

PUZZLE

Subject: 1422-Cardio Pulmonary Bypass and Perfusion Technology

UNIT - I - CONDUCT OF BYPASS

Logic Puzzle: The Bypass Enigma

Instructions

- Read the scenario and clues carefully.
- You must deduce the sequence of events and identify one KEY error in the process flow that compromises patient safety.
- Show your reasoning for each step and explain your final answer.
- All answers should be supported by logical deduction from clues provided below.

Scenario

During a complex open-heart procedure requiring cardiopulmonary bypass, a surgical team must follow precise steps to ensure safe initiation, continuation, and termination of bypass. The following clues reveal key actions and possible errors.

1. The team begins with median sternotomy and pericardial retraction.
2. Systemic heparinisation and placement of aortic and venous purse string sutures are done.
3. ACT time after heparinisation is measured and found at 310 seconds.
4. Aortic cannulation is performed, but before attachment to the arterial line, the cardiomy suction is turned on and the reservoir is checked.
5. The arterial cannula is attached to the arterial line, but the team notices minor air bubbles in the line. They proceed after clamping and deairing.
6. Venous cannulation follows successfully. The circuit is assembled, primed, circulated, and occlusion is checked.
7. At initiation, aortic clamp is placed and cardioplegia is administered every 40 minutes as per protocol.
8. During the procedure, partial deairing is attempted by passive filling, but the left atrial vent is left open by mistake.
9. After de-clamping, the perfusionist lowers the arterial flow and monitors for LV distension.
10. Protamine is administered for heparin reversal while the cardiomy sucker is still running.

Questions

- A. List and logically sequence each key step by their correct order according to standard protocol.
- B. Identify the single critical error in the above sequence that presents highest risk for patient

safety during bypass.

C. Explain your reasoning and the potential consequences of this error.

10-Mark Rubric

Criteria	Marks	Description
Step Sequencing	4	Correct and logical order of steps, justified with reference to bypass protocol
Error Identification	3	Identification of the single critical safety error
Reasoning/Consequences	3	Clear, concise explanation of why this error is critical and what consequences could result