

N433 Care Plan

Tetralogy of Fallot

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Pathophysiology of the Tetralogy of Fallot, APA format (20 points):

Tetralogy of Fallot (ToF) is a rare combination of four heart defects that are present at birth. (Mayo Clinic,2018) This congenital disease affects the structure of the heart causing poorly oxygenated blood to flow out of the heart and into the rest of the body. The four heart defects that make this up include pulmonary valve stenosis, overriding aorta, ventricular septal defect, and right ventricular hypertrophy. These defects can cause other problems with circulation damaging body on a cellular level starting with the heart itself. If the heart does not receive oxygen it can cause an MI (Hinkle and Cheever, 2017). If the heart is damaged it can then cause problems with other systems directly connected to the heart such as the lungs. If the heart begins to have trouble the pulmonary system soon follows. There are times ToF may not be detected until later in life as an adult depending on the severity of the symptoms.

Tetralogy of Fallot have **signs and symptoms** that depend on the extent of blood flow obstruction. These S&S include cyanosis, shortness of breath, clubbing of fingers and toes, poor weight gain, tiring easily during play, irritability, prolonged crying, and heart murmurs. (Mayo Clinic, 2018). A preventative nursing actions to a couple of these complications include putting client in a high fowlers position upon dyspnea. Another nursing action one may use with these signs and symptoms being a complication are administration of oxygen if needed to promote the circulation of oxygen. **Expected findings** correlate to this directly. Some of these expected findings include difficulty breathing, bluish discoloration of the skin, passing out or seizures, weakness, or unusual irritability. The bluish discoloration is a lack of circulation. This may lead to a lower oxygen saturation.

The **diagnosis** is completed by the baby's cardiologist who will complete a physical examination and several tests such as echocardiography, electrocardiogram, chest x-ray, oxygen

level measurement (pulse oximetry), or cardiac catheterization. (Mayo Clinic, 2018). The only **treatment** that is effective is surgical repair or a temporary procedure that uses a shunt. The surgery is intracardiac repair an open-heart surgery usually done within the first year of birth. Adults may undergo this surgery if they never did as a child.

Pathophysiology References (2) (APA):

Mayo Clinic. (2018, March 9). *Tetralogy of Fallot - Symptoms and*

causes. <https://www.mayoclinic.org/diseases-conditions/tetralogy-of-fallot/symptoms-causes/syc-20353477>

Hinkle, J. L., & Cheever, K. H. (2017). *Brunner & Suddarth's textbook of medical-surgical nursing*. LWW.

Diagnostic Imaging

All Other Diagnostic Tests (5 points): Echocardiography, Electrocardiogram, Chest X-ray, pulse oximetry, Cardiac catheterization

Diagnostic Test Correlation (5 points): Echocardiography – uses high pitched sound waves to produce an image of the heart (generally used to determine if there is a ventricular septal defect) Electrocardiogram – records electrical activity to see if the heart is pumping the way that it should be. Chest X-ray – shows the structure of heart and lungs. The heart is usually “boot-shaped” because the right ventricle is enlarged.

Diagnostic Test Reference (APA):

Mayo Clinic. (2018, March 9). *Tetralogy of Fallot - Diagnosis and treatment - Mayo*

Clinic. <https://www.mayoclinic.org/diseases-conditions/tetralogy-of-fallot/diagnosis-treatment/drc-20353482>

Current Medications (10 points)

****Complete ALL of your patient's medications****

Brand/Generic	Digoxin	Morphine
Frequency	BID	Q4 hours PRN
Route	PO	IV
Classification	antiarrhythmic	Analgesic
Mechanism of Action	Increases force and velocity of myocardial contraction	Binds and activates opioid receptors
Reason Client Taking	Improve cardiac output.	pain
Safe Dose Range Calculation	25mcg/kg to 35mcg/kg	0.01 to 0.206 mg/kg/hr
Maximum 24-hour Dose	@ 7lb 6oz or 3,345g 115.5 mcg in 24 H	@ 44 lbs or 20kg 98.88 mg in 24 H
Contraindications (2)	Hypersensitive carotid sinus syndrome, ventricular fibrillation, and v tach	Respiratory depression, upper airway obstruction, acute bronchial asthma in unmonitored setting
Side Effects/Adverse Reactions (2)	Confusion, arrhythmias	Amnesia, confusion, bradycardia, cardiac arrest
Nursing Considerations (3)	Not recommended in clients with heart failure, expect to treat underlying thiamine deficiency, monitor client for signs of digitalis toxicity	Use in caution in clients with hypoxia, use caution for clients with carbon dioxide retention, use cautiously in clients who may undergo surgery
Client Teaching needs (2)	Emphasize importance of taking exactly as prescribed, teach to take at same time every day	Take exactly as prescribed, avoid alcohol, explain drug may be addictive, tell patient to alert all prescribers of morphine use in case of drug-drug interactions.

Medication Reference (APA):

Learning, J. &. (2018). *2019 nurse's drug handbook*. Jones & Bartlett Learning.

Nursing Diagnosis (15 points)

Must be NANDA approved nursing diagnosis and listed in order of priority

Nursing Diagnosis <ul style="list-style-type: none"> Include full nursing diagnosis with “related to” and “as evidenced by” components 	Rationale <ul style="list-style-type: none"> Explain why the nursing diagnosis was chosen 	Intervention (2 per dx)	Evaluation <ul style="list-style-type: none"> How would you evaluate the nursing intervention?
1. Potential for hemorrhage related to surgery as evidenced by surgical implementation of cardiac cath or surgical repair	There are many things to look for in a post-operative patient. Hemorrhage is a very serious possible consequence of surgery	1. inspect dressing on site at frequent intervals and report findings. 2. Assess for and report diminished or absence of distal pulses, delayed cap refill, coolness of extremities, or pallor	Hemorrhage or shock requires early recognition of problems for proper intervention. The client will maintain comfortable position to reduce pain and promote healing after a surgery is performed.
2. Decreased tissue perfusion related to heart failure as evidenced by cyanosis	It is imperative to ensure the body has enough oxygen supply for the entire body. If the body does not have what it needs it will cause more complications later in life.	1. The nurse will monitor vital signs and continuously monitor heart rhythm and function. 2. Monitor lab tests such as CBC, Na levels, and serum creatinine for dehydration or fluid retention.	The desired outcome is to have a BP within the expected range and the absence of the 6 P’s pain, pallor, pulselessness, paresthesia, poikilothermia (coolness), and paralysis.
3. Fatigue with decreased exercise tolerance related to decreased	When you have a decrease in cardiac output the flow of oxygen to the tissues and muscles are	1. Assess vitals at frequent intervals and be alert to any changes 2 Assist with	Heart rate increases when the demands of the body are not being met. The client should maintain normal vitals throughout the day to show that

<p>cardiac output as evidenced by clients heart rate.</p>	<p>restricted causing the client to feel tired.</p>	<p>exercises, medical interventions, and treatments to provide adequate rest periods between care activities</p>	<p>treatment is working. The client will accept help from the staff to provide proper care and treatment.</p>
<p>4. Knowledge deficit related to lack of exposure as evidenced by Tetralogy of Fallot</p>	<p>Tetralogy of Fallot is not a commonly known disease in the public. This is a new disease to the individual effected and to the family</p>	<p>1. Assess motivation and willingness to learn. 2. Educate on Tetralogy of Fallot and explain how it effects individuals in everyday life.</p>	<p>Client will be excited to learn more about the disease and process to help guide their care in the correct direction. Learning requires energy and desire. If you want to learn about something you must put time and effort into research.</p>

Other References (APA):

Discussion Questions: Congenital Heart Defect Case Study

1. Prior to reviewing the case study, what did you know about congenital heart defects?

I have only ever heard of congenital heart disease. Although knowing a defect is usually something a person is born with, then, we can understand that this is a heart defect in children. I have a cousin who recently had a child, but she is high risk due to a blood disorder that she had received from her father’s genes. This is different that Tetralogy of Fallot, but it is the only personal link that I have to this disease.

2. What are the 4 congenital heart defects associated with Tetralogy of Fallot?

The four heart defects associated with Tetralogy of Fallot include pulmonary valve stenosis (a narrowing or obstruction involving the pulmonary flow), overriding aorta (the aortic outflow tract does not have a well-developed pulmonary outflow tract to balance

against in utero) , ventricular septal defect (a hole in the septum that separates the two lower chambers of the heart's ventricles – this allows a mix of oxygenated blood fresh from the lungs with deoxygenated blood from the body), and right ventricular hypertrophy (develops as the right ventricle attempts to pump against an obstructed or narrowed pulmonary valve). If a client does not have all four of these heart defects they will not be diagnosed with Tetralogy of Fallot.

3. What signs and symptoms are associated with Tetralogy of Fallot?

Cyanosis, shortness of breath, loss of consciousness, poor weight gain, easily fatigued, and irritability are the most common signs and symptoms for those who have Tetralogy of Fallot. Some other associated factors that may cause exacerbation may include anxiety, fever, anemia, or sepsis.

4. Which defect is responsible for the hypercyanotic spells?

Patients diagnosed with Tetralogy of Fallot are at the highest risk for hypercyanotic spell. Cyanosis occurs because the deoxygenated blood on the right side of the heart is unable to get through the area of obstruction in the pulmonary outflow tract, and flows across the ventricular septal defect to the left side of the heart and out to the body.

5. What is the relationship between the blood flow and pulmonary stenosis that contributes to hypercyanotic spells?

The greater the degree of pulmonary stenosis the greater the degree is the more cyanotic the client will be. The more quantity of blood that is being mixed and improperly distributed had a significant effect of how advanced the disease has advanced. The progression of the disease has the greatest impact on the mortality of the disease.

6. What causes hypercyanotic spells?

A cyanotic spell is when a case of cyanosis worsens. Tet spells can also occur in adults. When deoxygenated blood becomes unable to get through the area of obstruction in the pulmonary outflow tract it causes a backup of blood in the heart. Cyanotic spells are linked with hyperpnea and can lead to loss of consciousness. (Sharma, 2018). At times cyanotic spells can even cause hypoxic seizures if the episodes are prolonged and untreated. Some other causes of hypercyanotic spells include anxiety, fever, anemia, sepsis, or it can be spontaneous.

7. What is the initial treatment of a child experiencing a hypercyanotic spell?

The only effective treatment for tetralogy of Fallot is surgical repair of the heart. The surgery will be determined with the most appropriate surgery and the timing will depend on the child's condition. Conventional treatment for tetralogy of Fallot is sedation with morphine. Knee chest position compresses the femoral arteries and veins enhancing the afterload the heart feels. This position reduces the return of desaturated blood from the lower limbs.

8. How is Tetralogy of Fallot corrected?

Surgical fixture involves the closure of ventricular septal defect with Dacron or pericardium and removal of the muscle bundles near the pulmonary valve or right ventricular outflow tract. A research article did a study on the right ventricle of clients who have Tetralogy of Fallot for those who had a pulmonary valve replacement. The authors state, "By evaluation of the RV-PA coupling, the results of our study provide new insights into the RV-PA response to ventricular dilatation which can help in additional understanding for the decline of RV performance." (Sandeep et al., pg. 8, 2020).

9. After reviewing the case study, what are your thoughts on Tetralogy of Fallot?

Tetralogy of Fallot is not something I can confidently say the public is aware of. It seems to me that this can be a very serious and life-threatening condition that would require time and funds to adjust to. I believe that I will need to do more research on this subject. I have found that it is possible for this disease to go unnoticed until adulthood. This is kind of shocking to me because you would think with as many serious effects it has that would be unlikely.

References

- Sandeep, B., Huang, X., Li, Y., Wang, X., Mao, L., Kan, Y., Xiong, D., Gao, K., & Zongwei, X. (2020). Evaluation of right ventricle pulmonary artery coupling on right ventricular function in post operative tetralogy of Fallot patients underwent for pulmonary valve replacement. *Journal of Cardiothoracic Surgery*, 15(1), 241. <https://ezproxy.lakeviewcol.edu:2097/10.1186/s13019-020-01281-1>
- Sharma, R. (2018). *Paediatric Cardiac Intensivist, child heart ICU care specialist*. Retrieved October 4, 2020, from <https://kidshearticu.com/cyanoticspells>

Proof of Completion of Case Study (10 pts)

The screenshot shows a web browser window displaying a course page on OpenPediatrics.org. The browser's address bar shows the URL: learn.openpediatrics.org/learn/course/3104/play/50435/chapter-3-transposition-of-the-great-arteries. The page title is "congenital heart defects". The breadcrumb trail is: Home > Content Suggested for You > My Courses and Learning Plans > Congenital Cardiac Defects with Decreased Pulmonary Blood Flow. The main content area features a video player with a handwritten note "Rece Degett" in the top left corner. The video player shows a progress bar at 02:30. Below the video player, the chapter title "Chapter 3: Transposition of the Great Arteries" is displayed, along with a list of tags: heart, aorta, arteries, left ventricle, coronary artery, coronary arteries, occlusion, tissue, vessels, and ventricle. To the right of the video player is a sidebar with a progress indicator for "Congenital Cardiac Defects with Decreased Pulmon..." (ID: E-82ZDRND) showing 37.5% completion. Below this are navigation buttons for "PREVIOUS" and "NEXT". The sidebar also lists three chapters: "Chapter 1: Introduction and Pathophysiology Video", "Chapter 2: Tetralogy of Fallot Video", and "Chapter 3: Transposition of the Great Arteries Video", with the third chapter highlighted in blue. At the bottom of the page, there is a "Comments" section and a "Help" button. The Windows taskbar at the bottom shows the time as 1:23 PM on 10/4/2020.