Trauma

Resuscitation

The team approach

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Journals

Title	Abbreviation
<i>Acta Neurochirurgica Supplement</i>	<i>Acta Neurochir. Supp.</i>
<i>American College of Emergency Physicians</i>	ACEP
<i>American College of Surgeons' Bulletin</i>	<i>Am. Coll. Surgeons Bull.</i>
<i>American Journal of Diseases of Children</i>	<i>Am. J. Dis. Child</i>
<i>American Journal of Surgery</i>	<i>Am. J. Surg.</i>
<i>Anaesthesia</i>	—
<i>Anaesthetic Society Journal</i>	<i>Anaesth. Soc. J.</i>
<i>Anaesthesiology</i>	—
<i>Annals of Emergency Medicine</i>	<i>Ann. Emerg. Med.</i>
<i>Annals of Neurology</i>	<i>Ann. Neurol.</i>
<i>Annals of the Royal College of Surgeons (England)</i>	<i>Ann. R. Coll. Surg.</i>
<i>Annals of Surgery</i>	<i>Ann. Surg.</i>
<i>34th Annual Proceedings of the Association for the Advancement of Automotive Medicine</i>	<i>34th Ann. Proc. AAAM</i>
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<i>British Journal of Hospital Medicine</i>	<i>Br. J. Hosp. Med.</i>
<i>British Journal of Intensive Care</i>	<i>Br. J. Int. Care</i>
<i>British Journal of Medicine</i>	<i>Br. Med. J.</i>
<i>British Journal of Surgery</i>	<i>Br. J. Surg.</i>
<i>Canadian Anaesthesiology Society Journal</i>	<i>Can. Anaesth. Soc. J.</i>
<i>Canadian Journal of Anaesthesiology</i>	<i>Can. J. Anaesth.</i>
<i>Canadian Journal of Surgery</i>	<i>Can. J. Surg.</i>
<i>Canadian Medical Association Journal</i>	<i>Can. Med. Assoc. J.</i>

Title	Abbreviation
<i>Chest</i>	—
<i>Circulatory Shock</i>	<i>Cir. Shock</i>
<i>Clinical Anaesthesiology</i>	<i>Clin. Anaesthesiol.</i>
<i>Clinical Intensive Care</i>	<i>Clin. Int. Care</i>
<i>Clinical Orthopaedics and Related Research</i>	<i>Clin. Ortho. Rel. Res.</i>
<i>Clinics in Medicine</i>	<i>Clin. Med.</i>
<i>Clinics in Plastic Surgery</i>	<i>Clin. Plast. Surg.</i>
<i>Critical Care Clinics</i>	<i>Crit. Care Clinics</i>
<i>Critical Care Medicine</i>	<i>Cr. Care Med.</i>
<i>Critical Care Nursing</i>	<i>Crit. Care Nurs.</i>
<i>Emergency</i>	—
<i>Emergency Medical Clinics of North America</i>	<i>Em. Med. Clinics N. Am.</i>
<i>Emergency Medical Reports</i>	<i>Em. Med. Repts</i>
<i>Emergency Medical Services</i>	<i>Emerg. Med. Serv.</i>
<i>Emergency Medicine</i>	<i>Em. Medicine</i>
<i>Health Trends</i>	—
<i>Heart Lung</i>	—
<i>Hospital Update</i>	—
<i>Infectious Disease Clinics of North America</i>	<i>Infect. Dis. Clin. N. Am.</i>
<i>Injury</i>	—
<i>Intensive Care</i>	<i>Int. Care</i>
<i>Intensive Therapy</i>	<i>Int. Ther.</i>
<i>Intensive Therapy and Clinical Monitoring</i>	<i>Int. Ther. Clin. Mon.</i>
<i>Journal of the American College of Emergency Physicians</i>	<i>JACEP</i>
<i>Journal of the American Medical Association</i>	<i>JAMA</i>
<i>Journal of Burn Care and Rehabilitation</i>	<i>J. Burn Care Rehabil.</i>
<i>Journal of Emergency Nursing</i>	<i>J. Emerg. Nursing</i>
<i>Journal of Environmental Injuries</i>	<i>J. Environ. Inj.</i>
<i>Journal of Hospital Infection</i>	<i>J. Hosp. Infec.</i>
<i>Journal of Neurosurgery</i>	<i>J. Neurosurg.</i>
<i>Journal of the Royal College of Surgeons (Edinburgh)</i>	<i>J. R. Coll. Surg. Edinb.</i>
<i>Journal of Trauma</i>	<i>J. Trauma</i>
<i>Lancet</i>	—
<i>Military Medicine</i>	<i>Mil. Medicine</i>
<i>Morbidity and Mortality Weekly Report</i>	<i>MMWR</i>
<i>New England Journal of Medicine</i>	<i>N. Eng. J. Med.</i>
<i>The Nursing Clinics of North America</i>	<i>Nurs. Clin. N. Am.</i>

Title	Abbreviation
<i>New York State Journal of Medicine</i>	<i>NY State J. Med.</i>
<i>Nursing</i>	—
<i>Nursing Research</i>	—
<i>Nursing Standard</i>	—
<i>Nursing Times</i>	—
<i>Paediatrics</i>	—
<i>Paraplegia</i>	—
<i>Patient Care</i>	—
<i>Perspectives in Shock Research</i>	<i>Perspec. Shock Res.</i>
<i>Pharmacology and Therapeutics</i>	<i>Pharmac. Ther.</i>
<i>Quarterly Journal of Experimental Physiology</i>	<i>Q. J. Exp. Physiol.</i>
<i>Radiology</i>	—
<i>Seminars in Orthopaedics</i>	<i>Seminars in Ortho.</i>
<i>Southern Medical Journal</i>	<i>S. Med. J.</i>
<i>The Surgical Clinics of North America</i>	<i>Surg. Clin. N. Am.</i>
<i>Topics in Emergency Medicine</i>	<i>Top. Emerg. Med.</i>
<i>Trauma Nursing</i>	—
<i>Trauma Quarterly</i>	—

Foreword

In 1988 the Royal College of Surgeons of England published its report on the Management of Patients with Major Injuries. The report contained data from a survey of 1 000 trauma deaths and concluded that at least one in five patients, presenting to hospitals in the United Kingdom alive, subsequently died unnecessarily. These avoidable deaths were due to medical mismanagement at every level and throughout the specialties. The report confirmed suspicions held by many in the front line of trauma management, and served as a catalyst for a variety of initiatives designed to reduce this appalling toll, often of the youngest and most productive members of our society. Amongst other suggestions the Royal College of Surgeons of England proposed an improvement in medical and paramedical education.

The Advanced Trauma Life Support Course (ATLS) for doctors was introduced late in 1988, followed by the Advanced Trauma Nursing Course (ATNC). More recently the Pre Hospital Trauma Life Support (PHTLS) programme was initiated for paramedics. These educational packages have truly changed behaviour in ambulances and resuscitation rooms nationally and have resulted in better early care.

As well as these educational initiatives, a pilot Trauma Centre has been established in Stoke and nationwide Accident and Emergency Consultants have established Trauma Teams to initiate rapid assessment and resuscitation of trauma victims.

There has not, as yet, however, been a comprehensive text providing all the information necessary to mount an optimum management response to a patient with major injuries. This excellent text will admirably fill this gap.

This volume is the result of the commitment of a group of nurses and doctors who strongly believe that the early care of the multiply injured should, and can, be improved. The authors are well-known to those working with trauma during the 'Golden Hour'. They have been key individuals in raising the profile of the trauma patient and advocating speedy and

efficient patient management by optimal team organisation and training. The value of the book is enhanced by the multi-disciplinary nature of the contributors.

It will be obvious from reading the text that not only is the advice on patient management sensible and practical but it has been carefully put together by those directly involved in patient care. The environment in which critically injured patients are initially managed is, without doubt, demanding and highly stressful. For doctors and nurses in this situation the combination of the need for urgent action, together with concern about their own performance within a highly charged situation, can easily lead to chaos. This potential for chaos can only be reduced by pre-planning, together with theoretical and practical preparedness.

This book, edited by four trauma care workers, provides sound information for all team members and will, therefore, take its place in the front line as a factor in the reduction of death and disability from this modern epidemic – trauma.

L. Hadfield
London

D. V. Skinner
Oxford

Preface

The evolution of trauma care in developed countries around the world has created new and exciting roles for all the personnel involved in the resuscitation and recovery of critically injured patients. The stress on strict, separate roles for the nurse, the doctor, the paramedics and the ancillary staff is now being replaced by a greater emphasis on the 'team approach'. This acknowledges the interactive nature of the procedures undertaken by the trauma team and the need for close co-operation at all stages of the resuscitation. It is an approach at its most successful when based on a formally organized team structure which incorporates the concept of task allocation. This enables procedures to be undertaken simultaneously, thereby reducing resuscitation times. In addition, it puts *each* member of the trauma team in the position of being responsible for evaluating the patient and the situation, anticipating the next most appropriate action even as one is being performed, and communicating with each member of the team to provide the best care.

This book has been created with this new vision of the multi-member trauma team in mind. The objective of the authors is to present a comprehensive view of trauma management and its sequelae that relates to both nurses and doctors involved with trauma resuscitation. The general approach to the clinical management of the patient is similar to that espoused by the Advanced Trauma Nursing Course (ATNC) and the Trauma Nursing Core Course (TNCC), both of which have been adopted as a standard of training by the Royal College of Nursing. It also follows the principles of the American College of Surgeons' Advanced Trauma Life Support Course (ATLS), now adopted by the Royal Colleges of Surgeons in the UK.

In addressing both nurses and doctors, the book emphasizes the importance of all personnel involved having a good understanding of the pathophysiological changes underlying a trauma resuscitation. This enables greater co-operation between personnel and facilitates the anticipation of

the patient's needs. Consideration is therefore given to the relevant mechanisms of injury, the physiological response to injury, and a practical system of identifying and addressing life-threatening conditions. Trauma care is reviewed in a systematic way, body system by body system. In addition, in the chapters concerned with areas where injury is commonly life-threatening, particular attention is paid to the applied anatomy and physiology of the normal system. Following this, the pathophysiological changes due to trauma and the clinical management of these patients is reviewed. For further information, the interested reader is referred to the section at the end of each chapter: this lists both nursing and medical literature which can be used to follow up on particular aspects of trauma care.

No attempt has been made to highlight either the nurses' or doctors' allocated tasks since the aim of the book is to emphasize the need for an *integrated team* approach. At certain points in the text, however, the nurse's role has been stressed, and technical procedures that in the UK would be mainly undertaken by doctors have been highlighted for easy reference. The extent to which nurses and doctors carry out particular tasks will depend on training and local policy. With limitations in medical personnel – as seen in developing countries, for example – the trauma nurse could be expected to take over more of the doctor's role. In *every* situation, though, the philosophy of the trauma team should be understood by *all* members, so that consistent good care can be achieved.

The authors recognize that trauma care is delivered in a growing variety of settings. It is our desire to equip all personnel, no matter what the environment in which they practise, with information that can assist them in developing the appropriate decision-making skills required in managing the injured patient. We are confident that *Trauma Resuscitation: the team approach* will help nurses and doctors reach their potential as members of the trauma team; and, by doing so, improve each patient's chances of returning to a full and active life.

Peter Driscoll
Carl Gwinnett
Cindy LeDuc Jimmerson
Olive Goodall

April 1993

A note about gender

For the sake of clarity, throughout this book the trauma victims and doctors are always assumed to be male and the trauma nurses to be female. In reality, of course, each can be of either sex.

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Abbreviations

a	arterial
A	alveolar
ABG	arterial blood gases
ACCOLC	access overload control
ADH	antidiuretic hormone
A/E	accident and emergency department
AIDS	acquired immune-deficiency syndrome
AIO	Ambulance Incident Officer
AIS	Abbreviated Injury Scale
AP	antero-posterior view
ARDS	adult respiratory distress syndrome
ATLS	Advanced Trauma Life Support Course
ATNC	Advanced Trauma Nursing Course
BASICS	The British Association for Immediate Care
BLS	basic life support
BP	blood pressure
bt	beat
CaO ₂	content of oxygen in arterial blood
CI	cardiac index; confidence interval
CNS	central nervous system
CO	carbon monoxide; cardiac output
CO ₂	carbon dioxide
COHb	carboxyhaemoglobin
CPP	cerebral perfusion pressure
CSF	cerebrospinal fluid
CT	computerized tomography
CvO ₂	content of oxygen in venous blood
CVP	central venous pressure

DAI	diffuse axonal injury
DO ₂	oxygen delivery
DPG	diphosphoglycerate
DPL	diagnostic peritoneal lavage
DTPA	diethylenetriaminepentaacetic acid
ECG	electrocardiograph
ECV	emergency control vehicle
ECM	external cardiac massage
EDH	extradural haematoma
EDP	end diastolic pressure
EDTA	ethylenediaminetetraacetic acid
ENT	ear, nose and throat
ET	endotracheal
GCS	Glasgow Coma Scale
GMC	General Medical Council
Hb	haemoglobin
Hct	haematocrit
HIV	human immunodeficiency virus
HPPF	human plasma protein fraction
IC	intercostal
ICH	intracerebral haematoma
ICP	intracranial pressure
IDH	intradural haematoma
ISS	Injury Severity Score
ITU	intensive care unit
IV	intravenous
IVC	inferior vena cava
JVP	jugular venous pressure
KE	kinetic energy
LA	local anaesthetic
LSP	life-saving procedures
LVEDP	left ventricular end diastolic pressure
MAP	mean arterial pressure
MIO	Medical Incident Officer
mmHg	millimetres of mercury
MMT	mobile medical team
MOF	multiple organ failure
MTOS	Major Trauma Outcome Study
NAIR	National Arrangements for Incidents Involving Radiation
NG	nasogastric

NIO	Nursing Incident Officer
NIPB	non-invasive blood-pressure monitor
OER	oxygen extraction ratio
P	partial pressure
PA	posterior-anterior view
PAC	pulmonary artery catheter
PaCO ₂	partial pressure of arterial carbon dioxide
PaO ₂	partial pressure of arterial oxygen
PASG	pneumatic anti-shock garment
PHTLS	Pre Hospital Trauma Life Support
PM	post-mortem
POWP	pulmonary artery occlusion (wedge) pressure
PR	rectal examination
Ps	probability of survival
PVC	polyvinyl chloride
PvO ₂	partial pressure of oxygen in venous blood
Q	volume of blood
RHA	Regional Health Authority
RTS	Revised Trauma Score
SaO ₂	oxygen saturation of arterial blood
SAH	subarachnoid haemorrhage
SDH	subdural haematoma
SvO ₂	mixed venous oxyhaemoglobin saturation
SVR	systemic vascular resistance
TBSA	total body surface area
TNCC	Trauma Nursing Core Course
TRISS	Trauma Score and ISS
UKCC	United Kingdom Central Council for Nursing, Midwifery and Health Visiting
v	venous
V	volume of gas
VO ₂	oxygen consumption
WHO	World Health Organization