Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company’s public news and information website.

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With an ever-increasing number of COVID-19 survivors, providers are tasked with addressing the longer lasting symptoms of COVID-19, or post-acute sequelae of SARS-CoV-2 infection (PASC). For critically ill patients, existing knowledge about postintensive care syndrome (PICS) represents a useful structure for understanding PASC. Post-ICU clinics leverage a multidisciplinary team to evaluate and treat the physical, cognitive, and psychological sequelae central to both PICS and PASC in critically ill patients. While management through both pharmacologic and nonpharmacologic modalities can be used, further research into both the optimal treatment and prevention of PASC represents a key public health imperative.

Initial reporting suggested that kidney involvement following COVID-19 infection was uncommon but this is now known not to be the case. Acute kidney injury (AKI) may arise through several mechanisms and complicate up to a quarter of patients hospitalized with COVID-19 infection being associated with an increased risk for both morbidity and death. Mechanisms of injury include direct kidney damage predominantly through tubular injury, although glomerular injury has been reported; the consequences of the treatment of patients with severe hypoxic respiratory failure; secondary infection; and exposure to nephrotoxic drugs. The mainstay of treatment remains the prevention of worsening kidney damage and in some cases they need for renal replacement therapies (RRT). Although the use of other blood purification techniques has been proposed as potential treatments, results to-date have not been definitive.

Patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are prone to venous, cerebrovascular, and coronary thrombi, particularly those with severe coronavirus disease 2019 (COVID-19). The pathogenesis is multifactorial and likely involves proinflammatory cascades, development of coagulopathy, and neutrophil extracellular traps, although further investigations are needed. Elevated levels of D-dimers are common in patients with COVID-19 and cannot be used in isolation to predict venous thromboembolism in people with SARS-CoV-2. If given early in hospital admission, therapeutic-dose heparin improves clinical outcomes in patients with moderate COVID-19. To date, antithrombotics have not improved outcomes in patients with severe COVID-19.
COVID-19 Acute Respiratory Distress Syndrome: One Pathogen, Multiple Phenotypes 505
Susannah Empson, Angela J. Rogers, and Jennifer G. Wilson

Acute respiratory distress syndrome (ARDS) is a heterogeneous syndrome arising from multiple causes with a range of clinical severity. In recent years, the potential for prognostic and predictive enrichment of clinical trials has been increased with identification of more biologically homogeneous subgroups or phenotypes within ARDS. COVID-19 ARDS also exhibits significant clinical heterogeneity despite a single causative agent. In this review the authors summarize the existing literature on COVID-19 ARDS phenotypes, including physiologic, clinical, and biological subgroups as well as the implications for improving both prognostication and precision therapy.

COVID-19 in the Critically Ill Pregnant Patient 521
Matthew Levitus, Scott A. Shainker, and Mai Colvin

Pregnant women are at increased risk for severe coronavirus disease 2019 (COVID-19) and COVID-19-related complications. Their increased risk in conjunction with the normal physiologic changes in pregnancy poses unique challenges for the management of the critically ill pregnant patient. This article will review the initial management of pregnant patients who develop acute hypoxic respiratory failure and subsequent treatment of those that deteriorate to acute respiratory distress syndrome and require advanced therapies. Moreover, fetal monitoring and timing of delivery will be reviewed.

Extracorporeal Membrane Oxygenation in COVID-19 535
Manuel Tisminetzky, Bruno L. Ferreyro, and Eddy Fan

Extracorporeal membrane oxygenation (ECMO) is an intervention for severe acute respiratory distress syndrome (ARDS). Although COVID-19-related ARDS has some distinct features, its overall clinical presentation resembles ARDS from other etiologies. Thus, similar evidence-based practices for its management should be applied. These include lung-protective ventilation, prone positioning, and adjuvant strategies, such as ECMO, when appropriate. Current evidence suggests that ECMO in COVID-19-related ARDS has similar efficacy and safety profile as for non-COVID-19 ARDS. The high number of severe COVID-19 cases and demand for therapies, such as ECMO, poses a unique opportunity to increase the understanding on how to optimize this intervention.

Acute Neurologic Complications of COVID-19 and Postacute Sequelae of COVID-19 553
Neha S. Dangayach, Virginia Newcombe, and Romain Sonneville

Neurologic complications can be seen in mild to severe COVID-19 with a higher risk in patients with severe COVID-19. These can occur as a direct consequence of viral infection or consequences of treatments. The spectrum ranges from non-life-threatening, like headache, fatigue, malaise, anosmia, dysgeusia, to life-threatening complications, like stroke, encephalitis, coma, Guillain-Barre syndrome. A high index of suspicion can aid in early recognition and treatment. Outcomes depend on severity of
underlying COVID-19, patient age, comorbidities, and severity of the complication. Postacute sequelae of COVID-19 range from fatigue, headache, dysosmia, brain fog, anxiety, depression to an overlap with postinvasive care syndrome.

Severe COVID-19 and Multisystem Inflammatory Syndrome in Children in Children and Adolescents

Allison M. Blatz and Adrienne G. Randolph

Severe complications related to COVID-19 occur infrequently in children and adolescents. these life-threatening complications are mainly acute respiratory failure from acute COVID-19 and multisystem inflammatory syndrome in children (MIS-C). MIS-C is a postinfectious complication occurring approximately 3 to 6 weeks mostly after an asymptomatic or mild SARS-CoV-2 infection. For both types of complications, supportive ICU care is often required. For MIS-C critical illness, immunomodulation is prescribed to reverse hyperinflammation and its cardiac and other sequelae.

Review of Anti-inflammatory and Antiviral Therapeutics for Hospitalized Patients Infected with Severe Acute Respiratory Syndrome Coronavirus 2

Jen-Ting Chen and Marlies Ostermann

Severe acute respiratory syndrome coronavirus 2 infection leads to dysregulation of immune pathways. Therapies focusing on suppressing cytokine activity have some success. Current evidence supports the use of dexamethasone in hospitalized patients requiring oxygen to decrease mortality. Interleukin-6 inhibitors, like tocilizumab and sarilumab, are also beneficial in hypoxemic patients, if used early. Janus kinase inhibition in combination with glucocorticoids is emerging as a potential therapeutic option for patients with moderate to severe symptoms. Data on the role of anakinra, hyperimmune immunoglobulin/convalescent plasma, or plasma purification are limited.

High-Flow Nasal Oxygen and Noninvasive Ventilation for COVID-19

Hasan M. Al-Dorzi, John Kress, and Yaseen M. Arabi

High-flow nasal oxygen (HFNO) and noninvasive ventilation (NIV) via facemask or helmet have been increasingly used in managing acute hypoxic respiratory failure (AHRF) owing to COVID-19 with the premise of reducing the need for invasive mechanical ventilation and possibly mortality. Their use carries the risk of delaying intubation and nosocomial infection transmission. To date, most studies on the effectiveness of these modalities are observational and suggest that HFNO and NIV have a role in the management of AHRF owing to COVID-19. Trials are ongoing and are evaluating different aspects of noninvasive respiratory support in patients with AHRF owing to COVID-19.

Critical Care Response During the COVID-19 Pandemic

Samuel Rednor, Lewis A. Eisen, J. Perren Cobb, Laura Evans, and Craig M. Coopersmith

Hospitals and health care systems with active critical care organizations (CCOs) that unified ICU units before the onset of the COVID-19 Pandemic...
were better positioned to adapt to the demands of the pandemic, due to their established standardization of care and integration of critical care within the larger structure of the hospital or health care system. CCOs should continue to make changes, based on the real experience of COVID-19 that would lead to improved care during the ongoing pandemic, and beyond.