Issues of thrombosis, bleeding, and transfusion are extremely common, and often complex, in critically ill patients. Haematology in Critical Care: A Practical Handbook provides a dependable source of expert guidance on how to handle common haematological problems seen in the critical care setting, as well as the acute care of patients with a primary haematological disorder.

Full-time clinical haematologists, regularly attending on intensive care, the Editors begin with an approach to abnormal laboratory tests, following with a disease-orientated approach to topics such as coagulation and haematological malignancy. Other key topics include paediatric and neonatal care, transfusion, point of care testing and the emergency presentation of haematological disease.

This title brings together two of the most highly scientific specialties in clinical practice, delivering a practical approach to these problems, and guiding the clinician through the diagnosis and management of common scenarios encountered in the ICU.

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Postgraduate Haematology
Sixth Edition
Edited by Victor Hoffbrand, Daniel Catovsky, Edward Tuddenham and Anthony Green
ISBN 9781405191807

ISBN 978-1-118-27424-8
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Patients with a primary haematological disorder account for 1–2% of admissions to intensive care units. In the UK, patients are usually managed on a mixed medical and surgical unit where low patient numbers may limit the degree of expertise that can be developed. In contrast, almost all critically ill patients require a full blood count and coagulation screen. These tests are frequently abnormal and require interpretation. Issues of thrombosis, bleeding, and transfusion are also extremely common in critically ill patients.

This book is a practical guide to the investigation and management of these common problems as well as the acute aspects of care in patients with a primary haematological disorder. We are full-time clinical haematologists, and both regularly attend on intensive care. We have started with an approach to abnormal laboratory tests and then taken a disease-orientated approach to topics such as coagulation and haematological malignancy. Other key topics include paediatric and neonatal care, transfusion, point-of-care testing and the emergency presentation of haematological disease.

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I would like to thank a number of individuals for kindly reviewing and commenting on specific areas of the text, including Dr Andy Breen, Dr Sharon English, Dr Mike Bosomworth, Dr Mervyn Davies and Professor David Bowen.

I would also like to thank my family for their support: my parents who have led by example, to Anita for her patience and to Lila and Reuben, stars twinkling at ground level.

QAH

I would like to thank my parents for their continued blessings, my wife Gail for her patience and support and my children Nimue, Neah and Izahak for the tremendous bliss.

JT

Acknowledgements
SECTION 1
Approach to Abnormal Blood Tests
Anaemia was defined by the World Health Organization as a haemoglobin (Hb) concentration less than 120 g/L (Hb < 36%) in females and less than 130 g/L (Hb < 39%) in males, but the lower level of the reference range for Hb may vary between laboratories. It is common in critically ill patients, occurring in up to 80% of those in intensive care units (ICUs) [1] with 50–70% having a Hb less than 90 g/L during their admission. By reducing oxygen delivery to the tissues, this may be tolerated poorly in those with cardiorespiratory compromise. In critical care, anaemia is commonly due to multiple factors such as inflammation, blood loss, renal impairment and nutritional deficiencies [2, 3] (see Table 17.1), but it is important to consider treatable causes and identify when more detailed investigation is needed. The role of transfusional support is considered in Chapter 17.

Tissue hypoxia exerts physiological control of Hb by triggering the release of erythropoietin (EPO) by the kidneys, which stimulates bone marrow (BM) erythropoiesis. Hb will increase so long as there are no underlying BM disorders (e.g. myelodysplasia) and there are adequate supplies of iron, vitamin B12 and folic acid. When a rapid marrow response occurs (e.g. following haemorrhage or replacement of a deficient vitamin), reticulocytes (young erythrocytes) enter the blood in large numbers and can be identified on the blood film (polychromasia) or by an elevated reticulocyte count. The normal lifespan for erythrocytes is 120 days, before being removed by the reticuloendothelial system (predominantly in the spleen and liver), but their lifespan may be shortened by inflammation, haemorrhage or haemolysis.

**Diagnostic approach to anaemia in critical care**

In the history, note pre-existing co-morbidities including renal and cardiac impairment. Also note medications, diet and symptoms suggestive of blood loss. Examine for jaundice, lymphadenopathy or organomegaly.

- If there is a sudden unexpected drop in Hb, this may be a sampling error; consider repeating the full blood count (FBC).
- Is the anaemia acute or chronic? This may inform the diagnosis, likely tolerance of anaemia and treatment strategy. Only 10–15% of ICU patients have chronic anaemia prior to admission [4].
- Is the anaemia isolated or are there other cytopenias? Thrombocytopenia (Chapter 3) is also a common finding (~40% of ICU patients) and will therefore often coexist with anaemia in critically ill patients. Common causes of both include sepsis, organ failure and acute blood loss, but important differentials include disseminated intravascular coagulation (DIC) (Chapter 9) and thrombotic microangiopathies (TMAs) (Chapter 11). Review the