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<p>Excellent resuscitation requires technical skills and knowledge, but also the right mindset. Expert practitioners must master their internal affective state, and create the environment that leads to optimal team performance. Leaders in resuscitation should use structured approaches to prepare for resuscitation, and psychological skills to enhance their performance including mental rehearsal, positive self-talk, explicit communication strategies, and situational awareness skills. Postevent recovery is equally important. Providers should have explicit plans for recovery after traumatic cases, including developing resilience and self-compassion. Experts in resuscitation can improve their performance (and that of their team) by consciously incorporating psychological skills into their armamentarium.</p>	
Updates in Cardiac Arrest Resuscitation	755
Vivian Lam and Cindy H. Hsu	
<p>There are approximately 350,000 out-of-hospital cardiac arrests and 200,000 in-hospital cardiac arrests annually in the United States, with survival rates of approximately 5% to 10% and 24%, respectively. The critical factors that have an impact on cardiac arrest survival include prompt recognition and activation of prehospital care, early cardiopulmonary resuscitation, and rapid defibrillation. Advanced life support protocols are continually refined to optimize intracardiac arrest management and improve survival with favorable neurologic outcome. This article focuses on current treatment recommendations for adult nontraumatic cardiac arrest, with emphasis on the latest evidence and controversies regarding intracardiac arrest management.</p>	
Postarrest Interventions that Save Lives	771
Alexis Steinberg and Jonathan Elmer	
<p>Patients resuscitated from cardiac arrest require complex management. An organized approach to early postarrest care can improve patient outcomes. Priorities include completing a focused diagnostic work-up to identify and reverse the inciting cause of arrest, stabilizing cardiorespiratory instability to prevent rearrest, minimizing secondary brain injury,</p>	

evaluating the risk and benefits of transfer to a specialty care center, and avoiding early neurologic prognostication.

Fluid Resuscitation: History, Physiology, and Modern Fluid Resuscitation Strategies 783

David Gordon and Rory Spiegel

Intravenous (IV) fluids are among the most common interventions performed in the emergency department. They are at times lifesaving, but if used recklessly can be harmful. Given their ubiquity, it is important to understand the history, physiology, and current strategies that govern the use of IV fluids during the resuscitation of the critically ill.

Emergency Transfusions 795

Michael S. Farrell, Woon Cho Kim, and Deborah M. Stein

Successful emergency transfusions require early recognition and activation of resources to minimize treatment delays. The initial goals should focus on replacement of blood in a balanced fashion. There is an ongoing debate regarding the best approach to transfusions, with some advocating for resuscitation with a fixed ratio of blood products and others preferring to use viscoelastic assays to guide transfusions. Whole-blood transfusion also is a debated strategy. Despite these different approaches, it generally is accepted that transfusions should be started early and crystalloid infusions limited. As hemodynamic stability is restored, endpoints of resuscitation should be used to guide the resuscitation.

Updates in Sepsis Resuscitation 807

Timothy Ellender and Nicole Benzoni

Sepsis care has evolved significantly since the initial early goal-directed therapy (EGDT) trials. Early fluid resuscitation, source control, and antibiotic therapy remain cornerstones of care but overall understanding is more nuanced, particularly regarding fluid selection, vasopressors, and inotropic support. Timely nutrition therapy and ventilatory support tend to receive less attention but also are important. Recent research has explored immunomodulation, β -blockade, and vitamin supplementation. A renewed emphasis on early, aggressive resuscitation reaffirms the importance of emergency medicine providers knowledgeable and skilled in sepsis management.

Pediatric Cardiac Arrest Resuscitation 819

Nathan W. Mick and Rachel J. Williams

Pediatric cardiac arrest is a relatively rare but devastating presentation in infants and children. In contrast to adult patients, in whom a primary cardiac dysrhythmia is the most likely cause of cardiac arrest, pediatric patients experience cardiovascular collapse most frequently after an initial respiratory arrest. Aggressive treatment in the precordial arrest state should be initiated to prevent deterioration and should focus on support of oxygenation, ventilation, and hemodynamics, regardless of the presumed cause. Unfortunately, outcomes for pediatric cardiac arrest, whether in hospital or out of hospital, continue to be poor.

- The Crashing Toxicology Patient** 841
Aaron Skolnik and Jessica Monas
- This article examines, using an organ-systems based approach, rapid diagnosis, resuscitation, and critical care management of the crashing poisoned patient in the emergency department. The topics discussed in this article include seizures and status epilepticus, respiratory failure, cardiovascular collapse and mechanical circulatory support, antidotes and drug-specific therapies, acute liver failure, and extracorporeal toxin removal.
- The Crashing Obese Patient** 857
Sara Manning
- The obesity pandemic now affects hundreds of millions of people worldwide. As obesity rates continue to increase, emergency physicians are called on with increasing frequency to resuscitate obese patients. This article discusses important anatomic, physiologic, and practical challenges imposed by obesity on resuscitative care. Impacts on hemodynamic monitoring, airway and ventilator management, and pharmacologic therapy are discussed. Finally, several important clinical scenarios (trauma, cardiac arrest, and sepsis), in which alterations to standard treatments may benefit obese patients, are highlighted.
- Massive Gastrointestinal Hemorrhage** 871
Katrina D'Amore and Anand Swaminathan
- Massive gastrointestinal hemorrhage is a life-threatening condition that can result from numerous causes and requires skilled resuscitation to decrease patient morbidity and mortality. Successful resuscitation begins with placement of large-bore intravenous or intraosseous access; early blood product administration; and early consultation with a gastroenterologist, interventional radiologist, and/or surgeon. Activate a massive transfusion protocol when initial red blood cell transfusion does not restore effective perfusion or the patient's shock index is greater than 1.0. Promptly reverse coagulopathies secondary to oral anticoagulant or antiplatelet use. Use thromboelastography or rotational thromboelastometry to guide further transfusions. Secure a definitive airway and minimize aspiration.
- Updates in Traumatic Cardiac Arrest** 891
William Teeter and Daniel Haase
- Evaluating and treating traumatic cardiac arrest remains a challenge to the emergency medicine provider. Guidelines have established criteria for patients who can benefit from treatment and resuscitation versus those who will likely not survive. Patient factors that predict survival are penetrating injury, signs of life with emergency medical services or on arrival to the Emergency Department, short length of prehospital cardiopulmonary resuscitation, cardiac motion on ultrasound, pediatric patients, and those with reversible causes including pericardial tamponade and tension pneumothorax. Newer technologies such as resuscitative endovascular balloon occlusion of the aorta, selective aortic arch perfusion, and extracorporeal

membrane oxygenation may improve outcomes, but remain primarily investigational.

Resuscitating the Crashing Pregnant Patient

903

Kami M. Hu and Aleta S. Hong

Care of the critically ill pregnant patient is anxiety-provoking for those unprepared, as the emergency physician must consider not only the welfare of the immediate patient, but of the fetus as well. Familiarity with the physiologic changes of pregnancy and how they affect clinical presentation and management is key. Although some medications may be safer in pregnancy than others, stabilizing the pregnant patient is paramount. Emergency physicians should target pregnancy-specific oxygen and ventilation goals and hemodynamics and should be prepared to perform a perimortem cesarean section, should the mother lose pulses, to increase chances for maternal and fetal survival.

Pearls and Pitfalls in the Crashing Geriatric Patient

919

David P. Yamane

The geriatric population is growing and is the largest utilizer of emergency and critical care services; the emergency clinician should be comfortable in the management of the acutely ill geriatric patient. There are important physiologic changes in geriatric patients, which alters their clinical presentation and management. Age alone should not determine the prognosis for elderly patients. Premorbid functional status, frailty, and severity of illness should be considered carefully for the geriatric population. Emergency clinicians should have honest conversations about goals of care based not only a patient's clinical presentation but also the patient's values.

Current Controversies in Caring for the Critically Ill Pulmonary Embolism Patient

931

Samuel Francis and Christopher Kabrhel

Emergency physicians must be prepared to rapidly diagnose and resuscitate patients with pulmonary embolism (PE). Certain aspects of PE resuscitation run counter to typical approaches. A specific understanding of the pathophysiology of PE is required to avoid cardiovascular collapse potentially associated with excessive intravenous fluids and positive pressure ventilation. Once PE is diagnosed, rapid risk stratification should be performed and treatment guided by patient risk class. Although anticoagulation remains the mainstay of PE treatment, emergency physicians also must understand the indications and contraindications for thrombolysis and should be aware of new therapies and models of care that may improve outcomes.

Extracorporeal Membrane Oxygenation in the Emergency Department

945

Jenelle H. Badulak and Zachary Shinar



Video content accompanies this article at <http://www.emed.theclinics.com>.

Extracorporeal membrane oxygenation (ECMO) is a mechanical way to provide oxygenation, ventilation, and perfusion to patients with severe

cardiopulmonary failure. Extracorporeal cardiopulmonary resuscitation (ECPR) describes the use of ECMO during cardiac arrest. ECPR requires an organized approach to resuscitation, cannula insertion, and pump initiation. Selecting the right patients for ECPR is an important aspect of successful programs. A solid understanding of the components of the ECMO circuit is critical to troubleshooting problems. Current evidence suggests a substantial benefit of ECPR compared with traditional CPR for refractory cardiac arrest but is limited by lack of randomized trials to date.