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HOMOEOPATHYARENA

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Multisystem Inflammatory Syndrome In Children

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Introduction

Multisystem inflammatory syndrome in children (MIS-C), also called pediatric multi-system inflammatory syndrome temporally related to SARS CoV-2, is a potentially serious illness in children that appears to be a delayed, post-infectious complication of covid-19 infection. MIS-C has varied symptoms that affect several organs and systems in the body. Many children have symptoms resembling toxic shock syndrome or Kawasaki disease, in which the coronary arteries enlarge or form aneurysms. Also common are heart inflammation with impaired heart function and low blood pressure, rash or red eyes, and gastrointestinal symptoms. These symptoms can occur in different combinations.

Etiology

The cause of MIS-C is not yet fully understood. Some researchers suspect that MIS-C is caused by a
delayed immune response to the corona virus that somehow goes into overdrive, causing inflammation that damages organs. It's also possible that the antibodies children make to the virus, or some of their immune cells, are creating the illness. Since only a small number of children develop MIS-C, it is possible that there are genetic factors that make some children susceptible.

Clinical features

Symptoms of MIS-C may vary from child to child. The main symptoms to watch for are a persistent fever (lasting more than 24 hours and usually present for several days), your child appearing fatigued and ill, rash, red eyes, abdominal pain, vomiting, diarrhea, or loss of appetite or not drinking enough fluids.

Specific features of MIS-C may include:

- Skin/mucous membrane signs and symptoms: Rash, bloodshot eyes, swollen or red hands and
  feet, inflamed mucous membranes in the mouth, cracked lips, and a swollen tongue that looks like a strawberry.
- Symptoms and signs of shock or heart problems, such as cold, clammy skin, very low blood
  pressure, difficulty breathing, severe shortness of breath with exertion, dizziness or light
  headedness, and a very high heart rate or irregular heartbeat.
- Gastrointestinal symptoms: diarrhea, vomiting, or abdominal pain.
- Respiratory symptoms such as cough and shortness of breath.
- New neurologic symptoms, such as headache, neck pain, confusion, numbness/tingling in the
  hands and feet, or seizures.

Diagnosis

Currently, MIS-C is diagnosed based on history(testing positive for covid-19) and symptoms (persistent fever and dysfunction of one or more organs, such as the heart or gastrointestinal system), together with laboratory tests to look for signs of inflammation in the body.

Testing could include the following imaging tests:

- Echocardiogram
- Chest X-ray
- Abdominal ultrasound
- CT scan

Differential Diagnosis

- Kawasaki disease
- Toxic shock syndrome

Management

Children with MIS-C are treated in a hospital. Some need treatment in a pediatric intensive care unit.

Treatment is supportive care and efforts to lower inflammation in any affected vital organs to protect
them from permanent damage.

Supportive care may include:

- Fluids.
- Oxygen to help with breathing.

- Blood pressure medicines to treat low blood pressure related to shock or to help with heart function.
- Ventilator.
- Medicines that lower the risk of blood clots, such as aspirin or heparin.
- In very rare cases, extracorporeal membrane oxygenation (ECMO) using a machine that does the work of the heart and lungs.

Treatment to limit swelling and inflammation may include:

- Antibiotics.
- Steroid therapy.
- Intravenous immunoglobulin (IVIG).
- Other types of treatment, such as targeted therapies aimed at lowering high levels of proteins called cytokines, which can cause inflammation.

Prevention

The best way to prevent MIS-C is to protect a child from a COVID-19 infection.

- Getting vaccinated for COVID-19.
- Wearing a face mask.
- Avoid touching eyes, nose and mouth to prevent the spread of germs.
- Washing hands often with soap and water.
- Avoiding close contact.
- Clean and sanitize frequently touched surfaces and objects.

Prognosis

Most children diagnosed with MIS-C make a complete recovery. It can be life-threatening and severe in rare cases. Research is still ongoing to learn if there are any long-term side effects.

EMBRYOLOGY OF HUMAN HEART AND IT'S CORRELATED CONGENITAL ANOMALIES WITH SCOPE OF HOMOEOPATHIC REMEDIES

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INTRODUCTION

The embryology of the human heart is a complex and highly coordinated process that involves the development of multiple cell types, tissues, and organs. The cardiovascular system is one of the first body systems to appear within the embryo. The vascular system appears in the middle of the third week, when the embryo is no longer able to satisfy its nutritional requirements by diffusion alone. Initially, simple diffusion of necessary nutrients is sufficient but eventually becomes inadequate to supply oxygen and nutrients. Cardiac development is a complicated interplay of molecular communication, ensuring the proper formation of structures and spatial configuration changes in the appropriate timing. Interference with this process, whether genetic or environmental, leads to the formation of congenital heart diseases. The heart is mesodermal in origin. The heart begins to develop near the head of the embryo in a region known as Cardiogenic Arch. Cardiogenic cords develop lumen between them and are called endocardial tubes. Two tubes migrate together and fuse to form a single primitive heart tube. Progenitor heart cells lie in the epiblast, immediately adjacent to the cranial end of the primitive streak. From there, they migrate through the streak and into the splanchnic layer of lateral plate mesoderm where they form a horseshoe-shaped cluster of cells called the primary heart field (PHF) cranial to the neural folds . A congenital heart defect (CHD) results when the heart, or blood vessels near the heart, don't develop normally before birth. Such defects result when a mishap occurs during heart development soon after conception, before the mother is aware that she is pregnant.

There are several categories of possible childhood heart problems:- defects from faulty embryo development, misplaced structures, structures that don't develop properly and heart rhythm disturbances. Congenital heart defects range in simple to severe problems, such as "holes" between chambers of the heart, to very severe malformations, for example the complete absence of one or more chambers or valves.

CHDs affect nearly 40,000 births per year. Children with simple defects survive into adulthood. Although exercise capacity may be limited, most people lead normal lives. With more complex problems, limitations are common. Some children with congenital heart defects have developmental delay or other learning difficulties.

Here's an overview of the major stages and events:-

Early Heart Development (Weeks 3-4)

1. Cardiac progenitor cells : These cells differentiate from the splanchnic mesoderm and migrate to the anterior part of the embryo.

2. Heart tube formation : The cardiac progenitor cells form a linear heart tube, which is composed of an inner endocardial layer and an outer myocardial layer.

Heart Tube Looping (Weeks 4-5)

1. Heart tube elongation: The heart tube elongates and begins to loop, forming an S-shaped structure.

2. Rightward looping: The heart tube loops to the right, establishing the right-sided position of the heart.

Chamber Formation (Weeks 5-8)

1. Atrioventricular canal formation : The heart tube divides into four chambers: the left and right atria, and the left and right ventricles.

2. Septation : The atrioventricular canal is divided by the formation of the atrioventricular septum.

3. Ventricular septation : The ventricular septum forms, separating the left and right ventricles.

Valve Formation (Weeks 6-8)

1. Atrioventricular valve formation: The atrioventricular valves (mitral and tricuspid) form from the endocardial cushions.

2. Semilunar valve formation: The semilunar valves (aortic and pulmonary) form from the outflow tract.

Outflow Tract Development (Weeks 7-8)

1. Outflow tract formation : The outflow tract forms from the conotruncal region of the heart tube.

2. Aorticopulmonary septation : The outflow tract is divided into the aortic and pulmonary trunks.

Coronary Vasculature Development (Weeks 8-10)

1. Coronary artery formation : The coronary arteries form from the epicardial layer of the heart.

2. Coronary vein formation : The coronary veins form from the sinus venosus.

Fetal Heart Development (Weeks 10-38)

1. Heart growth and maturation : The heart continues to grow and mature, with the development of the conduction system and the formation of the cardiac skeleton.

There are several congenital heart defects that can occur due to abnormalities during heart development:-

1. **Aortic Valve Stenosis (AVS)** - The aortic valve is narrowed, restricting blood flow from the heart.

Aortic stenosis symptoms (progressing from less severe to more severe) include:-

- Fatigue
- Heart palpitations
- Swelling in your feet, ankles or lower legs.
- Chest pain (feels like squeezing, pressure or discomfort and can extend to the neck, jaw, arm or abdomen)
- Shortness of breath.
- Dizziness, lightheadedness or fainting.

2. **Atrial Septal Defect (ASD)**- An atrial septal defect is a hole in the atrial septum, which is the wall that separates the heart's two upper chambers (atria). An ASD is a congenital heart defect that happens when the septum doesn't form properly. It's also called a "hole in the heart."

Symptoms:-

- Being underweight
- Growth delays
- Recurrent respiratory infections
- Arrhythmias
- Easily becoming fatigued when exercising
- Trouble breathing.

3. **Coarctation of the Aorta (CoA)**- A narrowing of the aorta, the main artery carrying blood from the heart.

Symptoms in infants include:-

- Fast pulse
- Fatigue
- Gray or pale skin
- Heavy sweating
- Irritability

4. **Complete Atrioventricular Canal defect** (CAVC) - A large hole in the center of the heart affecting all four chambers where they normally divide.

5. **Transposition of the Great Arteries** - The aorta and pulmonary artery are switched, leading to poor oxygen circulation.

Transposition of the great arteries (or vessels) is a rare issue where the main arteries that move blood out of the heart are in the wrong places. They also connect to the heart in the wrong places. It's a congenital (present at birth) condition.

The two reversed (transposed) arteries are:

- The main pulmonary artery, which carries blood into the lungs.
- The aorta, the artery that carries blood from the heart to the rest of the body.

Types of Transposition of the Great Arteries

a) Levo-Transposition (l-TGA) type
b) Dextro-Transposition (d-TGA) type

A baby may be more likely to be born with TGA if, during pregnancy, :

- Had gestational diabetes.
- Had rubella (German measles).
- Were exposed to certain pesticides or herbicides.
- Took certain antiseizure medications.

Symptoms of TGA includes:-

Newborns with d-TGA have symptoms of cyanosis (low oxygen) and may also have heart failure. Transposition of the great arteries symptoms include:

- Trouble breathing.
- Weak pulse.
- Difficulty feeding.
- Pounding heart.
- Skin or whites of their eyes appear bluish (in light-skinned babies) or grayish (in dark-skinned babies).

6. **Ebstein's Anomaly** - It is a rare heart defect in which parts of the tricuspid valve are abnormal.

Symptoms:-

- Rapid breathing.
- Shortness of breath.
- Slow weight gain.
- Swelling (edema) of the legs, abdomen or area around the eyes.

7. **Hypoplastic Left Heart Syndrome** - The left side of the heart is underdeveloped, causing severe heart problems.

8. **Patent Ductus Arteriosus (PDA)** - A blood vessel (ductus arteriosus) between the aorta and pulmonary artery fails to close after birth. Symptoms:-

- Rapid breathing.
- Shortness of breath (dyspnea).
- Sweating during feedings.

- Fatigue or tiredness.
- Feeding and eating problems.
- Poor weight gain or growth.
- Fast pulse or heart rate.

9. **Pulmonary Atresia** - The pulmonary valve is absent or severely narrowed, preventing blood flow to the lungs.

Pulmonary atresia types

a) Pulmonary atresia with a ventricular septal defect. This opening in the wall (septum) between the right and left ventricles allows oxygen-rich blood to mix with oxygen-poor blood.

b) Pulmonary atresia with an intact ventricular septum. The wall between the left and right sides of the heart is whole (intact).

Symptoms :-

- Rapid breathing.
- A bluish tinge to the skin, especially the lips, fingers and toes.
- Cool, pale or clammy skin.
- Breathing problems.
- Fatigue or tiredness.
- Irritability.
- Poor feeding.

10. **Pulmonary Valve Stenosis** - Pulmonic stenosis is a heart valve disorder that involves the pulmonary valve.

This is the valve separating the right ventricle (one of the chambers in the heart) and the pulmonary artery. The pulmonary artery carries oxygen-poor blood to the lungs. Stenosis, or narrowing, occurs when the valve cannot open wide enough and blood flows less easily to the lungs.

Causes- Narrowing of the pulmonary valve is present at birth. It is caused by a problem that occurs as the baby develops in the womb before birth. Narrowing that occurs in the valve itself is called valvular pulmonic stenosis. There may also be narrowing just before or after the valve.The defect may occur alone or with other heart defects that are present at birth. The condition can be mild or severe.Pulmonic stenosis is a rare disorder. In some, the problem runs in families.

Symptoms:-

- Abdominal distention
- Bluish color to the skin (cyanosis) in some people
- Poor appetite
- Chest pain

- Fainting
- Fatigue
- Poor weight gain or failure to thrive in infants with a severe blockage
- Shortness of breath
- Sudden death

11. **Single Ventricle Defects** - It is a congenital heart defect where one of the heart's pumping chambers is not strong enough or large enough to pump blood effectively.

12. **Tetralogy of Fallot** - A complex condition involving four heart defects: ventricular septal defect, pulmonary stenosis, overriding aorta, and right ventricular hypertrophy.

Tetralogy of Fallot symptoms depend on how much blood flow is blocked from leaving the heart to go to the lungs. Symptoms may include:

- Blue or gray skin color.
- Shortness of breath and rapid breathing, especially during feeding or exercise.
- Trouble gaining weight.
- Getting tired easily during play or exercise.
- Crying for long periods of time.
- Fainting.

Tet spells - Some babies with this suddenly develop deep blue or gray skin, nails, and lips. This usually happens when the baby cries, eats or is upset. These episodes are called tet spells.

13. **Total Anomalous Pulmonary Venous Connection (TAPVC)** - The pulmonary veins, which normally carry oxygenated blood from the lungs to the heart, connect to the wrong part of the heart.

14. **Tricuspid Atresia** - The tricuspid valve is absent or severely narrowed, preventing blood flow from the right atrium to the right ventricle.

15. **Truncus Arteriosus** - There is one large artery instead of two separate arteries (aorta and pulmonary artery) arising from the heart.

16. **Ventricular Septal Defect (VSD)** - A ventricular septal defect (VSD) is a hole in the wall between the two lower chambers (ventricles) of your child’s heart. A VSD from an incomplete wall can allow oxygen-rich blood from one side of the heart to mix with oxygen-poor blood from the other.

There are four main types of ventricular septal defects. They differ in their location and the structure of the hole (or holes). The types of VSDs are:

- **Membranous.** This is the most common type of VSD. These VSDs happen in the upper section of the wall between your ventricles.

- **Muscular.** These happen in the lower part of the wall. With this type, there's often more than one hole.
- **Inlet**. This is a hole just below the tricuspid valve in your right ventricle and the mitral valve in the left ventricle. When blood enters the ventricles, it must pass a VSD that connects them.
- **Outlet**. This kind of VSD creates a hole just before the pulmonary valve in the right ventricle and just before the aortic valve in the left ventricle. Blood has to go by the VSD on its way through both valves.

Symptoms of a VSD

Ventricular septal defect symptoms in a newborn may look like heart failure. These includes

- Shortness of breath, including fast breathing or struggling to breathe
- Sweatiness or fatigue during feeding
- Growth faltering (slow weight gain)
- Frequent respiratory infections

ROLE OF HOMOEOPATHY IN CHD

Homeopathy provides a holistic approach to managing congenital diseases by stimulating the body's natural healing mechanisms. Homeopathic treatments focus on uncovering and addressing the root causes. In cases of congenital diseases, it involves examining the pregnancy timeline to identify disruptions in fetal development.

Homeopathy considers the specific periods during pregnancy when developmental issues may have occurred. Through a thorough evaluation, stressors or underlying factors impacting organ formation are identified. Tailored homeopathic remedies are then prescribed to address these disruptions, promoting overall well-being and recovery.

HOMOEOPATHIC MEDICINES IN CHD

1. Latrodectus: This homeopathic remedy used for heart disease with symptoms of precordial pain in the body.

2. Aurum metallicum: Aurum metallicum is used in treating symptoms of weakness in the muscles of the heart. Sensation as if the heart stopped beating for two or three seconds. Palpitaio. Pulse rapid, feeble irregular.

3. Aconitum: Tachycardia. Affection of the heart with pain in the left shoulder. Stitching pain in the chest. Palpitation, with anxiety, fainting, and tingling in fingers. Pulse full, hard ,tense and bounding.

4. Cactus grandiflorus: Endocarditis with mitral insufficiency together with violent and rapid action. Heart weakness of arterio-sclerosis. Tobacco heart. Violent palpitation, worse lying on left side, at approach of menses. Angina pectoris, with suffocation, cold sweat, and ever-presentiron band feeling. Pain in the apex, shooting down left arm. Palpitation, with vertigo.

Constriction; very acute pains and stitches in heart; pulse feeble, irregular, quick, without strength.

5. Crataegus oxyacantha: Cardiac dropsy. Fatty degeneration. Aortic disease. Extreme dyspnoea on least exertion, without much increase of pulse. Pain in the region of the heart and under the left clavicle. Pulse irregular, feeble, intermittent.

6. Digitalis: The least movement causes violent palpitation, and sensation as if it would cease beating, if he moves (Opposite; Gels). Frequent stitches in heart. Irregular heart, especially mitral disease. Very slow pulse. Pulse weak, and quickened by least movement. Pericarditis. Dilated heart, tired, irregular, with slow and feeble pulse. Hypertrophy with dilatation. Cardiac failure following fevers. Cardiac dropsy.

7. Kalmia latifolia: Weak, slow pulse. Fluttering of heart, with anxiety. Palpitation; worse leaning forward. Gouty and rheumatic metastasis of heart. Tachycardia, with pain . Tobacco heart. Dyspnśa and pressure from epigastrium toward the heart. Sharp pains take away the breath. Shooting through chest above heart into shoulder-blades. Frequent pulse. Heart's action is tumultuous, rapid and visible. Paroxysms of anguish around the heart.

8. Glonoinum: Laborious action. Fluttering. Palpitation with dyspnśa. Cannot go uphill. Any exertion brings on a rush of blood to heart and fainting spells. Throbbing in the whole body to finger-tips.

CONCLUSION

Congenital heart disease (CHD), a significant cause of morbidity and mortality in children, necessitates early diagnosis and timely intervention to improve quality of life and survival rates. While advancements in surgical and anesthetic techniques have led to increased survival rates, lifelong care and monitoring are often required.

Advanced parental age, bad obstetric history, febrile illness during pregnancy, and a folic acid-deficient diet have been associated with an increased risk of CHD.

Injudicious use of drugs during pregnancy should be avoided.

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