

SDS/PACU Clinical Education Series: Cardiac Considerations

Thank you for your ongoing commitment to patient care and professional development. These activities are designed to assess and reinforce clinical knowledge across the SDS/PACU setting. Activities may be printed and completed or answered directly within Microsoft Forms. **To receive credit, all answers must be submitted through Microsoft Forms.** You may attempt each activity as many times as needed; a **score of 100% is required** to receive continuing education credit. Please reach out to Michelle or Dani with any questions.

Fact vs. Fiction

1. Management of a 'Tet' spell might include administration of morphine or a sedative. True or False
2. A junctional rhythm has either an inverted or missing P wave. True or False
3. Atropine can be used to treat bradycardia and can be found in the emergency carts on the unit. True or False
4. Junctional rhythms originate from the sinoatrial (SA) node. True or False
5. Blood will flow from areas of high pressure to areas of low pressure. True or False
6. Cardiac arrest management includes administering epinephrine every 3-5 minutes. True or False
7. The atrioventricular (AV) node and surrounding structures are collectively called the AV junction, which is why rhythms originating there are termed junctional rhythms. True or False
8. Excessive caffeine intake can cause an irregular heart rate and inverted or missing P waves. True or False
9. Treatment for sinus bradycardia includes epinephrine and atropine. True or False
10. Sinus tachycardia is a lethal arrhythmia and should be shocked immediately. True or False
11. Ventricular arrhythmias originate below the bundle of His, either in the bundle branches, Purkinje system, or ventricular muscle. True or False
12. Synchronized cardioversion is a PALS/ACLS supported intervention for correcting ventricular tachycardia (VT) with a pulse. True or False
13. Generally speaking, pressures on the right side of the heart are higher than on the left side of the heart after birth. True or False
14. A patient who has undergone a cardiac catheterization is at an increased risk for premature ventricular contractions (PVCs). True or False
15. Defibrillation for a patient whose rhythm is ventricular fibrillation (VF, V Fib) is not supported by PALS/ACLS. True or False

SDS/PACU Clinical Education Series: Cardiac Considerations

Case Study

Name: Tyler Johnson

Age: 6 years old

Weight: 20 kg

Diagnosis: Status-post Open-Heart Transplant in 2024

Procedure: Cardiac Catheterization with Endomyocardial Biopsy

Tyler presents with his caregiver for a scheduled cardiac catheterization and biopsy to evaluate for possible rejection. He is alert but anxious. He has a history of immunosuppression therapy.

Assessment Questions

1. Identify priority pre-op assessments for this patient: (Select all that apply)
 - a. Baseline cardiac status (heart rate, rhythm, perfusion, recent echo/cath results)
 - b. Signs of infection (temperature, labs, symptoms due to immunosuppression)
 - c. Medication review, especially immunosuppressants and last doses
 - d. Airway assessment and sedation/anesthesia history
2. Why is a recent transplant history significant for this procedure?
 - a. Increased risk for organ rejection and infection due to immunosuppression
 - b. Greater risk of bleeding due to anticoagulation therapy
 - c. Higher likelihood of arrhythmias or myocardial irritation during the procedure
 - d. Decreased healing capacity related to chronic inflammation
3. What medications are critical to verify prior to procedure? (Select all that apply)
 - a. Immunosuppressants (e.g., tacrolimus, mycophenolate, steroids)
 - b. Anticoagulants/antiplatelets
 - c. Cardiac medications (e.g., beta-blockers, antiarrhythmics)
4. Which assessment finding requires immediate provider notification? (Select all that apply)
 - a. Temperature of 38.5°C (101.3°F)
 - b. New onset irritability and inconsolable crying
 - c. NPO status confirmed for 8 hours
 - d. Heart rate increased from baseline with occasional ectopy
 - e. Parent present at bedside providing comfort
 - f. Reports of fatigue and decreased activity compared to baseline
5. Which of the following are nursing priorities for the nurse in pre-op?

SDS/PACU Clinical Education Series: Cardiac Considerations

- a. Verify immunosuppressant therapy adherence
 - Assess for signs of infection
 - Confirm allergies and sedation history
 - Ensure informed consent is signed
 - All of the above

The nurse performs a re-check of the temperature and obtains a reading of 37.1C. Documentation is updated, and the procedure is set to be completed as scheduled. All tasks and assessments are completed, and anesthesia takes the patient to the cath lab.

The procedure is uneventful. The PACU nurse receives the following report:

“Tyler Johnson is a 6-year-old, 20 kg male, status-post orthotopic heart transplant (2024), who just underwent a cardiac catheterization with endomyocardial biopsy for rejection surveillance. He was accessed via the right femoral vein. Specimens were successfully obtained and sent to pathology.

Assessment- He is sedated but able to be aroused. The groin site has a clean, dry, and intact pressure dressing. Pulses are felt distally and are +2, cap refill is <2 seconds. Right extremity is warm, no bruising noted.”

1. Which assessments are the highest priority upon PACU arrival following this procedure?
 - a. Pain score, level of consciousness, and family presence
 - b. Airway patency, respiratory effort, heart rhythm, and access site integrity
 - c. Dietary tolerance, hydration status, and urine output
 - d. Emotional response, temperature, and mobility status
1. What complications are highest risk post-cardiac cath with biopsy? (Select all that apply)
 - a. Arrhythmias (due to myocardial irritation from biopsy)
 - b. Bleeding or hematoma at the femoral access site
 - c. Vascular complications (impaired distal perfusion, thrombosis)
 - d. Cardiac perforation/tamponade (rare but critical)
 - e. Infection (higher risk due to immunosuppression)
2. Tyler develops frequent premature ventricular contractions (PVCs). What is the most appropriate initial action?
 - a. Document and reassess in 1 hour
 - b. Increase stimulation to wake patient
 - c. Assess hemodynamic stability and notify provider
 - d. Remove oxygen

After 1 hour in Phase I PACU, Tyler is improving and nearing readiness for Phase II recovery. He is arousable, following commands, and beginning to interact with his caregiver. Pain appears well controlled.

Current Assessment:

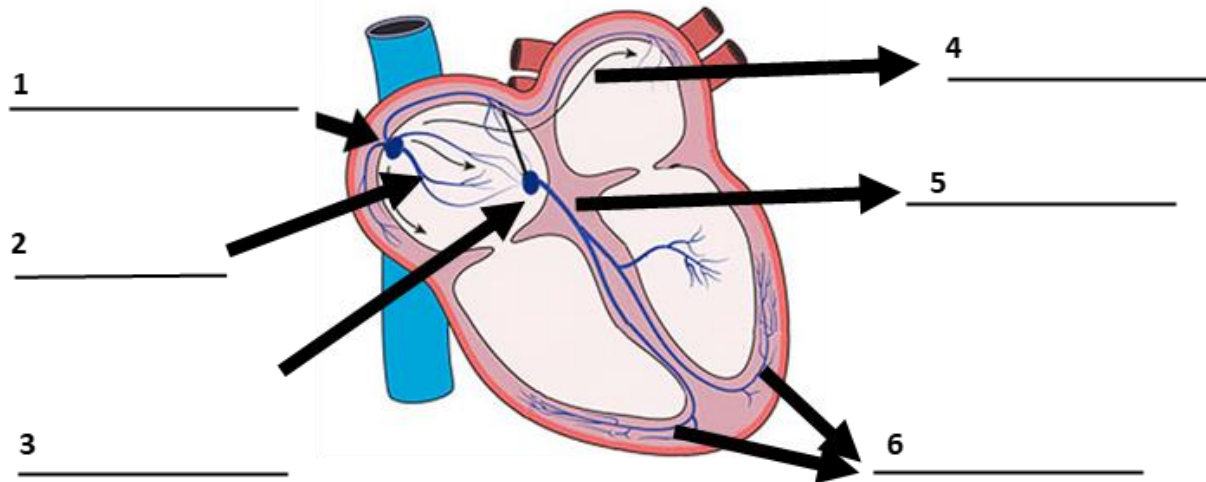
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- Heart Rate: 96 bpm, sinus rhythm
- Blood Pressure: 95/58 mmHg
- Respiratory Rate: 22 breaths/min, unlabored
- SpO₂: 97% on room air
- Temperature: 36.7°C (98.0°F)
- Access Site: Right femoral site clean, dry, intact; no bleeding
- Distal Pulses: Palpable, cap refill <2 seconds

Tyler remains hemodynamically stable with no arrhythmias and is progressing appropriately toward Phase II PACU for continued recovery and discharge planning.

1. What criteria must be met prior to discharge? (Select all that apply)
 - a. Stable vital signs within age-appropriate limits
 - b. Return to baseline neurologic status
 - c. Access site stable and free of bleeding, hematoma, impaired perfusion
2. What education should be provided to the caregiver? (Select all that apply)
 - a. Monitor catheter site for bleeding, swelling, redness, drainage
 - b. There are no activity restrictions and the patient can continue activity as tolerated immediately after discharge
 - c. When to call provider (fever, bleeding, decreased perfusion, chest pain)
 - d. Remove the dressing and assess for bleeding every 3 hours
3. Which caregiver statement indicates need for further teaching?
 - a. "I will monitor the site for bleeding."
 - b. "He should not resume normal activity until cleared by his cardiologist."
 - c. "I will call if he has a fever."
 - d. "I will only follow up with cardiology if we have a concern."
4. Which discharge teaching points should the nurse include for Tyler's caregiver following cardiac catheterization with biopsy? (Select all that apply)
 - a. Monitor the catheter site for bleeding, swelling, or redness
 - b. Limit strenuous activity for the prescribed timeframe
 - c. Watch for fever or signs of infection
 - d. Administer medications exactly as prescribed
 - e. Ensure follow-up appointments are scheduled and kept

Electrical Activity of the Heart



Electrical Pathway	Function
1	Located in right atrium; referred to as the natural pacemaker of the heart as its impulses determine heart rate; contracts the atria; the younger the child, the faster the impulses/ heart rate.
2	Consists of the anterior tract (Bachmann's), middle tract (Wenckebach's), and posterior tract (Thorel's) and conducts impulses from the SA node through the right atrium.
3	Located in the right atrium above the tricuspid valve; delays impulse between atria and ventricles, allowing time for ventricular filling following atrial contraction and prior to ventricular contraction.
4	Conducts impulses from the SA node to the left atrium.
5	Composed of thick fibers arising from the AV node that travel over the crest of the ventricular septum; divides into the left and right bundle branches; and interruption in this pathway causes a bundle branch block.
6	Conduct impulses to ventricles resulting in contraction of ventricles; conduct cardiac action in the heart more quickly and efficiently than any other cells; source of ventricular arrhythmias.

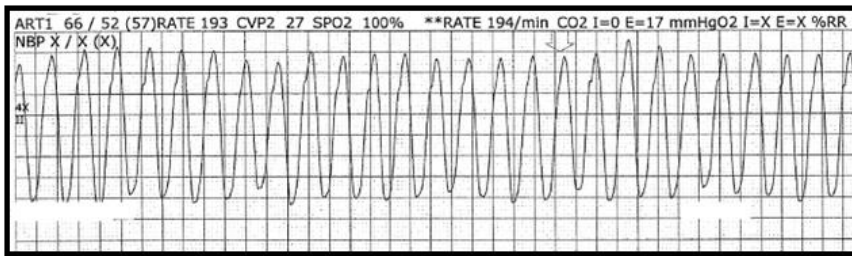
Word Bank

Purkinje Fibers	Internodal Pathways	Bundle of His	Atrioventricular Node	Sinoatrial Node	Bachmann's Bundle
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Test your knowledge

1. When utilizing the defibrillator, patients who are less than how many kilograms need to use the pediatric sized pads?
 - a. 50 kg
 - b. 25 kg
 - c. 15 kg
 - d. 30 kg
2. Which assessment finding most strongly supports a diagnosis of SVT rather than sinus tachycardia in a neonate?
 - a. Heart rate of 180 bpm with crying
 - b. Heart rate of 220 bpm with fever
 - c. Sudden onset heart rate of 280 bpm with narrow QRS complexes
 - d. Gradual increase in heart rate during feeding

3. How would you classify this rhythm?



- a. Sinus tachycardia
 - b. Supraventricular tachycardia
 - c. Ventricular tachycardia
 - d. Atrial fibrillation
4. Which congenital heart defect consists of pulmonary artery stenosis, ventricular septal defect (VSD), hypertrophy of the right ventricle, and an overriding aorta?
 - a. Transposition of the Great Arteries
 - b. Pulmonary Atresia
 - c. Atrioventricular Septal Defect
 - d. Tetralogy of Fallot
 5. The following are examples of obstructive congenital heart defects (select all that apply):
 - a. Ventricular Septal Defect
 - b. Pulmonic Stenosis
 - c. Aortic Stenosis
 - d. Coarctation of the Aorta

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6. Which of the following illnesses is known to produce antibodies that attack the heart valves?
- Coronavirus
 - Rheumatic fever
 - Influenza
 - Tuberculosis
7. Which of the following are potential surgeries that a patient with a single ventricle diagnosis might have to undergo? (select all that apply)
- Glenn procedure
 - Fontan procedure
 - Ross procedure
 - Norwood Procedure
8. How would you classify this rhythm?

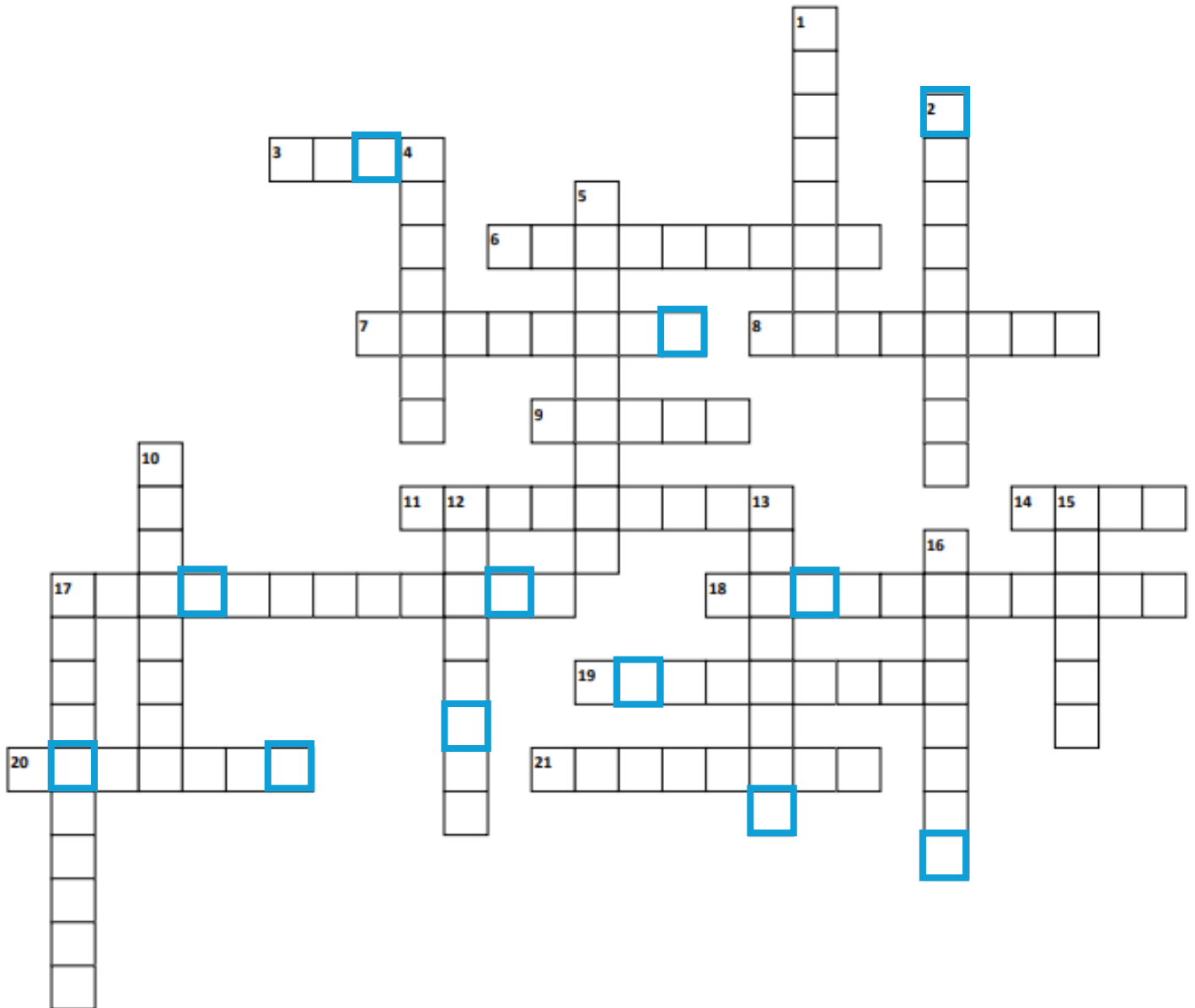


- Normal sinus rhythm
 - Sinus bradycardia
 - Bigeminy
 - Sinus arrhythmia
9. How would you classify this rhythm?



- Ventricular tachycardia
 - Ventricular fibrillation
 - Atrial flutter
 - Supraventricular tachycardia
10. During a post-procedure assessment for a patient who had just undergone a right femoral venous cardiac cath, the nurse notices that the pedal pulse is not palpable. The extremity is cool to touch, and the patient reports having a decrease in sensation. What is the most appropriate initial action?
- Document the finding and reassess in 15 minutes.
 - Apply a warm compress to the extremity.
 - Notify the provider and assess perfusion immediately.*
 - Encourage movement of the affected extremity.

Crossword



Each highlighted box in the crossword puzzle contains one letter of the challenge word. Unscramble the letters to reveal the challenge word and receive credit for the crossword puzzle.

In a post-op pediatric cardiac patient, what overall concept is being assessed when evaluating heart rate, blood pressure, and perfusion to determine stability? _____ (12 letters)

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Across	Down
3. Prior to cardioversion, what soft-key button needs to be pressed on the Zoll to ensure correct energy delivery?	1. A catheterization procedure in which a catheter enters the heart and directs energy at the parts of the heart that are interfering with normal function.
6. Ebstein's anomaly is a rare defect that involves an abnormality of the _____ valve.	2. Before administering Digoxin, check the patient's _____ and confirm it's within appropriate parameters. (two words- no space needed in the crossword)
7. Contraction of the heart is systole; relaxation of the heart is _____.	4. Hypotension may indicate decreased _____ output.
8. A medication that increases contractility is referred to as an _____.	5. This medication has multiple uses in the cardiac population including analgesia, local anesthetic, or antiarrhythmic.
9. If a patient is in SVT (supraventricular tachycardia) it is appropriate to first attempt _____ maneuvers to terminate the arrhythmia. (examples include quickly placing ice on the face, take a deep breath and hold it, and a strong cough or suction).	10. This type of medication is common for cardiac patients to assist in fluid removal and preventing fluid overload.
14. In typical anatomy of the heart, how many pulmonary veins are there?	11. In congenital heart disease, when the blood entering the aorta is completely oxygenated it is called a _____ defect. (Some examples include a VSD or ASD).
17. The equation for Cardiac output is $CO = HR \text{ (heart rate)} \times$ _____. (two words- no space needed in the crossword)	12. _____ describes the thickening of distal segments of fingers and toes due to chronic hypoxia.
18. Oxygen is a potent pulmonary _____ and can be used to decrease pulmonary vascular resistance in pediatric cardiac patients.	13. Normal oxygen saturation levels may be lower in children with _____ heart defects. (classification)
19. This anti-arrhythmic has a very short half-life; therefore, it should be administered in an IV close to the heart with a large flush.	15. Urine _____ is a good indicator of end organ or renal perfusion.
20. Hypoparathyroidism associated with DiGeorge Syndrome might lead a patient to require more frequent replacements of this electrolyte.	16. What rhythm is seen below: 
21. The nurse should verify the timing of the last dose of anticoagulants to reduce the risk of _____.	17. The _____ node is the heart's pacemaker. It is located in the right atrium near where the SVC enters the heart.

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Resources:

American Heart Association. (2025). Pediatric advanced life support (PALS) provider manual. First American Heart Association Printing.

Jakubik, L. D. (2018). Pediatric nursing certification review book (4th ed.). Society of Pediatric Nurses.

Jones, M. B. (2015). Pediatric cardiac intensive care handbook. Pediatric Cardiac Intensive Care Books.

Pediatric Cardiac Intensive Care Society. (2026). *Nursing resources*. In *Education & Nursing resources*. Retrieved June 3, 2026, from PCICS website: <https://pcics.org/education/nursing-resources/>