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Edited by Daniele Bryden , Andrew Temple
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accurate and up-to-date information which is in accord with
accepted standards and practice at the time of publication. Although
case histories are drawn from actual cases, every effort has been made
to disguise the identities of the individuals involved. Nevertheless,
the authors, editors and publishers can make no warranties that the
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advised to pay careful attention to information provided by the
manufacturer of any drugs or equipment that they plan to use.

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Preface

Case-based discussion is an integral part of critical care teaching and training.

Although the specialty is a relatively young branch of medicine, in addition to its own specific knowledge base, it requires a detailed background knowledge of surgery, medicine and trauma across all age ranges.

In creating this book, we have approached knowledgeable and enthusiastic trainers in their subject fields to discuss an interesting or illustrative case. The aim was to create a number of discrete small chapters that could be used as the basis for individual general reading, group tutorials or as a starting point for further exploration around a topic area. This is not intended to be a definitive text but contains a mixture of core knowledge and detailed background information so that there is material of interest to everyone looking after critically ill patients.

The cases chosen have all been mapped to the UK Faculty of Intensive Care Medicine FFICM exam and the European Society of Intensive Care Medicine EDIC exam so we hope it will provide alternative reading for those studying for those exams.

We have enjoyed reading and editing the cases and have learnt from the expertise of the authors. We hope you will too.

Levels of Evidence

(adapted from the Centre for Evidence Based Medicine, Oxford)

- 1a Systematic reviews (with homogeneity) of randomised controlled trials
- 1b Individual randomised controlled trials (with narrow confidence intervals)
- 1c ‘All or none’ randomised controlled trials (i.e., when all patients died before the treatment became available, but some now survive on it; or when some patients died before the treatment became available, but none now die on it)
- 2a Systematic reviews (with homogeneity) of cohort studies
- 2b Individual cohort study or low quality randomised controlled trials (e.g., <80% follow-up)
- 2c “Outcomes” Research
- 3a Systematic review (with homogeneity) of case-control studies
- 3b Individual case-control study
- 4 Case-series (and poor quality cohort and case-control studies)
- 5 Expert opinion without explicit critical appraisal, or based on physiology, bench research or “first principles”

Abbreviations Referred to in Case Discussions

AAA	abdominal aortic aneurysm
AAGBI	Association of Anaesthetists of Great Britain and Ireland
ABGs	arterial blood gas(es)
ABI	acute brain injury
ACE	angiotensin converting enzyme
ACS	abdominal compartment syndrome
ACTH	adrenocorticotrophic hormone
ADH	antidiuretic hormone
AF	atrial fibrillation
AGNB	aerobic gram negative bacilli
AIH	autoimmune hepatitis
AIP	acute interstitial pneumonitis
AIS	acute ischaemic stroke abbreviated injury scale
AKI	acute kidney injury
ALD	alcoholic liver disease
ALT	alanine transaminase
ANP	advanced nurse practitioner
APACHE	acute physiology and chronic health evaluation
APP	abdominal perfusion pressure
APPT	activated partial thromboplastin time
APRV	airway pressure release ventilation
ARDS	adult respiratory distress syndrome
ARF	acute respiratory failure
aSAH	aneurysmal subarachnoid haemorrhage
ASB	assisted spontaneous breathing
ASPEN	American Society for Parenteral and Enteral Nutrition
AST	aspartate aminotransferase
ATC	acute traumatic coagulopathy
ATN	acute tubular nephropathy
ATP	adenosine triphosphate
ATS	American Thoracic Society
AU	absorbance units
BAL	bronchoalveolar lavage
BIPAP	biphasic positive airway pressure
BIS	bispectral index
BMI	body mass index
BP	blood pressure
bpm	beats per minute
BSI	blood stream infection
BTF	brain trauma foundation
BTS	British Thoracic Society
BURP	backwards, upwards and rightwards pressure on the thyroid cartilage
CA	cerebral autoregulation
CAM-ICU	Confusion Assessment Method for the Intensive Care Unit
CAP	community acquired pneumonia
CBF	cerebral blood flow
CBG	capillary blood gases
CBV	cerebral blood volume
CFA	cryptogenic fibrosing alveolitis
CFAM	cerebral function analysing monitor
CFU	colony forming units

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CHO	carbohydrate
CI	cardiac index
CK	creatinine kinase
CLA-BSI	central line associated blood stream infection
CMRO2	cerebral metabolic rate for oxygen
COMT	catchyl-0-methyltransferase
COP	cryptogenic organising pneumonia
COPD	chronic obstructive pulmonary disease
CPAP	continuous positive airway pressure
CPC	cerebral performance category
CPIS	Clinical Pulmonary Infection Score
CPK	creatinine phosphokinase
CPM	central pontine myelinolysis
CPP	cerebral perfusion pressure
CPS	Child Pugh Score
CR-BSI	catheter related blood stream infection
CRP	C-reactive protein
CRT	capillary refill time
CRRT	continuous renal replacement therapy
CSW	cerebral salt wasting syndrome
CT	computed tomography
CTA	CT angiography
CTEPH	chronic thromboembolic pulmonary hypertension
CTPA	CT pulmonary angiogram
CVC	central venous catheter
CVST	cerebral venous and sinus thrombosis
CVVH	continuous venovenous haemofiltration
CVVHD	continuous venovenous haemodiafiltration
DAS	Difficult Airway Society
DBD	donation after brainstem death
DC	direct current
DCCV	direct current cardioversion
DCD	donation after circulatory death
DCI	delayed ischaemic deficit/ delayed cerebral ischaemia
DGH	district general hospital
DHI	dynamic hyperinflation
DIC	disseminated intravascular coagulation
DKA	diabetic ketoacidosis
DSA	digital subtraction angiography
DVT	deep venous thrombosis
EBIC	European Brain Injury Consortium
E-CPR	extra-corporeal support during cardiopulmonary resuscitation
ED	emergency department
EEG	electroencephalogram
ERCP	endoscopic retrograde cholangio pancreatography
ESPEN	European Society for Clinical Nutrition and Metabolism
ESBL	extended spectrum beta lactamases
EWS	early warning score
FBC	full blood count
FEV1	forced expiratory volume in 1 second
FiO ₂	fraction of inspired oxygen
FRC	functional residual capacity
FV	flow velocity
GAS	group A streptococcus
GCS	Glasgow Coma Scale
GDC	Guglielmi detachable coil

		Abbreviations	xv
GEB	gum elastic bougie		
GGS	Group G beta-haemolytic streptococcus		
GMC	general medical council		
GP	General Practitioner		
G6PD	glucose 6 phosphate dehydrogenase		
HCAI	healthcare associated infection		
HELLP	Haemolysis, Elevated Liver enzymes, Low Platelets syndrome		
HR	heart rate		
HAART	highly active antiretroviral therapy		
HAP	hospital acquired pneumonia		
HASU	hyperacute stroke unit		
HDU	high dependency unit (level 2 unit)		
HELICS	Hospitals in Europe Link for Infection Control through Surveillance		
HES	hydroxy ethyl starch		
HFOV	high frequency oscillatory ventilation		
HHS	hyperosmolar hyperglycaemic state		
HPB	hepatobiliary		
HRCT	high resolution CT chest		
HRS	hepatorenal syndrome		
IABP	intra aortic balloon pump		
IAP	intra abdominal pressure		
IAH	intra abdominal hypertension		
IBW	ideal body weight		
ICD	implantable cardiac defibrillator		
ICDSC	Intensive Care Delirium Screening Checklist		
ICNARC	Intensive Care National Audit and Research Centre		
ICP	intracranial pressure		
ICU	intensive care unit (level 3 unit)		
ID	infectious diseases		
IE	infective endocarditis		
IMV	intermittent mandatory ventilation		
INR	international normalised ratio		
IO	intraosseous		
iv/IV	intravenous		
IVIG	intravenous immunoglobulin		
ILCOR	International Liaison Committee on Resuscitation		
ILD	interstitial lung disease		
IPF	idiopathic pulmonary fibrosis		
ISAT	International Subarachnoid Aneurysm Trial		
ISS	injury severity score		
LDH	lactate dehydrogenase		
LFTs	liver function tests		
LMA	laryngeal mask airway		
LP	lumbar puncture		
L-VAD	left ventricular assist device		
MAO	monoamine oxidase inhibitors		
MAP	mean arterial pressure		
MCF	mean clot firmness		
MD	microdialysis (usually cerebral)		
MDR	multi-drug resistant		
MH	malignant hyperpyrexia		
MIC	mean inhibitory concentration		
MCA	middle cerebral artery		
MDR	multidrug resistance		
MELD	model for end stage liver disease		
mmHG	millimetres of mercury		

xvi	Abbreviations
MODS	multiorgan dysfunction syndrome
MRA	magnetic resonance angiography
MRCP	magnetic resonance cholangiopancreatogram
MRI	magnetic resonance imaging
MUST	malnutrition universal screening test
MV	mechanical ventilation
NAC	N-acetylcysteine
NAP4	4th National Anaesthesia Project Audit Report
NBA	net bilirubin absorbance
NHSBT	NHS blood and transplant
NIBP	non invasive blood pressure
NICE	National Institute for Health and Care Excellence
NIRS	near infrared spectroscopy
NIV	non invasive ventilation
NJ	naso-jejunal
NMB	neuromuscular blocking agent
NMS	neuroleptic malignant syndrome
NOA	net oxyhaemoglobin absorbance
NPE	neurogenic pulmonary oedema
NPIS	national poisons information service
NPPV	noninvasive positive pressure ventilation
NPSA	National Patient Safety Agency
NPWT	negative pressure wound therapy
NSAIDs	non steroidal anti-inflammatory drugs
NSE	neurone specific enolase
NSIP	non specific interstitial pneumonitis
NTSP	national tracheostomy safety project
OELM	optimal external laryngeal manipulation
OHCA	out of hospital cardiac arrest
PAC	pulmonary artery catheter
PAOP	pulmonary artery occlusion pressure
PaO ₂	partial pressure of oxygen in arterial blood
PaCO ₂	partial pressure of carbon dioxide in arterial blood
PbtO ₂	partial pressure of oxygen in brain tissue
PCP	pneumocystis jirovecii pneumonia
PCR	polymerase chain reaction
PDT	percutaneous dilational tracheostomy
PEA	pulseless electrical activity or pulmonary endarterectomy
PEEP	positive end expiratory pressure
PHE	Public Health England
PI	pulsatility index
PICC	peripherally inserted central catheter
PICCO	pulse index contour cardiac output
PICU	paediatric intensive care unit
PF	(ratio) of arterial oxygen concentration as PaO ₂ to the fraction of inspired oxygen
p MDI	pressurised metered dose inhaler
PRx	pressure reactivity index
PSA	prostate-specific antigen
PSB	protected specimen brush
PSI	pneumonia severity index
PT	prothrombin time
PTE	pulmonary thromboembolism
PtiO ₂	brain tissue oxygen tension
PTr	prothrombin time ratio
PVL	Panton-Valentine leukocidin
PVR	pulmonary vascular resistance

		Abbreviations	xvii
QTc	corrected QT interval		
RCT	randomised controlled trial		
ROS	reactive oxygen species		
ROSC	return of spontaneous circulation		
ROTEM	thromboelastometry		
RR	respiratory rate		
RRT	renal replacement therapy		
rRNA	ribosomal ribonucleic acid		
RRT	renal replacement therapy		
SaO ₂	arterial oxygen saturation		
SBP	systolic blood pressure		
SBP	spontaneous bacterial peritonitis		
SBT	spontaneous breathing trial		
SDD	selective decontamination of the digestive tract		
SIADH	syndrome of inappropriate ADH		
SIGN	Scottish Intercollegiate Guideline Network		
SIRS	systemic inflammatory response syndrome		
SNOD	specialist nurse for organ donation		
SOD	selective oral decontamination		
SOFA	sequential organ failure assessment		
SpO ₂	oxygen saturation (via pulse oximetry)		
SSEP	somatosensory evoked potentials		
STEMI	ST elevation myocardial infarction		
SVRI	systemic vascular resistance index		
TACI	total anterior circulation infarct		
TAPSE	Tricuspid Annular Plane Systolic Excursion		
TARN	trauma audit and research network		
TB	tuberculosis		
TBI	traumatic brain injury		
TCA	tricyclic antidepressant		
TCD	transcranial doppler ultrasonography		
TEG	thromboelastography		
TIPS	Transjugular Intrahepatic Portosystemic Shunt		
TNF-α	tumour necrosis factor alpha		
TOE	transoesophageal echocardiogram		
tPA	tissue plasminogen activator		
TPG	transpulmonary gradient		
TPN	total parenteral nutrition		
TPMT	thiopurine methyl transferase		
TRALI	transfusion associated lung injury		
TTM	targeted temperature management		
UIP	usual interstitial pneumonitis		
UKDEC	UK Donor Ethics Committee		
VAC	vacuum assisted closure		
VA-ECMO	venous-arterial extracorporeal membrane oxygenation		
VAP	ventilator associated pneumonia		
VATS	video-assisted thoracoscopic surgery		
VF	ventricular fibrillation		
Vt	(as part of GCS) not assessed verbal score due to presence of tracheostomy		
WCC	white cell count		
WSACS	World Society of the Abdominal Compartment Syndrome		