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CARDIOLOGY

PEDIATRIC ELECTROCARDIOGRAM - EASY STEPS TO ANALYSE

***Anita Khalil**

Abstract: *With the development of pediatric emergency, pediatric and neonatal intensive care units, the need for understanding ECG has tremendously increased. Many critical derangements like arrhythmia and electrolyte disturbances have to be recognized and resolved in time without any delay. ECG rhythm plays a vital role in resuscitating a child in cardiac arrest. It also has a small but important role in the initial diagnosis and management of conditions like myocarditis and scorpion sting causing myocardial involvement. A pediatrician working in acute care areas should be familiar with ECG rhythm strip, as pediatric cardiology consultation may not be available at all times and places. Hence, ECG interpretation adds strength to the skills of pediatrician.*

Keywords: *Electrocardiogram, Children.*

An electrocardiogram (ECG) is an investigation which records changes in the electrical activity of the heart and the information provided by the ECG is not readily obtained by any other method. ECG plays an important role in arrhythmia detection and management. It supplements the information required for diagnosis along with clinical examination and chest radiography.

Points to Remember

- *An electrocardiogram (ECG) is the only investigation which records changes in the electrical activity of the heart.*
- *Measurement of heart rate and identification of cardiac rhythm go hand in hand -abnormalities of heart rate can result in arrhythmias.*
- *Main waves on ECGs have been named as PQRST and U. All the waves signify depolarization and repolarization of atria, ventricles and interventricular septum.*
- *ECG of the newborn shows right ventricular dominance due to increased pressures on right side of the heart.*
- *Common ECG abnormalities include atrial and ventricular enlargement or hypertrophy and different types of arrhythmias.*
- *Arrhythmias are rhythm disturbances due to abnormal impulse generation, impulse conduction, block or delay.*
- *Specific ECG changes in some congenital cardiac anomalies are diagnostic - which include TOF, anomalous origin of coronary artery from pulmonary artery, tricuspid atresia and Ebstein's anomaly.*

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CARDIOLOGY

CONGESTIVE CARDIAC FAILURE - CURRENT CONCEPTS IN MANAGEMENT

***Smita Mishra**

Abstract: *Clinical syndrome of pediatric heart failure is a gamut of varied etiologies and treatment options. An infant or child presenting with the cardiac dilatation and dysfunction must be proactively investigated for correctable lesions like-a structural heart disease, rhythm disorders and electrolyte imbalance. Henceforth, the traditional astuteness for clinical diagnosis remains the handy tool of a cost-effective advanced management-plan. Since research has revealed comprehensively, that HF is a catastrophic outcome of metabolic aberrations resulting into oxidative stress at the cellular level owing to the unbalanced compensatory neuro-hormonal mechanism, new therapeutic substrates are being gauged. Moreover, the solitary decongestive therapy is ousted completely and being replaced by the multipronged approach which includes pharmacotherapy, surgical or catheter intervention as well as the devices to provide mechanical support to the cardiorespiratory unit. New genetic tools are being explored through the gene or stem cell therapy as the futuristic but promising modalities. Finally, the modern management of heart failure is about presumptive, supervised target-oriented fine tuning of the available modalities for a patient, starting from the ICU and extending it upto the rehabilitation home care program.*

Keywords: *Heart failure, Children, Congestive, Causes, Diagnostic approach, Inotropes, Beta blockers, ECMO, Ventricular assist devices, Cardiac transplantation.*

Points to Remember

- *The clinical syndrome of HF may result from congenital or acquired disorders of the pericardium, myocardium, endocardium, heart valves, or great vessels or from certain metabolic abnormalities.*
- *The traditional decongestive and inotropy-based management has been replaced by pharmacotherapy based on neurohumoral model of HF bringing in ACEi/ARBs/betablockers/levosimendan as the preferential drugs. The micro and macro-nutritional factors with anti-oxidant property are also related to better outcome.*
- *Very high doses of dopamine and dobutamine must be avoided and rather combination of inotropes must be preferred. Fluid challenges and diuretics must be used with monitoring of CVP and input and output charting.*
- *A meticulous effort has to be made to identify a correctable etiology a timely intervention may lead to complete recovery.*
- *Pulmonary artery banding in DCM is a new modality promised to be an effective alternative therapy.*
- *IVIG and immunosuppressant therapy have limited but beneficial use in some subsets of patients.*
- *Mechanical support and cardiac transplant therapy, are now available in India but cost is an issue and family counselling is very important.*

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CARDIOLOGY

CONGENITAL HEART DEFECTS - NONSURGICAL MANAGEMENT

***Snehal Kulkarni**
** **Tanuja Karande**

Abstract: *Structural heart defects in children are the most common congenital anomalies. Surgery was the only option until few years back. Today, therapeutic catheterization techniques have replaced conventional surgery for many lesions. The percutaneous transcatheter procedures may be broadly grouped as dilations (septostomy, valvuloplasty, angioplasty and endovascular stenting) or as closures (vascular embolization and device closure of defects). With improving hardware and increasing experience and expertise, more and more procedures are being performed with great degree of safety and efficacy. The major advantages of non surgical procedures are avoidance of thoracotomy, cardiopulmonary bypass and scar, along with a shortened period of hospitalization, less post-operative pain and recuperation period.*

Keywords: *Nonsurgical management, Cardiac defect, Congenital.*

Points to Remember

- *Pediatric cardiac intervention is a rapidly advancing field with several new procedures replacing some of the simpler surgeries in congenital heart defects.*
- *A mainstay of interventional congenital cardiology is the use of transcatheter balloon dilation and stenting to relieve vascular stenoses and closure of shunts using various FDA approved devices.*
- *Hybrid pediatric cardiac surgery is an emerging field that combines skills of pediatric cardiac surgeons and interventional pediatric cardiologists.*

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CARDIOLOGY

CARDIOGENIC SHOCK***Arpita Chattopadhyay******Rakesh Lodha**

Abstract: *Cardiogenic shock is defined as a state of acute circulatory failure, leading to reduced cardiac output that is unable to meet the metabolic demands of the body. Apart from congenital heart diseases, other causes of acute heart failure such as primary or secondary cardiomyopathy, several metabolic, infectious and medications or toxin related etiologies may present as cardiogenic shock. Management involves fine tuning oxygen consumption and delivery variables by titrating inotropes, vasopressors, mechanical ventilation and in some cases extra corporeal membrane oxygenation. This article summarizes the pathophysiology, diagnosis and management of a pediatric patient presenting with cardiogenic shock.*

Keywords: *Cardiogenic shock, Myocarditis, Cardiac output, Systolic heart failure.*

Points to Remember

- *Cardiogenic shock is a state of acute circulatory failure due to low cardiac output.*
- *Diagnosis is mainly based on hypotension, signs of pulmonary congestion and features of end organ hypoperfusion.*
- *Management is by optimising oxygen consumption and by titrating inotropes and vasopressors.*

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CARDIOLOGY

EXTRA CORPOREAL MEMBRANE OXYGENATION

***Rajakumar PS**

Abstract: *Extracorporeal membrane oxygenation (ECMO) is a modified cardiopulmonary bypass technique which provides temporary support in severe respiratory and/or cardiac failure due to any reversible cause. Venoarterial ECMO supports both heart and lung function while venovenous ECMO supports lung function alone. Different methods and sites of cannulation are available. Anticoagulation, good intensive care focusing on lung and heart rest, specific therapy for the underlying disease, prevention of infection and meticulous monitoring are essential for the organs to recover before weaning and decannulation are done. Awareness of indications and contraindications is important as patient selection and timing of initiation are crucial for success.*

Keywords: *Extra corporeal membrane oxygenation, Veno venous ECMO, Veno arterial ECMO, Extra corporeal life support.*

Points to Remember

- *ECMO provides lifesaving temporary lung and/or heart support in severe respiratory and cardiac failure due to any reversible cause.*
- *Patient selection and timing of initiation are crucial for successful outcomes.*
- *There is increase in the availability of the service in India and there is good evidence to support the use of ECMO.*
- *Awareness of indications and early discussion with ECMO service provider is very important.*

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CARDIOLOGY

ACUTE MYOCARDITIS AND CARDIOMYOPATHY

***Zulfikar Ahamed M**

Abstract: *Viral Myocarditis continues to be a major cause of mortality and morbidity in children among acquired cardiac causes. Myocardial cell necrosis and inflammation of myocardium, due to both viral invasion and immune mimicry leads to myocarditis. The clinical manifestations range from nearly asymptomatic presentation to fulminant myocarditis. Evaluation includes acute phase reactants, cardiac biomarkers, chest x-ray, ECG and echocardiography. Radionuclide scan, cardiac MRI and endomyocardial biopsy are utilized in selected situations. Treatment of myocarditis is essentially supportive-treatment of heart failure, using diuretic, ACE inhibitors, IV inotropes and mechanical support by mechanical ventilation, ECMO and LVAD. Antiviral agents and immune suppressants have limited role only in treating viral myocarditis. IVIG could be useful in children. The newer vistas in viral myocarditis encompass immunopathology in EMB, use of cardiac MRI in early detection and possible use of drugs which prevent biotransformation to DCM. The prognosis of viral myocarditis is guarded, due to both short term and long term mortality and morbidity.*

Keywords: *Myocarditis, Cardiomyopathy, Management, Children.*

Points to Remember

- *Currently Coxsackie B, adenovirus and human parvo virus are the three leading causes of viral myocarditis.*
- *Dallas criteria is the first and still the foremost histological classification of myocarditis.*
- *The major presentations of myocarditis are recent onset CHF, acute fulminant myocarditis and chest pain syndrome in children.*
- *Remediable causes of 'recent onset' LV dysfunction in infants, such as ALCAPA, undiagnosed CoA, hypocalcemia and scorpion sting should be recognized and treated.*
- *Viral myocarditis can mimic bronchiolitis.*
- *Cardiac biomarkers, AST and ESR are the three most useful blood investigations while echocardiography is the most useful one. Chest x-ray and ECG are abnormal in 90% of cases.*
- *CMR is the most promising imaging modality in recognition and characterization of myocarditis.*
- *Endomyocardial biopsy is utilized only in selected centers.*
- *Mechanical ventilation, ECMO and LVAD are increasingly used to save a life in fulminant myocarditis.*
- *Fulminant myocarditis, even if it has high acute mortality, recover completely once they survive.*
- *Those who present with chest pain syndrome, arrhythmia and fulminant myocarditis have excellent long term prognosis.*
- *Newer modalities of treatment like antiviral agents and immunosuppression have only limited role, though IVIG administration continuous to be popular.*
- *Newer agents which could prevent biotransformation of myocarditis to DCM have to be developed in the future.*

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CARDIOLOGY

APPROACH TO MANAGEMENT OF ARRHYTHMIAS IN CHILDREN

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Abstract: *Arrhythmias are not uncommon in pediatric population and vary in spectrum from benign normal variants to life threatening arrhythmias. Acute management is based on presence or absence of pulse, perfusion and QRS width in ECG. Chronic management aimed at prevention of recurrences is dictated by the specific arrhythmia.*

Keywords: *Narrow complex tachycardia, Wide complex tachycardia, Bradycardia, Supraventricular tachycardia, Ventricular tachycardia, Implantable defibrillator, Pacemaker*

Points to Remember

- *Arrhythmias in children are not uncommon.*
- *Diagnosis is based on the ECG characteristics.*
- *Differentiation of supraventricular from ventricular tachyarrhythmias is essential.*
- *Acute arrhythmias should be treated in pediatric intensive care unit.*
- *Indications for antiarrhythmic drugs are clear cut while some may need implantable defibrillator or pacemaker.*

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CARDIOLOGY

CARDIOVASCULAR ISSUES IN SYSTEMIC CONDITIONS

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Abstract: *Systemic conditions are generally an interdisciplinary challenge in clinical practice. Heart gets directly or indirectly involved by different mechanisms. A cardiovascular history and thorough examination helps to evaluate underlying cardiac dynamics. Diagnostic methods, especially two-dimensional echocardiography is often required, which can be used for screening as well as for the detection of early stages of the disease. In view of a high degree of morbidity and mortality, clinicians in care of these patients should be equipped with knowledge and awareness of cardiac involvement to support the heart and tailor the management of the systemic illness.*

Keywords: *Cardiovascular issues, Systemic conditions*

Points to Remember

- *Heart is affected in most systemic conditions of childhood.*
- *Hypothyroidism in addition to direct effect on heart, affects it indirectly by causing hyperlipidemia and atherosclerosis.*
- *Selective deficiency of thiamine, selenium and calcium can lead to cardiac failure*
- *Cardiac involvement in diphtheria during the second and third week of illness is responsible for 50%-60% of deaths.*
- *Scorpion sting causes cardiac toxicity due to catecholamine surge.*
- *Commonest drugs causing cardiac toxicity are anthracyclines and other anti metabolites.*
- *A high index of clinical suspicion and timely evaluation to diagnose the underlying cardiovascular involvement is advised to reduce the morbidity and mortality.*
- *Echocardiogram is a non-invasive modality that can aid in detection of subclinical cardiac involvement in appropriate situations.*

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CARDIOLOGY

PEDIATRIC PULMONARY HYPERTENSION - RECENT MANAGEMENT GUIDELINES

***Rani Gera**

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Abstract: *Pediatric pulmonary hypertension (PH) is being diagnosed increasingly due to improved recognition and increased survival of sick children. Pulmonary hypertension is defined as a mean pulmonary arterial pressure greater than 25 mmHg at rest. Though there is improved understanding of pediatric PH management remains challenging. Echocardiography is the noninvasive investigation of choice for initial screening while cardiac catheterisation should be performed at diagnosis before initiation of PH directed therapy, except in critically ill children. The response to treatment in PH is variable in children and hence requires constant monitoring to titrate the treatment to the response.*

Keywords: *Pediatric pulmonary hypertension, Guidelines, Newer therapies*

Points to Remember

- *Pulmonary hypertension in infants and children though rare is associated with significant morbidity and mortality.*
- *Targeted pulmonary vasodilator therapies have demonstrated hemodynamic and functional improvement in children.*
- *Management of pediatric PAH remains challenging as treatment decision are based mainly on results from evidence-based adult studies.*

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GENERAL ARTICLE

DISASTER RELATED INJURIES - PEDIATRIC PERSPECTIVE

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Abstract: *India has long been susceptible to natural disasters because of its distinctive geographic and climatic conditions. Added to this, the changing demography, increasing urbanization, depletion and destruction of environmental resources, pollution, epidemics and pandemic have all intensified disaster risks. Disaster exposure involves not just personal injury but also loss and adversity leading to impact on whole communities with the pediatric population being the most vulnerable. However data available on the management and helping the kids cope with disaster are meager. This article deals with the short and long term consequences of disaster related illnesses, injury and perceived needs of care especially among pediatric population and management of crush injuries.*

Keywords: *Disaster, Injuries, Post traumatic stress, Crush injuries.*

Points to Remember

- *Disaster is any catastrophic event either natural or manmade with the potential to affect lives of many.*
- *Pediatric population being more vulnerable they are required to be supervised by adults.*
- *The burden of disaster related injuries amongst children is difficult to quantify.*
- *Disasters may result in a wide array of consequences.*
- *For any disaster always make a disaster preparedness plan.*
- *Triage and aggressive initial management could save the lives of many.*
- *During rehabilitation special emphasis needs to be on psychosocial support.*

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DRUG PROFILE

PHARMACOTHERAPY OF HEART FAILURE

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Abstract: *Heart failure in children can have a wide range of etiologies that range from congenital to acquired causes and the presentation also varies in different clinical settings. Most of the guidelines in children are based on adult literature. Safety profile and drug dosages also vary according to the age and underlying pathophysiology. A systematic review of the commonly used drugs in heart failure is given in this article.*

Keywords: *Heart failure, Diuretics, Inotropes*

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SURGERY

LAPAROSCOPY IN PEDIATRICS

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Abstract: *Minimally invasive surgery offers many advantages such as smaller incisions, greater surgical precision, decreased risk of infection, reduced length of stay and decreased cost of care. Considering these benefits, it ought to be the standard of care for infants and small children. In this review, recent progress in minimally invasive surgery and the challenges which can be tackled are described.*

Keywords: *Minimally invasive surgery, Laparoscopy, Appendicectomy, Thoracoscopy*

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CASE REPORT**LOWER GASTROINTESTINAL BLEED -
A RARE CAUSE**

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Abstract: *Vascular malformations (VM) are rarely seen in children and clinical manifestations depend on site involved. Labia majora is the most common site of vascular malformations of pelvic region and less common sites include rectum, vagina, uterus and bladder. We report a girl with rectal bleed secondary to vascular malformation.*

Keywords: *Arteriovenous malformation, Hemangioma, Rectal bleed, Children*

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