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CASE STUDY ON UNIVENTRICULAR HEART DISEASE

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Abstract:
Univentricular heart is the word that defines the defect existing from birth which is delicate to restoring the ventricles. The high mortality rates and utilization of medical resources are linked with lacerations. A 24 years male patient was admitted in Public Hospital Lahore with H/O fever, productive cough, pain in epigastric region, worsening of dyspnea. Clinical suspicion of univentricular heart was inveterate by chest x-rays, ECG, Echocardiograph.After that preoperative preparation catheterization done, in catheterization the hemodynamics, systemic and pulmonary venous anatomy,ventricular morphology,function, and pulmonary vascular resistance and abnormal aortopulmonary collateral vessels are measured.Postoperative care was uneventful. It is a genetic disease and is a leading cause of newborns death. If it is recognized earlier it can be pickled (Helbinget, Van der Ven, Van den Bosch & Bogers, 2018).

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INTRODUCTION:

Congenital heart disease is most recurrent syndrome happening in 1 into 40 neonates in Latvia (Rutka, Lubaua, Ligere, Smildzere, Ozolins & Balmaks, 2018).

Single ventricular heart is a deformity of cardiovascular system in which heart is unable to perform systemic and pulmonary circulation with one ventricle.In birth defects mono-ventricular heart has maximum rates of mortality. Many resources and tasks in children are managed with the help of multidisciplinary team.The other examples of cardiac malformations are left heart syndrome, tricuspid valve stenosis, and double-inlet ventricle (Rutka et al., 2018).

Univentricular heart is caused by various genetic components, 3% of univentricular heart is caused by siblings harbored congenital heart disease. The prevalence of communal single ventricle of right ventricular morphology (5%) is larger in siblings than a double inlet left ventricle (0.5%)(Frescura & Thien, 2014).

In case of univentricular heart due to absence of one or presence of two mitral valves the atrium is connected to the one ventricular chamber. In both cases the one ventricle is hypoplastic and the other is large in size.Single ventricular heart is incapable to tolerate the pulmonary, and the systemic circulation.In this disease ventricles are not quick to respond for the biventricular restoring work (Frescura et al., 2014).

Cardiovascular abnormalities were detected in 19% of siblings with left hypoplastic heart syndrome. Single ventricle inlet, DILV, is a heterogeneous syndrome with a significantly lower risk of transplantation from Mendelian inheritance.In a multi gene model, it is assumed that the phenotype is the result of several genetic linkages with other genes and environmental factors.The risk of siblings and off spring of people with auniventricular heart is 2to 5% (Corno et al., 2015).

Clinical manifestations of monoventricular heart are the occurrence or absence of pulmonary outflow obstruction.Lack of pulmonary stenosis or low pulmonary confrontation there were large signs and symptoms of left-to-right shunting, e .g, congestive heart failure was present. Aortic outflow obstructions can be increased with excessive pulmonary circulation and exacerbation ofcardiac infarction. Some patients have pulmonary venous return to aorta and venous return to pulmonary return. There is a desire for physiological grading of pulmonary constrictions in univentricular heart were present to prevent circulation, and this leads to hypoxia and cyanosis (Corno, 2015).

Two-way bidirectional linkage involves redirecting the vena cava to the pulmonary trunk. Theflow of blood into the heart from peripheral vessels to the pulmonary artery is prevented from passing through the ventricle the Fontan procedure was performed (Erikssen, Aboulhosn, Lin, Liestol, Estensen, Gjesdal & Lindberg, 2018).

The prevalence of this disease varies between 0.08 to 0.4 per 1,000 births worldwide.Single ventricular heart disease caused by various morphological problems, the most common are left hypoplastic heart syndrome (25 to 67%),tricuspid valve stenosis (15 to 24%),and single ventricular heart (14 to 18%). Approximately 22,000 patients in Europe and 50,000 in the United States.It is decreased by Palliation procedures. The sequence of the procedure is performed to eliminate the antagonistic effect of the mono-ventricular heart. In the first operation, by connecting the pulmonary artery to right atrium the ventricle is replaced with the atrium. However, due to low blood flow this palliation procedure generates enlargement of the right atrium leading to arrhythmia and blood clotting.A change within this operation iscalled pulmonary atrial connections (Helbing et al., 2018).

Case Presentation:

A 24 years male patient was admitted in Public Hospital Lahore with H/O hyperthermia, productive cough, pain in epigastric region, dyspnea, on examination the, patient had tachycardia, swelling in the feets and legs, cough, patient had jugular vein distended and abdominal distention contributed to respiratory distress, on palpation displacement of Apical impulse, on auscultation crackles and wheezing sounds due to pulmonary edema, pericardial and pleural effusion, S3 sound is heard at the apex using the bell of the stethoscope. Vital signs are checked.B.P: 110/70, Pulse: 110/m, Temp: 98F, Complete blood count: 9.4%, Blood Sugar Random: 87mg/dl, Urea: 23%, Creatinine: 0.6%, INR: 13.6, APTT: 37, Na+134, K+4.2, Bilirubin: 0.5, ALT: 15, TroponininTHS: 9.89pg/ml, Fibrinogen level plasma: 577mg/dl, HBsAg: Negative, USG abdomen done. ECG shows small R and deep S waves on right and long R waves on left precordial leads, Q waves were absent over left precordial leads and present on right ,II, and IIIprecordial leads, it also shows a right ventricular hypertrophy. ChestX-rays shows that the right ventricle position is modify by ascending aorta

.Echocardiography shows the Intact IAS, single ventricle, and pulmonary stenosis. According to this assessment patient had a univentricular heart.

Due to his illness patient's health perception and health management pattern is disturbed because due to illness his daily activities has disturbed and he said that his illness should be treated as early. Nutritional and metabolic pattern is also disturbed because he cannot take proper diet due this reason he note that his weight has loss. Self-perception and self-concept pattern is also disturbed because he and his family were worried about his illness. Sleep rest pattern is disturbed due to his illness because his cannot sleep properly.

According to these assessment patterns patient was prepared for cardiac catheterization with association of cardiologist and anesthesiologists. Catheterization done after the bed arranged in ICU for post-operative care. Through this procedure the hemodynamics, pulmonary venous anatomy, ventricular-arterial connection, pulmonary vascular resistances are measured. After catheterization patient was shifted to ICU for post-operative care. Postoperative care recovery was monotonous and patient was discharged on 9th post-operative day.

Physiology of the Single ventricular heartdepends on the obstruction of the blood flow through the pulmonary vein. Due to obstruction the person is dependent on right-to-left shunting to maintain systemic output. Blood is mixing within atrial and ventricular chamber and is ejected through the pulmonary valve to systemic vascular beds. The flow of blood is dependent on left to right shunting through a ductus arterious in pulmonary obstruction. Due to obstruction pulmonary hypertension may results (Ishigami, Ohtsuki, Eitoku, Ousaka, Kondo & Horio, 2017).

Inj heparin infusion in 100ml n/s i/v x State.Inlanoxin 500mg i/v x O.D,Injcalmox 600mg i/v x TDS,Inj levofloxacin 500 i/v x O.D,Cap omega 40mg p/o x O.D,Tab Neo-K 500mg p/o x B.D, Inj Lasix 20mg i/v x B.D,Tabnoclot 75mg p/o x O.D, Tab Disprin 300mg p/o x O.D, Nebulization Q.i.d.

Nursing considerations: Educate the patient about health hygiene, advise the patient to take flow up and full course of treatment, advise the patient to take heart healthy diet including sodium control, and fluid restrictions.

DISCUSSION:

Univentricular heart contains one or a large dominant ventricle and atrioventricular valves with an opposing ventricle. Itis characterized by defects such as ventricular hypoplasia, Av valve atresia.At the ventricular and atrial level the monoventricular heart is marked by absolute arterial and venous circulation, then output is distributed to the systemic and pulmonary beds through the ventricle. Onconsequence the output of ventricle is the sum of pulmonary flow. The distribution of the arterial and venous blood flow depends on the comparative resistance in two parallel circuits, and oxygen saturation is similar in the aorta (Rutka et al., 2018)

According to the potential function and morphology of the hypoplastic ventricle surgical repair of the functionally univentricular heart is done. In some cases a biventricular is performed when the size of the ventricles is enlarged, in other cases one and half ventricle is repaired. Only a ventricular repair is performed when one ventricle is deficient in dysfunction (Menicanti, Castelveccio, Ranucci, Frigiola, Santambrogio, De Vincentiis & Di Donato, 2017).

The patient with single ventricular heart is marked by a whole mixture of arterial and venous circulation at the ventricular level. After noninvasive imaging failure, for the arterialdistortion, pulmonic vascular confrontationcount, and to identify the abnormal aortopulmonary collateral vessels cardiac catheterization can be performed (Bacher, Bogaert, Lapere, De wolf & Thierens, 2015).

Superior cavopulmonary or two-way Glenn shunt for treat the mono-ventricular heart is performed. In this procedure Obstruction of the pulmonary arterial tree was corrected. For separation of systemic and pulmonary circulation in single ventricular heart Fontan procedure is performed (Lewis, Thorne, Clift & Holloway, 2017).

Norwood is a procedure for the treatment of mono-ventricular heart, which is consist of Norwood Phase I and II. Permanent systemic outflow, and unclogged venous return of right ventricle, and temporary pulmonary blood supply for the growth and progressionof pulmonary vasculature Norwood stage-I is performed. The second phase of the Norwood consists of a two-way Glenn shunt, hemi-Fontan, and the closing of the Blalock Taussing. The second stage of Norwood completes the total Fontan cavopulmonary from the inferior vena cava to the pulmonary artery (Ghanayem, Allen, Tabbutt, Atz, Clabby, Cooper & Kaltman, 2017).

CONCLUSION:

Mono-ventricular refers to a wide variety of rare and complex congenital heart defects that leave most of the atrial ventricular septum. Although most patients are managed by a staged procedure due to final Fontan procedure, the minority will not expose to Fontan palliation because they maintain systemic and pulmonary circulation under negative hemodynamics.In surgically palliated patients a mono-ventricular heart is managed through cardiovascular physiology, anatomic variants appreciation, cyanotic heart repercussion, and post-operative sequelae. Follow multi-disciplinary teams with experience in all aspects of congenital heart disease needed for optimal patient care (Rutka et al., 2018).

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