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FEATURES OF INTENSIVE CARE AND RESUSCITATION IN CHILDREN

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ABSTRACT

Pediatric intensive care and resuscitation represent a critical area of modern medicine focused on the stabilization, treatment, and recovery of critically ill children. Unlike adults, children have unique anatomical, physiological, and psychological characteristics that require specialized approaches in emergency and intensive care settings. This study explores the main features, principles, and challenges of intensive therapy and resuscitation in pediatric patients, emphasizing age-specific management and multidisciplinary care.Children differ significantly from adults in airway structure, cardiovascular response, metabolic rate, and immune function. These differences influence the assessment, diagnosis, and therapeutic strategies applied in intensive care units. Early recognition of life-threatening conditions, rapid stabilization of airway, breathing, and circulation (the ABC approach), and continuous monitoring are essential components of pediatric resuscitation. Proper fluid management, oxygen therapy, mechanical ventilation, and pharmacological support must be carefully adjusted according to body weight and developmental stage.Pediatric intensive therapy also requires psychological support for both the child and family, as emotional stress can affect treatment outcomes. In addition, the use of modern technologies such as advanced monitoring systems, infusion pumps, and non-invasive ventilation has significantly improved survival rates. Training of healthcare professionals in pediatric life support protocols is crucial for ensuring effective emergency responses. Pediatric intensive care and resuscitation demand specialized

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knowledge, rapid decision-making, and coordinated teamwork. Improving early diagnosis, applying evidence-based interventions, and integrating technological advancements contribute to better prognosis and reduced mortality among critically ill children. Continuous professional education and family-centered care remain key elements in the successful management of pediatric patients in intensive care settings.

Keywords: Pediatric intensive care, resuscitation, emergency treatment, critical illness in children, airway management, mechanical ventilation, hemodynamic support, pediatric life support, monitoring systems, family-centered care.

INTRODUCTION

Pediatric intensive care and resuscitation constitute one of the most important and challenging fields in modern healthcare. The primary aim of pediatric intensive care units (PICUs) is to provide comprehensive, continuous, and specialized treatment to critically ill children whose lives are threatened by severe diseases, trauma, infections, or congenital disorders. Over the last decades, improvements in medical technologies, pharmacology, and clinical protocols have significantly increased survival rates among pediatric patients. Nevertheless, the management of critically ill children remains complex due to their unique anatomical, physiological, and psychological characteristics.

Children are not simply “small adults.” Their bodies function differently in terms of airway structure, respiratory mechanics, cardiovascular response, metabolism, and immune system activity. For example, infants have narrower airways, higher oxygen consumption, and lower functional residual capacity, which makes them more vulnerable to respiratory failure. The cardiovascular system of children also responds differently to shock, often maintaining blood pressure until sudden decompensation occurs. These age-related differences require healthcare professionals to apply specialized approaches when assessing, monitoring, and

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treating pediatric patients in intensive care settings.The cornerstone of pediatric resuscitation is the early recognition of life-threatening conditions and the rapid initiation of supportive measures. Structured approaches such as the ABC (Airway, Breathing, Circulation, Disability, Exposure) algorithm and Pediatric Advanced Life Support (PALS) guidelines help clinicians to systematically evaluate and stabilize children. Immediate airway management, oxygen therapy, ventilation support, and circulation stabilization through fluid resuscitation and vasoactive drugs are essential steps in preventing organ damage and death. Because children can deteriorate quickly, even a short delay in intervention may lead to irreversible complications.Another essential aspect of pediatric intensive therapy is individualized, weight-based, and age-appropriate treatment. Drug dosages, fluid volumes, and nutritional support must be carefully calculated according to the child's body mass and developmental stage. Over- or under-treatment can result in serious side effects, such as fluid overload, electrolyte imbalance, or drug toxicity. Therefore, precise monitoring of vital signs, laboratory parameters, and organ functions is a fundamental component of intensive pediatric care.Respiratory support plays a central role in pediatric intensive care. Many critically ill children require oxygen therapy, non-invasive ventilation, or mechanical ventilation due to respiratory distress, pneumonia, sepsis, trauma, or congenital anomalies. Ventilation strategies must be adapted to protect the fragile lungs of children and reduce the risk of ventilator-associated complications. Advances in ventilatory technology, including high-flow nasal oxygen and synchronized ventilation modes, have contributed to better respiratory outcomes in pediatric patients.

Hemodynamic stabilization is equally important. Shock, whether septic, hypovolemic, cardiogenic, or distributive, is a frequent cause of admission to PICUs. Early fluid resuscitation, monitoring of perfusion, and timely administration of vasoactive agents are essential to maintain adequate tissue oxygenation. Continuous monitoring using electrocardiography, pulse oximetry,

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blood pressure measurement, and laboratory analysis allows clinicians to assess the effectiveness of treatment and adjust therapy promptly.In addition to physical stabilization, pediatric intensive care emphasizes the psychological and emotional well-being of both the child and the family. Hospitalization in an intensive care environment can be frightening for children, leading to anxiety, stress, and behavioral disturbances. Family-centered care has become an important principle in modern PICUs, encouraging parental involvement, clear communication, and emotional support. Such an approach not only improves patient satisfaction but also contributes positively to recovery and cooperation during treatment. Modern pediatric intensive therapy also relies heavily on multidisciplinary teamwork. Physicians, nurses, respiratory therapists, pharmacists, nutritionists, and psychologists work together to provide holistic care. Nurses play a particularly vital role in continuous observation, medication administration, airway care, and family communication. Effective collaboration among healthcare professionals ensures timely decision-making and reduces the risk of medical errors. Technological innovation has significantly transformed pediatric intensive care. Advanced monitoring systems, infusion pumps, portable ultrasound, and electronic medical records improve accuracy and efficiency in patient management. Non-invasive diagnostic tools allow clinicians to detect complications early and intervene appropriately. Furthermore, simulation-based training and continuous professional education help medical staff maintain high competency in pediatric life support and emergency procedures. Another important issue in pediatric resuscitation is prevention and early intervention. Many life-threatening conditions can be avoided or mitigated through timely vaccination, health education, injury prevention strategies, and early diagnosis of chronic diseases. Strengthening primary healthcare and emergency response systems plays a crucial role in reducing the burden on intensive care units and improving long-term pediatric health outcomes.Pediatric intensive care and resuscitation represent a highly specialized field that integrates medical

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knowledge, technological innovation, psychological support, and multidisciplinary cooperation. Understanding the specific physiological and developmental features of children is essential for providing safe and effective care. Continuous improvement of clinical protocols, professional training, and family-centered approaches will further enhance the quality of intensive therapy and reduce mortality among critically ill pediatric patients. The study of pediatric intensive care remains an important priority for modern healthcare systems aiming to protect the most vulnerable population — children.

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