

Salomone Di Saverio · Fausto Catena · Luca Ansaloni
Federico Coccolini · George Velmahos *Editors*

Acute Care Surgery Handbook

Volume 1

General Aspects,
Non-gastrointestinal and
Critical Care Emergencies

Foreword by David Feliciano



WORLD SOCIETY OF
EMERGENCY SURGERY



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Editors

Salomone Di Saverio
Emergency and Trauma Surgery
Service
C.A. Pizzardi Maggiore Hospital
AUSL Bologna
Bologna, Italy

Fausto Catena
Emergency and Trauma Surgery
Maggiore Hospital of Parma
Parma, Italy

Luca Ansaloni
General, Emergency and Trauma
Surgery
Papa Giovanni XXIII Hospital
Bergamo, Italy

Federico Coccolini
General, Emergency and Trauma
Surgery
Papa Giovanni XXIII Hospital
Bergamo, Italy

George Velmahos
Trauma, Emergency Medicine
Harvard Medical School
Massachusetts General Hospital
Boston, Massachusetts
USA

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With deep gratitude I'd like to dedicate this book the memory of my father, Tito, who recognized my inclinations early on, and who encouraged and supported me in my pursuit of a medical and surgical career. His constant presence in my youth is for me still a model for how to lead my own life. I also wish to thank my mother Gabriella, who has always been the beacon of light guiding me morally and culturally. She remains my mentor in logic and the humanities, sharing the wisdom of her beloved Greek and Latin masters. Last but not least, I am grateful to and dedicate this book to my devoted wife Omeshnie, who is constantly supporting me with patience and love

Salomone Di Saverio

To my parents who served as my life's springboard and to my wife and children who serve as my life's compass

George Velmahos

To my family that tolerates me and my job every day....

Fausto Catena

To my wife Anna

Federico Coccolini

Foreword

As specialization in general surgery has continued to increase around the world, it has become obvious that patients with injuries and those with acute surgical conditions benefit from care by surgical specialists with training and continuing interest in these fields. The specialty of acute care surgery (ACS), now approximately 10 years old, has evolved rapidly. There are now fellowships for postresidency training in the field, designated ACS Services in most academic and large community hospitals, and surgical organizations such as the World Society of Emergency Surgery to encourage best practices and continuing research and development in the field. Having a standard textbook in the field of acute care surgery is a necessary next step.

Dr. Salomone Di Saverio from Bologna, Italy, and colleagues from the World Society of Emergency Surgery have now authored the *Acute Care Surgery* manual. Volume 1 of this comprehensive manual provides the perspective on ACS around the world, the history of the specialty, opportunities for research in the field, organization of an in-hospital ACS service, and describes the use of checklists to enhance patient safety. The remainder of the text focuses on management of patients with a variety of ACS conditions from the head and neck to the anus to the peripheral vascular system. In addition, there are comprehensive chapters on resuscitation, use of ultrasound, use of

antibiotics, management of septic shock, nutrition, other areas of surgical critical care, and the role of interventional radiology in ACS. Finally, there are chapters highlighting the care of special patient groups such as children, pregnant women, geriatric patients, burn patients, transplant patients, and any patients requiring damage control operations or developing the abdominal compartment syndrome.

This manual is a broad overview of the field of acute care surgery written by many individuals who have contributed to the rapid development of the field. Dr. Di Saverio and his colleagues have taken their extensive experience in acute care surgery and have consolidated and organized it into this comprehensive and readable manual. This will soon be a standard text used by surgeons who practice acute care surgery around the world, and it was a privilege to review it.

David V. Feliciano, MD, FACS
Battersby Professor and Director of General Surgery
IUH (Indiana University Health) Methodist Hospital
Emeritus Chief, Division of General Surgery
Department of Surgery
Emeritus Chief of Surgery
Indiana University Hospital
Indiana University Medical Center
Indianapolis, IN, USA

Preface

The World Society of Emergency Surgery (WSES) was established in 2007 and its aim was clearly declared: “The overall goals include the promotion of the specialty of emergency surgery as part of the emerging discipline of acute care surgery via academic exchange in an effort to further training and education as well as translational research in the specialty”.

Since 2011, the core group of Acute Care and Trauma Surgeons, founder members of World Society of Emergency Surgery, had the feeling of a strong need for improving education in the field of Acute Care and Trauma surgery, especially for the younger surgeons or any doctors and professional, approaching for the first time this discipline and the complex management of trauma and acute care (non-trauma) patients.

We have therefore had the idea of writing initially a book of trauma surgery, aiming to offer a practical manual of procedures, techniques, and operative strategies, which was published 2 years ago.

Following this preliminary and successful project, we have decided to proceed further with the project of a comprehensive acute care surgery manual, covering the whole aspects of the treatment of acute surgical patients, with a worldwide perspective. In different nations and continents, the emergency surgical care may vary widely. Being a group of World Emergency

Surgeon, we would like to provide suggestions and skills that are valid and therefore can be used everywhere, as well as to give a picture of several different options and perspectives in acute care surgery.

After more than a year of hard work, it is now with great pleasure that we are announcing the completion of our further ambitious project of an acute care surgery manual, where most of the renowned acute care surgeons and physicians from all over the world have made an appreciated and highly valuable contribution, with the intent not to merely describe in academic fashion the most recent surgical techniques, but rather to suggest the best surgical and/or endoscopic and/or interventional radiology strategies, with the final of keeping the things simple but effective when in treating a patient in acute care setting. The contributing professionals are herewith sharing their expertise for achieving a wise clinical judgment and good common sense. We hope this manual may represent a real “vademecum,” especially for young physicians and trainees, with the specific aim of giving a fresh view and practical suggestions for best managing acute patients and improving the skills of their treating surgeons and physicians.

This Volume 1 of the manual is dealing with non-GI injuries in acute care surgery, offering an overview of the most common problems in thoracic, obstetric, gynecologic, anorectal, vascular, and skin surgery. Chapters on complications in postoperative bariatric surgery, antibiotic management, nutrition, and interventional radiology in acute care surgery are also included. This practical and complete guide stems from the partnership and collaboration between the members of World Society of Emergency Surgery (WSES) and other internationally recognized experts in the field; its aim is to provide general surgeons as well as emergency physicians, gastroenterologists and professionals from many other specialties, residents and trainees with a complete and up-to-date overview of the most relevant operative techniques and with useful “tips and tricks” for their daily clinical practice.

Once again, I would like to thankfully acknowledge the excellent level of scientific quality and educational value of the content that each chapter's author have contributed. The material received is, once again, extremely extensive in terms of quantity and quality that the contents have been apportioned between two volumes.

We are moreover very glad that this project, conducted in cooperation with our World Society of Emergency Surgery and its Journal, has truly joined together not only acute care surgeons, but also surgeons and physicians from other surgical specialties, such as thoracic and vascular surgery, ObGy, urology, pediatrics, ENT, as well as gastroenterology, gastrointestinal endoscopy, and interventional radiology, from all over the world sharing our experiences in the management of the acutely ill patients. The multidisciplinary board of authors, editors, and foreword writers of this book is truly International with contributors from the Americas, Europe, Africa, Australasia, and Asia. This is the most heartening and promising signal for a worldwide collaboration.

This is the second of the planned WSES Books series, starting the WSES Educational Program for the next future years. This project aims to link together WSES courses, WSES Guidelines, and WSES books to give complete educational tools to the next generation of emergency and trauma surgeons.

WSES is demonstrating to act as the first scientific world society capable to develop a systematic scientific and education program with the aim of science progress according to evidence-based medicine and experience sharing program among professionals.

I would also like to acknowledge the invaluable foreword contributions from two masters, Dr. Kenneth Mattox MD FACS and Dr. David Feliciano MD FACS, emanating from their extensive experiences.

Last but not least, I am deeply grateful to the board of Directors of AUSL Bologna for their continuing commitment in improving Public Health and the care of Acute Surgical patients.

Special mention to the Director General of AUSL Bologna, Dr. Chiara Gibertoni, the Health Director Dr. Angelo Fioritti, the Administrative Director Dr. AM. Petrini, the Directors of the Department of Emergency Dr. Giovanni Gordini and Department of Surgery Prof Elio Jovine, and the chief of the Trauma Surgery Unit Dr. Gregorio Tugnoli. With the contribution and cooperation of all these professionals, an outstanding model of Acute Care Surgery and Trauma Center for a modern and multidisciplinary care of the Acute Surgical Patients has been developed in the Province of Bologna, including a functional model of “Hub and Spoke” and a convenient system of Tertiary Referral Care. I am sincerely proud to be part of this exciting multidisciplinary team of AUSL Bologna dedicated to the improvement of Acute Care Surgery model, within a northern Italian province of Emilia Romagna region!

We look forward to a successful and worldwide ongoing cooperation within our international family of enthusiastic acute care and emergency surgeons, aiming to provide a better care for the acutely ill surgical patients.

Bologna, Italy Salomone Di Saverio, MD, FACS, FRCS

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Chapter 1

Acute Care Surgery Around the World: Future Perspectives

Rao R. Ivatury and Fausto Catena

Increasing specialization and fragmentation of ‘general surgery’ has reduced the role of surgeons to care for patients with acute surgical emergencies. The need for such services, however, has escalated due to the population living to older age with increasingly complex diseases and co-morbidities. Compounding the problem is the mounting number of severely injured patients in the emergency departments which are already filled to capacity by non-emergency patients. Other factors have also contributed to the emergence of the new specialty of ‘acute care surgery’. These include the dissatisfaction of surgeons with trauma as a career in the current era of non-operative management of many traumatic injuries; the loss of traditional general surgery cases to ‘organ-specific practices’ (e.g. colon and rectal surgery, upper

R.R. Ivatury, MD, FACS, FCCM (✉)
Department of Surgery, Virginia Commonwealth University,
Richmond, VA, USA
e-mail: raoivatury@gmail.com

F. Catena, MD
Emergency Surgery Department, Parma University Hospital, Parma, Italy

GI surgery, endocrines) and highly specialized techniques (minimally invasive surgery, organ transplantation, and robotic surgery). Even non-surgical specialties, for example interventional radiology and gastrointestinal endoscopy have eroded the modern surgical practice [1]. The time was ripe for the creation of a new specialty, acute care surgery, created and developed by the American Association of Surgery for Trauma (AAST).

Current Status of ACS in the United States LD Britt, former President of AAST, architect of the name ‘acute care surgery’ and the ‘creator of AAST Congress of Trauma and acute care surgery’ [2] expounded on the current status of the specialty in his Fitts oration to the AAST last year. He also elaborated on his vision of the future challenges and impediments to the success of this specialty and potential strategies for the AAST to pursue. This specialty is not to be confused with ‘surgical hospitalists’ [3] who only provide in-hospital coverage of emergency general surgical services, but have no specialized expertise. As also underscored by Britt [2], ACS ““will gain the ultimate recognition for its impact and value that it brings to the optimal care of the severely injured and critically ill surgical patients, by promulgating the brand and “chronicle and publish well-documented improved outcome results, and advance the science by rigorous studies.....””.

In fact, several recent studies have documented that the concept of ACS has lead to improved, perhaps optimal care of the surgical patient. Many academic centres in the USA have replaced ‘general surgery’ divisions with a Division of ACS [3–15], recognizing that there is no question that the establishment of both the Acute Care Surgery model and the Acute Care Surgery fellowship is the paramount advancement needed to begin addressing the health care disparities in acute surgical care [2]. Several tertiary hospitals appear to subscribe to this concept that the ACS teams are now the ‘general surgeons’ of the department with their three pillars of expertise: trauma, emergency general surgery and in certain settings, surgical

critical care [2, 4–15]. The last mentioned pillar of expertise appears to be more prevalent in the United States rather than other countries, where medical intensivists and anaesthesiologists serve the critically injured or ill patient.

Of great interest, even though there was initial opposition for the ACS model voiced by many, more recent experience has the support of the model from ‘specialty surgeons’ as well as hospital administrators [4–15]. There is tremendous variation in the implementation of ACS models still in the USA. For instance, Santry and colleagues [16] documented that in the ACS hospitals 25% do emergency general surgery (EGS) alone, 21% perform EGS and trauma, 17% EGS and elective surgery, while 30% perform all three. ACS model was adopted by nearly one-third of US university-affiliated hospitals and the model was more prevalent among urban, university-based level-I trauma centres [16]. Investigating the impact of ACS service on trauma volumes and outcomes, one study found that despite a 60% increase in total patient volume and a 233% increase in operative volume, the addition of EGS to a trauma service did not compromise trauma patient outcomes [8]. Similar to other series, Machailidu and associates [10] found that during ACS period time to gall bladder surgery was shorter (20.8 h vs. 25.7 h, $p=0.007$), more patients had surgery within 24 h (75% vs. 59%, $p=0.004$) and there were more operations between 12:00 MN and 7:00 AM (25% vs. 6.4%, $p<0.001$). These translated into shorter hospital stay at an average cost savings of \$ 1000 per patient. In the context of finances, several studies documented a positive contribution margin from ACS model [11–14].

The impact of ACS service on the elective surgical case load was investigated by Miller and Meredith [13]. They found that the number of operations by ACS group increased significantly compared with the mean of the 2 years preceding the service creation (1,639 vs 790/year; $p=0.007$) There was no change in total operations done by the elective surgery group (2,763 vs

2,496/year; $p=0.13$). Caseload did increase by 23 % in the elective surgery group. They concluded that ACS creation took emergency business from the elective group, but this was replaced with elective cases. This resulted in higher collections for both groups and a resultant significant increase in collections in aggregate.

Addressing the question whether the ACS paradigm is applicable to smaller community hospitals, Kalina and Johnson [17] reported that the model can be successfully implemented and maintained at a non-trauma centre with potentially \$2 million savings in a single year. The key to success is creation of a system that standardizes high-quality care, collaboration between acute care surgeons, non-surgical intensivists, elective general surgeons and medical staff administration. Similar sustainability and success of this model was confirmed in a non-trauma setting by O'Mara and colleagues [14].

Of note, there is also evidence that the ACS model has become increasingly popular for resident trainees. The attractive features for in-training residents include team work, shift work, exposure to more operative cases than trauma surgery will ever provide and the resolution by the ACS model of the many 'lifestyle' issues that trauma as a career would pose. In essence, ACS represents the natural maturation of the field of general surgery, and the ACS specialist comes the closest to the traditional concept of the true 'general' surgeon [1, 17, 18]. Cherry-Bukowiec and co-authors [17] documented that the non-trauma emergency surgery service provided ample opportunity for complex decision making, operative procedures, advanced surgical critical care management, acute care faculty surgical skills: all excellent for general and ACS residency training. In fact, the Acute Care Surgery Ad Hoc Committee of EAST [18] conducted a survey of all its members who opined that the biggest incentive to a career in ACS was that it was a challenging and exciting activity; the biggest disincentive was working at night. Seventy-two percent expressed satisfaction with their

career profile, and 92% were either very or somewhat happy with their career. The authors concluded that, compared with their previous survey, overall career satisfaction seemed stable. They suggested focus on surgeon satisfaction may lead to enhancements in patient care.

ACS seems to resonate well with medical students as well in their choice of a surgical career. A recent study [19] surveyed medical students with interest in surgery as a career asking them to rank factors and experiences influencing career selection on a scale of no influence to 10 (critical). Among 337 responses, the three most popular career choices were orthopaedics (16%), Trauma/ACS (12%) and paediatric surgery (8%). Overall, 115 students (34%) selected emergent surgery (Trauma/ACS) as one of their top three career choices. Factors that were ranked significantly higher by the students interested in T/ACS were related to professional satisfaction. Lifestyle factors received lower emphasis when choosing a surgical career. This appears to be a significant change from surveys in late 1990s that documented the lack of interest in trauma as a career.

The ultimate role for the acute care surgeon is in ‘surgical rescue’, as observed by Peitzman and his group [20]. They noted that the expertise of acute care surgeons was required to find, treat and salvage patients from post-operative, serious complications. In their experience, this was required, on an average, for one such patient per day. More than 80% of them required surgical treatment. More than half of them needed multiple procedures to be rescued from their complication. Half of these patients are from other services (the majority surgical) within the authors’ hospital. The other half were equally from regional hospitals and the authors’ own service. They concluded that early consultation, detection and intervention by the acute care surgery team provide the best chance for optimal recovery of these patients. This can be pronounced as the ‘ultimate’ contribution of ACS for the care of the severely injured or ill.

1.1 Acute Care Surgery Around the World

1.1.1 Canada

There is a renewed interest in the paradigm of acute care surgery in Canada [21–23]. Excellent outcomes (reduced time to consult and reduced hospital LOS) were documented post ACS implementation. These good results appear to be based on three notable changes brought about by the ACS paradigm: improved access to prompt high-quality surgical intervention for patients with time-dependent illnesses such as severe sepsis and septic shock, quality control by defining and standardizing best practices in surgical complications and the initiation of ACS registry that will define optimal care. Many Canadian surgeons believe that acute care surgery may provide a framework for general surgeons to work together. It can bring advances in techniques and strategy from all general surgical sub-specialties back to our roots [22]. At the same time, it is realized that, pragmatically, this requires the commitment of all sub-specialties of surgery. Also crucial is the institutional commitment to provide ancillary supportive services and economic incentive for the model to succeed. The benefits to the surgeon-in-training are already becoming increasingly evident, especially for the trauma surgeon who had become a non-operating surgeon prior to the onset of ACS [21–23]. The same concepts of ACS are increasingly becoming pertinent to the smaller community hospitals [21–23].

1.1.2 European Model

Trauma and emergency surgery practice is quite variable in different parts of Europe [24]. While general surgery is a recognized specialty, visceral/abdominal surgery is a specialty in

some countries and traumatology and trauma have different connotation in different countries. For example, the traumatologist/trauma surgeon treats skeletal trauma in Austria and Slovenia, whereas an orthopaedist does this in Finland, France, Italy, Norway, Portugal, Romania, Spain and Turkey; a general surgeon in Greece and Switzerland does trauma surgery, while visceral trauma is treated by a general surgeon in Austria, Croatia, Finland, Greece, Italy, Luxembourg, the Netherlands, Norway, Portugal, Romania, Switzerland, Spain and Turkey; by a visceral and/or trauma surgeon in Czech Republic, Germany, France and Slovenia. Abdominal emergencies are mostly handled by general surgeons in the majority of European countries. Specialty emergencies (thoracic and vascular are mostly treated by specialty or trauma or general surgeons) are treated by general surgeons. Some large hospitals in Germany have a central unit for all acute care, whether medical or surgical, while most of other countries have no separate departments or divisions. The specialists routinely involved in surgical acute care are traumatologists/orthopaedists in 13 countries, general surgeons in 11, anaesthesiologists/ intensivists in 10 countries and visceral/abdominal surgeons in 4 countries. There is little or no interest in acute care surgery (as a sub-specialty) in Austria and Slovenia, while there are signs of a trend toward the same in Finland, Germany. There appears to be no unified system of acute care surgery in Europe at the present time [24].

Currently, there is a tremendous interest in addressing the problem of emergency surgery. The European Union of Medical Specialists (UEMS) have formed a Working Group on Emergency Surgery and summarized their initial findings: ‘organisation of emergency surgical care is complex; training surgeons to provide emergency care is challenging; a flexible training model to accommodate international differences and improve standards may be the solution; a transferrable competence will be easier to implement than a new specialty’ [25]. Similar efforts are under way in the United Kingdom.

1.1.3 United Kingdom

Emergency Surgery in the United Kingdom has always been a contentious issue with notable differences to elective surgery. The NHS Confederation has an initiative called ‘Leading edge publications’ to stimulate debate. First in this series is by Andy Black on the future of acute care [26]. In this monograph, he makes a strong argument that emergency care needs to be modified with new approaches to emergency assessment with integration of medical and surgical teams. Specific to emergency surgery, the Nuffield Trust was commissioned by The Royal College of Surgeons of England to explore the challenges facing emergency general surgery (EGS) and identify opportunities to overcome them [27]. In an elaborate process with peer reviews, expert panels and new analyses, the report exposed the pitfalls in emergency surgery and summarized the many challenges facing emergency general surgery in the United Kingdom. They suggested potential opportunities to address these, including the systematic use of protocols and pathways, increased use of network-based approaches, development of new non-medical roles and new training models. This is a fascinating report that describes in detail the suboptimal status of the emergency surgical care in the United Kingdom. A recent article confirmed the greater need for EGS positions in the United Kingdom, despite a lack of training and certification [28]. The authors surveyed consultant members and UK trainees and noted, over a 6 year study period, that there were 1240 consultant job adverts in a general surgical specialty. The number of EGS adverts increased significantly in 2012–2014 compared to 2009–2011 ($p=0.008$). Only 21 % of trainees believed EGS will be delivered by EGS consultants in the future while only 8.2 % of trainees stated EGS as their career plan. Less than half of all UK consultant surgeons see

EGS as a sub-specialty. The authors concluded there is an increasing societal need for EGS consultants over the last 6 years and that Emergency Surgery has emerged as a new sub-specialty. Much work needs to be done for optimization of emergency surgical care.

1.1.4 Italy

As the pioneers of the World Society of Emergency Surgery (WSES), Italy has been at the forefront of refining the emergency general surgery component of acute care surgery [29, 30]. The editors of the World Journal of Emergency Surgery (WJES), official organ of WSES, often bemoaned the suboptimal care of the emergency surgery patients all over Europe. They exposed the lack of wide use of minimum standards set for emergency surgery and re-emphasized the need for the development of widely accepted guidelines for urgent surgical intervention as well as optimal post-operative care.

The WSES has indeed accomplished these goals very effectively for the past decade, publishing in the WJES these guidelines for a variety of emergent clinical problems. In a recent editorial, Salomone and colleagues, thought leaders in the WSES, opined in an editorial that there is increasing evidence in the literature showing that acute care surgical patients are best approached and managed only by attending surgeons with appropriate expertise in the field of Emergency and Trauma Surgery.

This approach is necessary to prevent complications, recognize them promptly and treat them appropriately [31].

The present manual, designed and executed by the leaders of the WSES is a vivid example of the contributions of the Society to ACS.

1.1.5 Israel

In Israel, the benefits of acute care surgery model are very appealing for surgeons, hospitals and clinical researchers [32]. Practicing general surgeons do take emergency department calls, sometimes forcing sub-specialty surgeons as a back-up for patients beyond their expertise and area of interest. This is a prime example of a flexible model of ACS, adopted to the area and the institution under question, with differing layers of emphasis on the two predominant parts of ACS: trauma and emergency surgery (the critical care component, as in Europe and South America, belongs to non-surgeons, e.g. anaesthetists or medical intensivists). Clearly, structured training fellowships should be provided and encouraged to produce a sufficient workforce of young, interested acute care surgeons. As the model matures, the impact of an ACS service on the clinical productivity of surgeons will be realized. The continuing contributions of Israeli surgical leaders to the WSES and their enthusiasm for the ACS paradigm bodes well for its success in Israel.

1.1.6 Australia and New Zealand

There is enthusiasm for the acute surgical unit (ASU) model of care in Australasia [33–35]. Increasingly positive experiences in terms of faster response to emergency department review, shorter time to emergency surgery and a reduction in hospital length of stay are being reported with the ASU model, at least in the larger centres. In a meta-analysis of ASU versus traditional ‘on-call’ model of care, Nagaraja and associates [35] reported on 18 studies; appendectomy ($n=9$), acute cholecystitis ($n=7$). In the appendectomy cohort, proportion of perforation, negative appendectomy rate, conversion rate to open surgery were similar in pre-ASU and ASU period. Complications,

however, were significantly lower in the ASU group; 14.5% pre-ASU and 10.9% post-ASU ($p=0.009$). Proportion of night-time operations reduced significantly in the ASU period (OR 1.9, 95% CI 1.32–2.74, $p=0.001$). These results are similar to other reviews of ACS in other countries. It is certain that ACS has a bright future in Australasia.

1.1.7 South America

Latin America and the Caribbean have a tremendous burden of violence, and, along with road traffic incidents, trauma is a serious health care problem. Poor preventive efforts in trauma as well as general health make emergency surgical care and trauma enormous problems. At the present time, there is a lack of state-wide system development. While there is widespread enthusiasm for ACS paradigm among surgeons, South America has many difficult hurdles for instituting it.

1.1.8 Low and Middle Income Countries (LMIC)

Emergency surgical care and injury continue to be major health care problems in LMIC. Many efforts are under way to address them. These include creating an acute care service delivery model to function in parallel with preventive and primary services, and improving coordination between various health care specialists who deliver this care. Data systems are being improved to define the problem and integrate acute care burden with the rest of the health system [36]. The African Federation for Emergency Medicine and the Academic Emergency Medicine Consensus Conference (devoted to ‘Global health and emergency care: a research agenda for M’) held in 2013 focussed on some of these aspects [37].

The second edition of ‘Disease control priorities in developing countries’ has chapters on surgery, emergency medical systems and injury [38]. Emergency obstetric care and essential trauma guidelines are both being used to evaluate surgical needs in LMICs. WHO established a Global Initiative on Emergency and Essential Surgical Care (GIESSC). For these reasons – large burden, attractive cost-effectiveness and past neglect – the Copenhagen Consensus in May 2008 considered essential surgery as a potential priority investment for the world’s poor.

In a recent article, Zakrisson [39] argues that it is irresponsible to ignore the larger social, political and economic context of global surgical disease when this is merely another manifestation of poverty in its worst form. How to gain access to ACS? Some believe that it should be delivered one patient at a time. Others maintain that this effort is useless, and prefer to re-direct scarce funds to high-technology endeavours. Happily, the common perception that surgical care is merely a luxury in poor countries is being reconsidered and its essential role in global public health is being acknowledged [39].

1.1.9 Summary of the Nature of ACS and Future Considerations

In an outstanding communication, ‘A qualitative analysis of acute care surgery in the United States: It’s more than just “a competent surgeon with a sharp knife and a willing attitude”’, Santry and colleagues [40] detailed the results of their interviewees of 18 ACS leaders from geographically distributed areas in the USA. All respondents described ACS as a specialty treating “time-sensitive surgical disease including trauma, emergency general surgery (EGS), and surgical critical care (SCC); 11 of 18 combined trauma and EGS into a single clinical team; 9 of 18 included elective general surgery.....Eight of 18 ACS

teams had scheduled EGS operating room time...13 of 18 shared EGS due to volume, human resources, or competition for revenue. Only 12 of 18 had formal sign out rounds; only 2 of 18 had prospective EGS data registries.....

ACS was described as the “last great surgical service’ reinvigorated to provide ‘timely’, cost-effective EGS by experts in ‘resuscitation and critical care’ and to attract ‘young, talented, eager surgeons’ to trauma/SCC (surgical critical care); however, there was concern that ACS might become the ‘wastebasket for everything that happens at inconvenient times’ ” [40]. The authors gave direct quotations of fascinating opinions of these leaders, expanding on the benefits and challenges of the ACS model (Table 1.1). This paper is an excellent summary of ACS, a required reading for all who want to know about this new model.

In summary, current consensus appears to confirm that the ACS model is one of inclusion rather exclusion. It has to be designed with flexibility, based on local, regional needs and the type of patients and the level of the institution (university, community centres). It may have different identities in different countries. In some, as for example in the university-based centres in the USA, ACS will have all three components (trauma, emergency surgery and surgical critical care). In other countries, ACS may only refer to emergency general surgery, while in still others it may focus on emergency general surgery and trauma. Whatever the wrinkle, it definitely has an impressive role for patient well-being, physician and professional satisfaction and administrative support.

With elective general surgery teams, sub-specialists in surgery, surgically minded intensivists and knowledgeable administrators cheering on, ACS has the potential to dramatically improve the care of emergency surgery and trauma patients and bring broad-based general surgery back to the future., it is worthwhile, however, to keep in mind this admonition from LD Britt [2]: ‘Yes, the “table has been set” but the maturation process must continue and do so on the right trajectory.’

Table 1.1 Benefits and challenges of ACS Santry et al. [40]

Benefits:

Frees up elective surgeon
 Job satisfaction
 Lifestyle
 Increased revenue
 Resident education
 Interest in ACS
 Expedites care
 Critical Care expertise
 Evidence based standards
 Research
 Stand-by help
 Emergency Department satisfaction
 Hospital reputation
 Access to emergency GS care
 Expedited referrals

Challenges:

Not enough manpower
 Poor continuity
 Lack of OR availability
 Intrusion of non-acute care surgeons

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