COMBAT ANESTHESIA: THE FIRST 24 HOURS

The Coat of Arms
1818
Medical Department of the Army

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Lieutenant Colonel, MC, US Army
Director, Borden Institute

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Senior Editors

CHESTER BUCKENMAIER III, MD
Colonel, Medical Corps, US Army
Director, Defense and Veterans Center for Integrative Pain Management
Professor, Anesthesiology, Uniformed Services University

PETER F. MAHONEY, OBE, MBA, FRCA
Colonel, Late Royal Army Medical Corps
Defence Professor, Anaesthesia & Critical Care, Royal Centre for Defence Medicine

Office of The Surgeon General
United States Army
Falls Church, Virginia

Borden Institute
Fort Sam Houston, Texas

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Editorial Staff: Joan Redding
Senior Production Editor

Douglas Wise, Venetia Valiga, and Bruce G. Maston
Illustrators

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Contributors

DOMINIC ALDINGTON, BSc(Hons), MBBS, FRCA
Lieutenant Colonel, Royal Army Medical Corps, Consultant in Pain Medicine, Defence Medical Rehabilitation Centre, Headley Court, Epsom, Surrey KT18 6JW, United Kingdom

MICHAEL K. ALMOND, DM, QVRM, AE
Wing Commander, Royal Auxiliary Air Force; 4626 Aeromedical Evacuation Squadron Royal Auxiliary Air Force, Consultant Physician and Nephrologist, Southend University Hospital, Essex SSO ORY, United Kingdom

GREGORY K. APPLEGATE, DO
Major, Medical Corps, US Army; Staff Anesthesiologist, University Hospital Case Medical Center, 11100 Euclid Avenue, Cleveland, Ohio 44106

TAYLOR ATCHLEY, BS
Second Lieutenant, Medical Corps, US Air Force; Medical Student, Georgetown University School of Medicine, 3800 Reservoir Road, NW, Washington, DC 20007

ROBIN D. BERRY, PHD
Wing Commander, Consultant in Anaesthetics and Intensive Medicine, Critical Care (Level 4), Derriford Hospital, Plymouth PL6 8DH, United Kingdom

JOHN BREEZE, MRCS
Major, Royal Army Medical Corps; Maxillofacial Surgeon, Academic Department of Military Surgery and Trauma, Royal Centre for Defence Medicine, Vincent Drive, Birmingham B15 2SQ, United Kingdom

CHESTER "TRIP" BUCKENMAIER III, MD
Colonel, Medical Corps, US Army; Director, Defense and Veterans Center for Integrative Pain Management, 11300 Rockville Pike, Suite 709, Rockville, Maryland 20852; Professor of Anesthesiology, Uniformed Services University

JESSICA BUNIN, MD
Lieutenant Colonel, Medical Corps, US Army; Chief, Medicine Service, Department of Medicine, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889

TODD E. CARTER, MD
Colonel (Retired), Medical Corps, US Air Force; Senior Flight Surgeon, Immediate Past US Air Force Surgeon Generals Chief Consultant, Anesthesia; Vice Chairman for Clinical Operations and Associate Professor of Clinical Anesthesia, University of Cincinnati, Department of Anestheisology, 231 Albert Sabin Way, Academic Health Center, PO Box 670531, Cincinnati, Ohio 45267-0531

MARK H. CHANDLER, MD
Colonel, Medical Corps, US Army; State Surgeon, Colorado Army National Guard; Associate Professor of Anesthesiology, Denver Health Medical Center, 777 Bannock Street, MC0218, Denver, Colorado 80204

JOHN H. CHILES, MD
Colonel (Retired), Medical Corps, US Army; Staff Anesthesiologist, Department of Anesthesia, Fort Belvoir Community Hospital, 9300 DeWitt Loop, Fort Belvoir, Virginia 22060

ALLISON A. COGAR, MD
Lieutenant Colonel, Medical Corps, US Air Force; Anesthesiologist, Mike O'Callaghan Federal Medical Center, Department of Anesthesia, 4700 North Las Vegas Boulevard, Las Vegas, Nevada 89191

STEVEN P. COHEN, MD
Colonel, Medical Corps, US Army Reserves; Walter Reed National Military Medical Center, 8901 Rockville Pike, Bethesda, Maryland, 20889; Professor, Johns Hopkins School of Medicine, 550 N. Broadway, Suite 301, Baltimore, Maryland 21205

DAN CONNOR, FRCA, RN
Surgeon Commander, Regional Anaesthesia Lead, Consultant Anaesthetist, Ministry of Defence Hospital Unit Portsmouth, Queen Alexandra Hospital, Portsmouth, Hants PO6 3LY, United Kingdom

SCOTT M. CROLL, MD
Lieutenant Colonel (P), Medical Corps, US Army; Chief of Anesthesiology, Evans Army Medical Hospital, Anesthesiology Department, Room 2745, 1650 Cochrane Circle, Fort Carson, Colorado 80913

MARK DAVIES, FRCA, MBBS
Lieutenant Colonel, Royal Army Medical Corps; Consultant Anaesthetist, Nuffield Department of Anaesthetics, Oxford University Hospitals, Oxford, Oxfordshire OX18 3SA, United Kingdom

CLINTON DAVIS
Flight Lieutenant, Princess Mary's Royal Air Force Nursing Service; Staff Officer (Grade 3) Aeromed (CCAST), Tactical Medical Wing, Royal Air Force Station Lyneham, Wiltshire, United Kingdom

ROB DAWES, BM, FRCA
Major, Royal Army Medical Corps; Specialist Registrar in Anaesthetics and Prehospital Care, 16 Air Assault Medical Regiment; Anaesthetics Department, Morriston Hospital, Swansea SA6 6NO, United Kingdom

DEBORAH EASBY, MB, BS, FRCA
Squadron Leader, Royal Air Force; Consultant in Anaesthesia and Critical Care, Norfolk and Norwich University Hospital, Norwich NR4 7UY, United Kingdom

HARRIET EDGAR, MBBS, FRCA
Major, Royal Army Medical Corps; Specialist Registrar in Anaesthesia, Southampton General Hospital, Hampshire SO16 6Y, United Kingdom

GEORGE EVETTS, MBBS, BSC
Major, Royal Army Medical Corps; Maxillofacial Surgeon, Academic Department of Military Surgery and Trauma, Royal Centre for Defence Medicine, Vincent Drive, Birmingham B15 2SQ, United Kingdom

R. SCOTT FRAZER, MB, CHB, FFARCS
Colonel, Late Royal Army Medical Corps; Consultant in Anaesthesia, Queen Elizabeth Hospital, Mindelsohn Way, Birmingham B15 2WB, United Kingdom

SAMUEL FRICKS, MS-HLS
Major, Medical Service Corps, US Army; Aeromedical Evacuation Officer, Army Medical Department Student Detachment; Fort Sam Houston, Texas 78234

KEVIN T. GALLOWAY, BSN, MHA
Colonel, Army Nurse Corps, US Army; Director, Army Pain Management Program, Office of the Army Surgeon General, Rm 35W127, 7700 Arlington Blvd, Falls Church, Virginia 22042

HAROLD GELFAND, MD
Lieutenant Commander, US Navy; Obstetric and Regional Anesthesia and Acute Pain Management, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889

DANIEL GOWER, PHD
Colonel (Retired), Medical Service Corps, US Army; Executive Director, The DUSTOFF Association, PO Box 8091, Wainwright Station, San Antonio, Texas 78208

ANDREW D. GREEN, FRCPATH
Group Captain, Royal Air Force; Director of Infection Prevention and Control, Royal Centre for Defence Medicine, ICT Centre, Birmingham Research Park, Vincent Drive, Edgbaston, Birmingham B15 2SQ, United Kingdom

ANDREW G. HALDANE, MBBS, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant Anaesthetist, Queen Elizabeth Hospital, Mindelsohn Way, Birmingham B15 2WB, United Kingdom

JACOB J. HANSEN, DO
Major, Medical Corps, US Army; Assistant Chief, Burn Anesthesia, US Army Institute of Surgical Research & Army Burn Center, 3698 Chambers Pass, Fort Sam Houston, Texas 78234-6315

RICHARD HEAMES, BM, FRCA
Surgeon Commander, Royal Navy; Consultant Anaesthetist, University Hospitals Southampton, Tremona Road, Southampton SO16 6YD, United Kingdom

AARON B. HOLLEY, MD
Lieutenant Colonel, Medical Corps, US Army; Chief of Sleep Medicine, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889

LANCE R. HOOVER, MD
Lieutenant Colonel, Medical Corps, US Army; Chief, Surgery and Specialty Care, Anesthesiologist, Moncrief Army Community Hospital, Fort Jackson, South Carolina 29207-5700

ELSPETH J. HULSE, MBCHB, FRCA
Surgeon Lieutenant Commander, Royal Navy; Anaesthestic Registrar, Anaesthestics Department, Royal Infirmary of Edinburgh, Scotland; Pharmacology, Toxicology, and Therapeutics, Centre for Cardiovascular Sciences, Queen's Medical Research Institute, University of Edinburgh, 47 Little France Crescent, Edinburgh, Midlothian EH16 4TJ, United Kingdom

MICHAEL INGRAM, MB, CHB, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant Anaesthetist, 34 Field Hospital, Queen Elizabeth Barracks, Strensall Camp, York YO32 5SW, United Kingdom

DAVID P. INWALD, PHD
Major, Royal Army Medical Corps; Senior Lecturer and Honorary Consultant in Paediatric Intensive Care, Imperial College, University of London, London W2 1PG, United Kingdom

S. JAGDISH, MBBS, MRCA, MBA
Colonel, Late Royal Army Medical Corps; Army Medical Services and Ministry of Defence Health Unit, Portsmouth, Albert House, Queen Alexandra Hospital, Southwick Hill Road, Cosham PO6 3LY, United Kingdom

JAN O. JANSEN, FRCS, FFICM
Major, Royal Army Medical Corps; Consultant in General Surgery and Intensive Care Medicine, 144 Parachute Medical Squadron, 16 Air Assault Medical Regiment, Aberdeen Royal Infirmary, Foresterhill, Aberdeen AB25 2ZN, United Kingdom

TIMOTHY JARDELEZA, MD
Major, Medical Corps, United States Army, Critical Care Service, Department of Surgery, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889

JEYASANKAR JEYANATHAN, MBBS
Major, Royal Army Medical Corps;, Academic Department of Military Anaesthesia and Critical Care, Royal Centre for Defence Medicine, Research Park, Edgbaston, Birmingham, B15 2SQ United Kingdom

ANDREW McD. JOHNSTON, FRCP (GLAS), DMCC
Lieutenant Colonel, Royal Army Medical Corps; Consultant in Respiratory and Intensive Care Medicine, Royal Centre for Defence Medicine, Queen Elizabeth Hospital Birmingham, Birmingham, B15 2WB, United Kingdom

RYAN KENEALLY, MD
Lieutenant Colonel, Medical Corps, US Army; Assistant Professor, Department of Anesthesiology, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, Maryland 20814

MICHAEL KENT, MD
Commander, Medical Corps, US Navy; Staff Anesthesiologist, Regional Anesthesia and Acute Pain Medicine, Walter Reed National Military Medical Center, Bethesda, Maryland 20889

MICHAEL LEE, MD
Lieutenant, Medical Corps, US Navy; Anesthesiology Resident, Department of Anesthesiology, Walter Reed National Military Medical Center, Bethesda, Maryland 20889

STEPHEN LEWIS, MBCHB, BSc(Hons), FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant in Critical Care and Anesthesia, Army Medical Services and King's College Hospital, London; Department of Anesthesia and Critical Care, King's College Hospital, Denmark Hill, London SE5 9RS, United Kingdom

JEMMA LOOKER, MBBS, BSc(Hons), FRCA
Squadron Leader, Royal Air Force; Anaesthesia and Intensive Care Medicine; St George's Hospital, London, SW17 0QT, United Kingdom

DOWNING LU, MPHL, MD, MPH
Lieutenant Colonel, Medical Corps, US Army; Chief of Pediatric Critical Care, Department of Pediatrics, Walter Reed National Military Medical Center, 8901 Rockville Pike, Bethesda, Maryland 20889

JONATHAN B. LUNDY, MD
Major, Medical Corps, US Army; Trauma and Burns Surgeon, US Army Institute of Surgical Research, 3698 Chambers Pass Ste B, Joint Base San Antonio, Fort Sam Houston, Texas 78234-7767

CHRISTOPHER V. MAANI, MD
Major, Medical Corps, US Army; Chief of Anesthesia and Perioperative Care, US Army Institute of Surgical Research & Army Burn Center, 3698 Chambers Pass, Fort Sam Houston, Texas 78234-6315

SEAN M. MacDERMOTT, DO
Major, Medical Corps, US Air Force; Cardiopulmonary Medical Director, Malcolm Grow Medical Clinic, 1050 West Perimeter Road, Joint Base Andrews, Maryland 20762

PETER F. MAHONEY, OBE, MBA, FRCA
Colonel, Late Royal Army Medical Corps; Defence Professor, Anaesthesia & Critical Care, Royal Centre for Defence Medicine, Research Park, Edgbaston, Birmingham B15 2SQ, United Kingdom

ANDREW MATHESON, MBBS
Surgeon Lieutenant Commander, Royal Navy; Registrar Microbiology, Institute of Naval Medicine, Alverstoke, Gosport, Hampshire PO12 2DL, United Kingdom

W. JONATHAN MAYLES, MD
Captain, Medical Corps, US Air Force, Medical Corps; Resident in Anesthesiology, University of Colorado, Denver, 12631 East 17th Avenue, Aurora, Colorado 80045

CRAIG C. McFARLAND, MD
Lieutenant Colonel, Medical Corps, US Army; Chief, Department of Anesthesia and Pain Management, Landstuhl Regional Medical Center, Division of Surgery, Building 3711, CMR 402, APO AE 09180

JAMES J.K. McNICHOLAS, MA, FRCA, FFICM
Lieutenant Colonel, Royal Army Medical Corps; Consultant in Anaesthetics and Intensive Care Medicine, Queen Alexandra Hospital, Cosham, Portsmouth PO6 3LY, United Kingdom

ADRIAN J. MELLOR, FRCA
Surgeon Commander, Royal Navy; Consultant Anaesthetist, Ministry of Defence Hospital Unit (Northallerton), Friarage Hospital, Northallerton, North Yorkshire DL6 1JG, United Kingdom

SIMON MERCER, FRCA
Surgeon Commander, Royal Navy; Consultant Anaesthetist, Aintree University Hospital NHS Foundation Trust, Longmore Lane, Liverpool L9 7AL, United Kingdom

ARTHUR R. MIELKE, MD, MPH
Captain, Medical Corps, US Army; Physician, Department of Anesthesia, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Building 9, Bethesda, Maryland 20889

JEFFREY A. MIKITA, MD
Lieutenant Colonel, Medical Corps, US Army; Program Director, Critical Care Medicine Fellowship; Chief, Department of Simulation, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889

PAUL MOOR, BMEDSCI (Hons), FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant Anaesthetist, Anaesthetics Department, Level 9 Terence Lewis Building, Derriford Hospital, Derriford, Plymouth PL6 J7P, United Kingdom

IAN NESBITT, TD, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant in Anaesthesia and Critical Care, Department of Anaesthesia, Perioperative and Critical Care, Freeman Hospital, Newcastle upon Tyne NE7 7DN, United Kingdom

CHRISTOPHER J. NAGY, MD
Lieutenant Colonel, Medical Corps, US Air Force; Program Director, SAUSHEC Anesthesiology, San Antonio Medical Center, 3851 Roger Brooke Drive, Fort Sam Houston, Texas 78234

T.C. NICHOLSON-ROBERTS, MRCP (UK), FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant in Anesthesia and Intensive Care Medicine, University Hospital Southampton, Neurosciences Intensive Care Unit, Wessex Neurology Centre, Southampton General Hospital, Tremona Road, Southampton, Hampshire SO16 6YD, United Kingdom

GILES R. NORDMANN, MB, CHB, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant Paediatric Anaesthetist, Derriford Hospital, Plymouth PL6 8DH, United Kingdom; Consultant Anaesthetist, 16 Medical Regiment, Colchester; Senior Lecturer in Military Anaesthesia, Royal College of Anaesthetists, London

W. ANDREW OWENS, MD, FRCS
Consultant Cardiothoracic Surgeon, James Cook University Hospital, Middlesbrough, TS4 3BW, United Kingdom

C.L. PARK, MBE, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant in Intensive Care Medicine and Anaesthesia, Kings College Hospital and Department of Military Anaesthesia and Critical Care, Royal Centre for Defence Medicine, Birmingham Research Park, Vincent Drive, Edgbaston, Birmingham B15 2SQ, United Kingdom

MATTHEW PENA, MD
Lieutenant Commander, Medical Corps, US Navy; Staff Anesthesiologist, Department of Anesthesiology, Naval Medical Center San Diego, California 92134

ANTHONY PLUNKETT, MD
Major, Medical Corps, US Army; Assistant Department Chief, Department of Anesthesia, Womack Army Medical Center, Fort Bragg, North Carolina 28310

CHRISTIAN POPA, MD
Colonel, Medical Corps, US Army; Critical Care Service, Department of Surgery, Walter Reed National Military Medical Center, 8901 Rockville Pike, Bethesda, Maryland 20889

CRAIG D. POPE, MBBS, FRCA
Major, Royal Army Medical Corps; Registrar in Anaesthesia, Royal London Hospital, London E1 1BB, United Kingdom

DOUGLAS POWELL, MD
Major, Medical Corps, US Army; Intensive Care Unit Director, Womack Army Medical Center, Building 4-2817, Reilly Road, Fort Bragg, North Carolina 28307

VICTORIA PRIBUL, FRCA
Major, Royal Army Medical Corps; Anaesthetic Registrar, Triservice School of Anaesthesia, Anaesthetics Department, Royal Devon and Exeter Hospital, Barrack Road, Exeter EX2 5DW, United Kingdom

H.E.J. PUGH, MBCHB, MRCOG, FRCA
Major, Royal Army Medical Corps (V); Consultant Anaesthetist, Royal Devon and Exeter Hospital, Exeter; Consultant Anaesthetist, Headquarters & London Detachment, Army Reserve Centre, 2 Priory Road, Hornsey, London N8 7RD, United Kingdom

BRYCE RANDALLS, MD
Major, Royal Army Medical Corps; Consultant, Intensive Care Medicine, Aberdeen Royal Infirmary, Foresterhill, Aberdeen AB25 2ZN, United Kingdom

RICHARD REED, FRCA
Major, Royal Army Medical Corps, Anaesthetic Registrar, Triservice School of Anaesthesia, Anaesthetics Department, Derriford Hospital, Derriford Road, Plymouth PL6 8DH, United Kingdom

DAN E. ROBERTS, FRCA
Squadron Leader, Royal Air Force; St. George's Hospital, Blackshaw Road, London SW17 0QT, United Kingdom

LAURA L. ROBERTS, MD
Lieutenant Commander, Medical Corps, US Navy; Department of Anesthesia and Perioperative Medicine, Medical University of South Carolina, 167 Ashley Avenue, Suite 301, MSC 912, Charleston, South Carolina 29425

MATTHEW ROBERTS, MA, FRCA
Lieutenant Colonel (Retired), Royal Army Medical Corps; Associate Professor in Anesthesiology, University of Colorado, Denver, 12631 East 17th Avenue, Aurora, Colorado 80045

JONATHAN A. ROUND, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant Anaesthetist, Ministry of Defence Hospital Unit (Northallerton), Friarage Hospital, Northallerton, North Yorkshire, DL6 1JG United Kingdom

STEPHEN RUSH, MD
Lieutenant Colonel, US Air Force/New York Air National Guard; US Air Force Pararescue Medical Director, Departments of Radiation Oncology and Neurosurgery, New York University Medical Center, 90 Merrivak Road, Great Neck, New York 11020

CLAIRE SANDBERG, MBBS, FRCA
Squadron Leader, Royal Air Force; formerly, Critical Care Air Support Team Anesthetist, Royal Air Force Brize Norton Airfield, United Kingdom

GUY JAMES SANDERS, MBBS
Major, Royal Army Medical Corps; Headquarters, Army Medical Directorate, Slim Road, Camberley, Surrey GU15 4NP, United Kingdom

TIMOTHY SCOTT, MRCP, FRCA
Surgeon Commander, Royal Navy; Consultant Anaesthetist, Department of Anaesthesia, John Radcliffe Hospital, Headley Way, Headington, Oxford OX3 9DU, United Kingdom

MICHAEL SHIGEMASA, MD
Captain, Medical Corps, US Army; Anesthesiologist, Department of Anesthesia, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Building 9, Bethesda, Maryland 20889

P.J. SHIRLEY, FRCA
Wing Commander, Royal Auxiliary Air Force; Consultant in Intensive Care Medicine and Anaesthesia, Royal London Hospital, Whitechapel, London 612 SQN, United Kingdom

BEN SIGGERS, MBCHB
Surgeon Commander (Ret), Royal Navy; Consultant in Anesthesia, Salisbury Hospital, Wiltshire SP2 8BJ, United Kingdom

CHARLOTTE SMALL, MBBS, FRCA
Anaesthetic Registrar, Department of Anaesthesia, Queen Elizabeth, Hospital Birmingham, Mindelsohn Drive, Edgbaston, Birmingham B17 2TH, United Kingdom

LARRY N. SMITH
Major, Medical Service Corps, US Army; Aviation Staff Officer, Army Medical Department Center and School, Directorate of Combat and Doctrine Development, Building 4011, Room C2, Fort Sam Houston, Texas 78234

KAREN SMYTH, FRCA, DICM
Wing Commander, Royal Air Force; Consultant in Anaesthetics and Intensive Care Medicine, Queen's Medical Centre, Nottingham NG7 2UH, United Kingdom

CHRISTOPHER J. SPEVAK, MD, MPH, JD
Professor of Clinical Anesthesia, Georgetown University School of Medicine, 3900 Reservoir Road, NW, Washington, DC 20007

NICHOLAS T. TARMEY, FRCA
Lieutenant Colonel, Royal Army Medical Corps, Department of Critical Care, Ministry of Defence Hospital Unit Portsmouth, Queen Alexandra Hospital, Southwick Hill Road, Portsmouth PO6 3LY, United Kingdom

CHRISTOPHER TEBROCK, MD
Lieutenant Colonel, Medical Corps, US Army; Chief, Anesthesia Service, Walter Reed National Military Medical Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889

RHYS THOMAS, MBBS, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant Anaesthetist, 16 Air Assault Medical Regiment; Anaesthetics Department, Morriston Hospital, Swansea SA6 6NO, United Kingdom

MICHAEL K. TIGER, MD
Captain, Medical Corps, US Air Force; Anesthesiology Resident Physician, San Antonio Military Medical Center, 3851 Roger Brooke Drive, Fort Sam Houston, Texas 78234

ROBERT D. TIPPING, MB, BS, FRCA
Wing Commander, Royal Air Force; Consultant Anesthetist, Royal Center for Defence Medicine, Anaesthetic Department, Queen Elizabeth Hospital Birmingham, Mindelsohn Way, Edgbaston, Birmingham B15 2WB, United Kingdom

S. TURNER, FRCA, MD
Wing Commander, Royal Air Force; former Senior Lecturer in Military Anaesthesia, Consultant in Anaesthesia and Intensive Care Medicine, Critical Care Air Support Team, Royal Air Force, RAF Brize Norton, Carterton, Oxfordshire OX18 3LX, United Kingdom

CHRISTOPHER M. WATSON, MD, MPH
Lieutenant Commander, Medical Corps, US Navy; Pediatric Intensivist, Department of Pediatrics, Walter Reed National Military Medical Center, 8901 Rockville Pike, Bethesda, Maryland 20889

INDY WILKINSON, MD
Captain, Medical Corps, US Army; Department of Anesthesia and Operative Services, Walter Reed National Military Medical Center, 8901 Rockville Pike, Bethesda, Maryland 20889

PAUL WOOD, MB, BCH, FRCA
Consultant Anesthetist, Queen Elizabeth Hospital Birmingham, Mindelsohn Way, Edgbaston, Birmingham B15 2WB, United Kingdom

K. WOODS, FRCA
Lieutenant Colonel, Royal Army Medical Corps; Consultant Anaesthetist, James Cook University Hospital, Marton Road, Middlesbrough TS4 3BW, United Kingdom

TOM WOOLLEY, MD, FRCA
Lieutenant Colonel, Consultant Anaesthetist, Derriford Hospital, Honorary Senior Lecturer Military Anaesthesia Royal College of Anaesthetists, Derrifird Road, Devon PL6 8DH, United Kingdom

CHRISTOPHER WRIGHT, MB, CHB
Lieutenant Colonel, Royal Army Medical Corps; Defence Consultant Advisor in Emergency Medicine and Pre-Hospital Care, North West London Major Trauma Centre, Emergency Department, St. Mary's Hospital, Praed Street, Paddington, London W2 1NY, United Kingdom

J.C. WRIGHT, MD
Lieutenant Commander, Medical Corps, US Navy; Staff Anesthesiologist, Naval Hospital Pensacola, 6000 West Highway 98, Pensacola, Florida 32512

MARK WYLDBORE, MBBS, BSc(Hons), FRCA
Major, Royal Army Medical Corps; Anaesthetics Registrar, St. George's Hospital, National Health Service Trust, Blackshaw Road, London SE17 0QT, United Kingdom

MICHAEL ZAPOR, MD, PhD
Colonel, Medical Corps, US Army; Infectious Disease Service, Walter Reed National Military Medical Center, Bethesda, Maryland 20889-0001

Foreword

I am pleased to present this volume, entitled C*ombat Anesthesia: The First 24 Hours*, published by the Army Medical Department's Borden Institute. The Borden Institute, part of the Army Medical Department Center and School, is the primary outlet for scholarly and peer-reviewed publications describing observations made and science conducted by the healthcare providers who take care of our Nation's Service Members and Veterans. The Institute's publications do not necessarily represent Army doctrine or the opinion of the Department of Defense or the Army; nevertheless, they represent our providers best work as they seek to inform future policy and decision-making.

This book focuses on anesthesia care during the 24 hours following battle wounds. It is written by British and American physicians who began this collaboration while providing acute care to injured Soldiers of both countries at Camp Bastion and Fort Leatherneck in the Helmand province of Afghanistan. These authors, having deployed throughout Afghanistan and Iraq, address the ways in which care was delivered by U.S. and British trauma teams working together and sharing their competence. This is a story of how these expert physicians organized care and improved in-hospital patient outcomes. The principles presented in this book are also relevant to trauma care in non-military hospitals in the United States, Britain, and beyond.

Looking back, the start of modern military anesthesia can be linked to the expansion of the role of anesthesiology in the post–Vietnam War era. Since then, many of the medical tools have evolved, enhancing the way we care for the trauma patient today. Airway management, vasopressor drug therapy and initiatives in resuscitation, and an array of antibiotic regimens are examples of advancement in acute trauma care over these years. Surgery and postoperative care are now safer and more reliably associated with better patient outcomes. Continued development in these clinical areas has allowed anesthesia providers to provide wounded Soldiers a level of care previously unattainable.

No one individual or group of practitioners is solely responsible for improved survival rates over the course of the war in Iraq and Afghanistan. Combat casualty care begins at the point of injury with the Combat Medic and continues with the collaborative teamwork of all military medical personnel, including technicians, nurses, physicians, and other medical specialists. With the growing experience in the acute care of wounded patients and the implementation of newer technologies during the wars in Iraq and Afghanistan, the survival rates of wounded Service Members has dramatically improved, from 83% (in 2002) to 92% (in 2014). This achievement is a direct result of jointly coordinated efforts by an entire team of military medical personnel.

I congratulate the authors on this collaborative effort, and I admire them for building a strong professional bridge between our countries through the practice of medicine. These officers recognized the importance of continuing, and then strengthening, the relationship formed in the operating rooms during the last 13 years of conflict. I recognize this effort as an important part of the tradition of military medicine, that is, presenting the lessons learned and preserving this knowledge for the next generation of military providers caring for our Service Members injured in combat. Whether the trauma care provider is a physician, nurse, or Combat Medic, the ensuing chapters of this text will serve as a valuable resource in documenting these lessons.

Serving to Heal . . . Honored to Serve!

Patricia D. Horoho
Lieutenant General, US Army
The Surgeon General and
Commanding General,
US Army Medical Command

Washington, DC
December 2014

Prologue

Surgeons rely on the capabilities of their anesthetist colleagues to ensure that complex procedures can be undertaken safely and successfully. This is no less the case during care for critically wounded patients from the battlefield, when surgical prowess requires the highest caliber of anesthesia. The advances achieved by multinational anesthesia teams in Iraq and Afghanistan over the last dozen years have changed thinking not only in the military but also in civilian practice. The authors of this text have drawn on their experiences in sustaining the physiology of the severely injured during prehospital transit, delivering a stabilized patient to the waiting surgical teams and improving survival chances. They have developed direct theater access and novel resuscitation and transfusion protocols aided by thrombo-elastography, which have become accepted civilian protocols. The military patient, however, may need to travel many thousands of miles to return home. Ensuring en-route pain relief with local anesthetic infusions that tolerate in-flight pressure changes has helped deliver patients pain free to the final hospital destination in the home country. Such practice is supported by research to develop an evidence base, and the authors have drawn on research from both sides of the Atlantic to underpin their knowledge. This ongoing research must remain vital for the future development of military anesthesia, even after the end of major conflict.

I have operated on the almost moribund at the multinational trauma hospital in Camp Bastion, Afghanistan. Patients who might not have survived 10 years ago, some with multiple injuries including triple limb amputation, are now carefully resuscitated and deftly anesthetised while their disrupted physiology is gradually restored. The depth of experience of our dedicated military anesthetic teams is distilled in this book, which will be of benefit to our civilian colleagues working in trauma hospitals as well as military providers in future conflicts. I would like to take the opportunity, on behalf of all military surgeons, to thank our anesthetist colleagues for the superb support they have provided to the great benefit of our patients.

Surgeon Rear Admiral Alasdair J. Walker, OBE, QHS, FRCS
Director, Medical Policy & Operational Capability, HQ Surgeon General

Lichfield, United Kingdom
October 2014

Preface

The genesis for this book began as a conversation between medical officers and anesthesiologists from different coalition countries in a tent in Camp Bastion, Afghanistan. The officers were discussing the advances in battlefield anesthetic care that had been achieved in the Iraq and Afghanistan conflicts, and the need to preserve this knowledge for the next generation of military anesthesia providers serving in upcoming wars. In short, it was felt to be ethically indefensible not to collect, organize, and record the advances in anesthetic practice that military anesthesia providers have achieved in the last 13 years of conflict. It was determined that the text would be a collaborative effort between military anesthesia providers of both the United States and United Kingdom, leveraging the experiences of the countries that provided the largest military medical response to the recent conflicts. The majority of chapters are products of this collaboration and naturally contain different perspectives of the two countries.

If anything positive can be said of war, it would be that it serves as a catalyst for rapid improvements in medical understanding and care. In the conflicts in Afghanistan and Iraq, coalition medical forces achieved a died-of-wounds rate below 10%. This statistic is historic and unprecedented in armed conflict. Many factors have contributed to this achievement, including improvements in body armor, highly trained medics, greater availability of blood and blood products, improved medical imaging far forward, faster evacuation with improved en-route care, and enhanced surgical approaches to wounds and trauma. Advances in battlefield anesthesia have made modern battlefield trauma resuscitation and surgery possible and thus have contributed greatly to enhanced survival of the injured.

The goal of this book is to document recent lessons learned in the anesthetic care of combat casualties and serve as a training foundation for anesthesia providers tasked with or contemplating providing anesthetic and analgesic care in future conflicts and disasters. The majority of its authors have deployed in the recent conflicts and are recognized authorities in the areas their chapters cover. This text is a tribute to their efforts and the patients they cared for and a gift to the next generation of combat anesthesia providers. We also take the opportunity to thank Mr Raul Gordon, of the Henry Jackson Foundation and Defense & Veteran Center for Integrative Pain Management, and Ms Alison Bess, of the Royal Centre of Defence Medicine. They have chased down authors, kept editors honest, and organized complex contributions. Without them there would be no book.

It was no easy task editorially; truly the United States and United Kingdom are two historical allies separated by a common language.

Chester Buckenmaier III, MD
Colonel, Medical Corps, US Army
Director, Defense and Veterans Center for
Integrative Pain Management
Professor, Anesthesiology, Uniformed Services University

Peter F. Mahoney, OBE, MBA, FRCA
Colonel, Late Royal Army Medical Corps
Defence Professor, Anaesthesia & Critical Care,
Royal Centre for Defence Medicine

Rockville, Maryland;
Birmingham, United Kingdom
August 2014