

# *Post Operative Cardiothoracic Case Study*



*To receive the most benefit from this case study work through the questions in chronological order, and utilise all the information provided leading up to the question. This case study was devised from an actual cardiothoracic patient*

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# Case study

Mr B Brown is a 79 year old man who is and elective admission for coronary artery bypass grafts. Mr Brown was admitted to the cardiothoracic ward for pre operative workup and has attended the pre-op clinic three weeks ago.

## Past Medical History

- Anterior infarct 3 months previously
- Hypertension
- Chronic Heart Failure
- Hypercholesterolemia
- Non insulin dependent diabetic

## Medications

- Asprin 150mg daily
- Metoprolol 25mg BD
- Metformin 500mg BD
- Coversyl 2mg DLY
- Atorvastatin 40mg nocte
- Esomeprazole 40mg DLY

## Mr Brown's pre operative observations were:

**Blood Pressure:** 160/80mmHg  
**Heart Rate:** 92 beats /min (irregular pulse)  
**Respiratory rate:** 16 breaths /min  
**Oxygen Saturation:** 96% on room air  
**Blood sugar Level:** 8.7 mmol/L  
**ECG:** revealing atrial fibrillation and previous anterior infarct.  
**Height:** 173 cm  
**Weight:** 110 kg

## Operation Performed

Coronary artery bypass grafts x 4. Lima → LAD  
SVG → OM → Right PL → PDA

Bypass time: 66 minutes

### **Question 1**

Define the abbreviations LIMA, LAD, SVG, OM, PL and PDA?

Mr Brown had the following insitu:

- Pulmonary artery catheter
- Intubated with size 7.5 endotracheal tube
- Arterial and peripheral lines
- Pleural and mediastinal drains on 20cm of suction
- Urinary catheter
- Dual chamber pacemaker
- Bellovac drain in right leg

Connected to the ventilator on:

SIMV, rate 10, Tidal Volume 900 mls, FiO<sub>2</sub> 60%, peep 5, Pressure Support 10.

Infusions running on arrival

- Maintenance at 110mls/hr (normal saline 500mls with 30mmols KCL and 20mmols Magnesium).
- GTN 15mg in 50mls at 2mls/hr
- 500ml bolus running in per anaesthetist instructions

Mr Brown's initial observations are:

- MAP is 70mmHg
- Heart rate is 80 beats per minute and is DDD paced (Atrial output is 10 / sensitivity 0.5 and Ventricular output is 10 / sensitivity 0.5).
- Central venous Pressure is + 8mmHg
- PA pressures 37/18
- PAWP is unobtainable as the catheter won't wedge
- Temperature is 34.6 C
- Urine output 1200mls emptied from the bag
- ICC's 20mls in the drains
- Air entry R=L
- Neuro - pupils size 2 equal and reactive and unconscious
- Peripherally cold with pulses in both feet

### **Question 2**

List in approximate order the immediate nursing actions, procedures and observations required after Mr Brown arrives in CICU?

Provide a rationale for each of these?

You may wish to utilise a table to answer this.

**Question 3**

A. Outline the trouble shooting procedures for the nurse when a PA catheter is not wedging.

B. When do you wedge a PA catheter in CICU?

***Initial Cardiac Outputs***

CO	CI	SV	SVI	SVR	PVR	LVSWI	RVSWI	HR	MAP	CVP	MPA	PCWP
4.4	2.0	56	25	1126	145	19.1	4.8	79	70	8	22	14

***Initial Arterial Blood Gas Results***

- pH 7.46
- pCO<sub>2</sub> 33.7
- paO<sub>2</sub> 145
- BE -0.4
- Hb 85
- K<sup>+</sup> 3.6
- BSL 6.9

ACT was 163 seconds

**Question 4**

What nursing actions are required at this time?

Mr Brown has started to shiver, he remains unconscious, and his temperature is now 34.9 C.

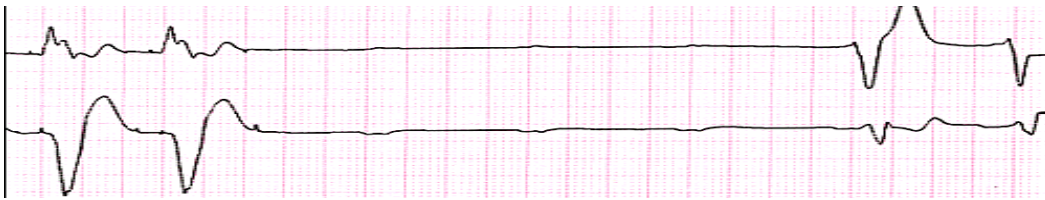
**Question 5**

Describe the physiological consequences of shivering. What is the appropriate intervention?

**Question 6**

Describe what nursing emergency and pacemaker safety checks that must be performed every shift

Mr Brown has been back in the unit for 3 hrs and his monitor was showing the rhythm below.



**Question 7.**

Describe what is happening in the above rhythm and provide the nursing actions required?

Mr Browns rhythm disturbance has been rectified and is now pacing in DDD paced rhythm.

**Question 8.**

When and how does the nurse check if the patient has an underlying rhythm?

The time is now 2200hrs (4hrs post op), these are his results at this time:

*Ventilator settings*

SIMV, rate- 10, TV – 760, PEEP – 5, Peak pressures – 27

Arterial Blood Gas Results

pH 7.29, PCO2 37.4, PaO2 109, BE -7.8, Hb 93, K+ 3.7, BSL 12.3

*Fluids since admission to CICU*

- One unit packed cells
- 3 litres of crystalloid

*Infusions currently running*

- Adrenaline (2mg in 50 ml) at 8ml/hr
- Noradrenaline (2mg in 50mls) at 2 ml/hr
- Maintenance at 110ml/hr

Urine Output

**1900hrs** = 290mls, **2000hrs** = 320mls, **2100hrs** = 300mls, **2200hrs** = 90mls.

Output from Chest Drains

**1900hrs** = 40mls, **2000hrs** = 60mls, **2100hrs** = 30mls, **2200hrs** = 20mls

Cardiac Outputs

CO	CI	SV	SVI	SVR	PVR	LVSWI	RVSWI	HR	MAP	CVP	MPA	PCWP
3.8	1.7	48	22	904	252	12.1	4.1	79	57	14	28	16

**Question 9**

What are the nursing interventions required at this stage?

**Mr Brown's condition at 2300 hrs is as follows:**

Cardiac Outputs

CO	CI	SV	SVI	SVR	PVR	LVSWI	RVSWI	HR	MAP	CVP	MPA	PCWP
4.4	2.0	54	24	745	109	10.6	5.0	80	56	15	28	16

Infusions

- Adrenaline (2mg in 50 ml) at 10ml/hr
  - Noradrenaline (2mg in 50mls) at 8 ml/hr
- 700mls crystalloid and 500mls of 4% Albumin

Urine Output was 30mls in the last hour

Drainage from the chest drains was 175mls the last hour

Arterial Blood Gas

pH 7.29, PCO2 37.4, PaO2 150, BE -10.0, Hb 81, K+ 4.0, BSL 12.0

**Mr Brown's condition at 2400 hrs is as follows:**

Cardiac Outputs

CO	CI	SV	SVI	SVR	PVR	LVSWI	RVSWI	HR	MAP	CVP	MPA	PCWP
4.3	1.9	50	23	780	167	9.8	5.8	86	56	14	33	24

Infusions

- Adrenaline (2mg in 50 ml) at 10ml/hr
- Noradrenaline (2mg in 50mls) at 18 ml/hr
- 1500mls crystalloid and 200mls of 4% Albumin

Urine Output was 35mls in the last hour

Drainage from the chest drains was 95mls the last hour

**Question 10**

Review the patient's condition and interventions at 2300hrs and 2400hrs, describe the nursing actions required.

What do you think is happening to this patient?

Mr Brown's condition further deteriorated at 0020hrs revealing:

#### Cardiac Outputs

CO	CI	SV	SVI	SVR	PVR	LVSWI	RVSWI	HR	MAP	CVP	MPA	PCWP
2.8	1.3	35	16	799	171	4.1	3.2	80	43	15	30	24

#### Infusions

- Adrenaline (2mg in 50 ml) at 10ml/hr
- Noradrenaline (2mg in 50mls) at 20ml/hr

The cardiac registrar suspected cardiac tamponade and a decision was made to proceed with an emergency chest opening.

#### Question 11

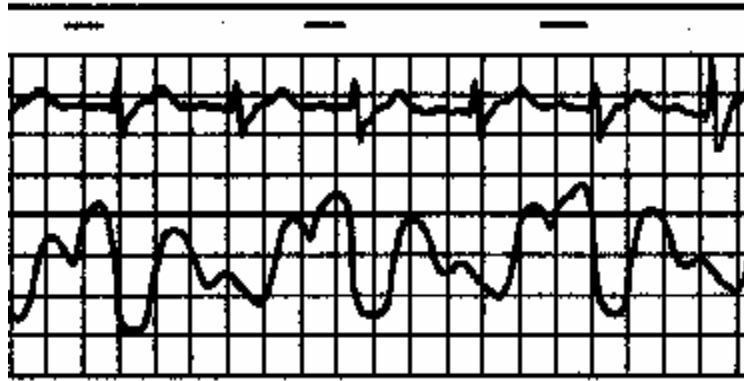
What are the signs and symptoms of cardiac tamponade?

#### Question 12

Explain the procedure for chest opening in CICU. Include in your answer what personnel need to be notified (1am in the morning), and the sequence of events.



Mr Brown's chest was opened in the CICU and the cardiac output improved, he was then returned to theatre and had the pericardial clot removed. The patient had an intra-aortic balloon pump (IABP) inserted at this time. On return to CICU the IABP revealed the following timing.



**Question 13**

Analyse the IABP timing and describe the physiological consequences of this timing error.

Mr Brown's condition improves and at 0400 hrs the adrenaline had been weaned and turned off, the noradrenaline was on 4mls/hr and the IABP was at 1:1 ratio. Glycerol trinitrate was commenced to control hypertension. Mr Brown's urine output was improving and was between 200 and 430mls/hr. Drainage from the chest drains was 120 to 25mls/hr.

Cardiac outputs

CO	CI	SV	SVI	SVR	PVR	LVSWI	RVSWI	HR	MAP	CVP	MPA	PCWP
7.2	3.2	95	43	832	122	39.4	10.4	80	90	15	33	22

Arterial Blood Gases

pH 7.31, PCO2 39, PaO2 100, BE -5.9, Hb 80, BM 11.7

**Question 14**

Outline the weaning process of this patient including inotropes, IABP and ventilation.

**Question 15**

Outline when and what type of pain relief is given to the post-operative cardiothoracic patient.

Mr Brown has been successfully weaned from inotropes and the IABP. It is now day 2 post operative and his cardiothoracic surgeon has indicated he can be transferred to the cardiothoracic ward.

**Question 16**

Discuss acceptable parameters for the following, prior to transfer to F3:

- Inotropes
- Oxygen and CPAP
- Urine Output
- Pacing

That concludes the case study. This case study is based on a patient in JHH CICU therefore your answers should reflect the guidelines in this area.

***Suggested Resources***

- Staff of CICU including medical and nursing
- CICU procedure guidelines located in CICU
- Cardiac Nursing 2nd Edition, 1989 Lippincott
- CIAP search on IABP, PA Catheters, and Pacing.