the investigation and management of autoimmune haemolytic anaemia. Categorise and recommend management strategies for blood provision for patients with cold and warm autoantibodies.
6. Determine, explain and interpret the investigation of a suspected transfusion reaction. Discuss the possible causes.
7. Explain and categorise the principles and practice of, and determine between, serological and electronic issue of blood components
8. Discuss and categorise the principles and mechanisms of, and recommend, blood component selection for a range of patients (including fetus/ neonate, haematological, BMT, HSCT, rare blood groups, pregnant women, immunocompromised, children, transfusion-dependent)

Unit 3 - Donation Testing and Components Processing (Specialism)

Indicative Content

In this Unit you will learn about:

- Preparation and quality monitoring of blood components
- Preparation and specifications of blood components with special requirements
- Testing requirements for blood donations in the UK
- Transfusion transmitted infections with respect to blood donation
- European Blood Safety Directives and Blood Safety and Quality Regulations
- Guidelines for the Blood Transfusion Services in the UK
- BCSH guidelines for the use of irradiated blood components
- BCSH guidelines for neonates and older children

Learning Outcomes

You will be expected to:

1. Determine, explain and discuss the design, operation and performance of processing techniques for blood components
2. Determine, explain and categorise additional processing and testing requirements for non-routine blood components
3. Identify, explain and categorise quality monitoring procedures applied to blood components
4. Determine, describe and categorise the design, operation and performance of automated and semi-automated testing technology used in blood donor testing.
5. Determine, explain, formulate and interpret the investigation of complex serological reactions, including recommendations for resolving unexpected anomalies, in donor testing
6. Describe and categorise the aetiology of transfusion transmitted infections. Discuss and recommend investigations for a range of transfusion transmitted infections.
7. Determine, describe and explain component validation, specification and labelling criteria

Generic Learning Outcomes

Intellectual skills

1. Critically analyse scientific data
2. Evaluate results commonly encountered in blood transfusion laboratories
3. Apply knowledge of transfusion science to address specific laboratory problems

Practical skills

1. Present information clearly in the form of verbal and written reports.
2. Communicate complex ideas and arguments in a clear and concise and effective manner.

Transferable skills and personal qualities

1. Present complex ideas in simple terms in written format.
2. Consistently operate within sphere of personal competence and level of authority.
3. Select and apply appropriate analysis or assessment techniques and tools.
4. Actively seek accurate and validated information from all available sources.
5. Evaluate a wide range of data to assist with judgements and decision making.
6. Interpret data and convert into knowledge for use in the clinical context of individual and groups of patients and donors.
7. Work in partnership with colleagues, other professionals, patients and their carers to maximise patient care.