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An atypical early pericardial tamponade in a case report

***Corresponding Author:** Martha kyriakou*

Email: m.kyriakou@euc.ac.cy

Maria Natsiou[1]; Florentios Pavlou[2]; Paraskevi Chyta[1]; Vasilios Grosomanidis[3]; Martha Kyriakou[4]*

[1]AHEPA University Hospital, Kiriakidi 1, Thessaloniki 546 36, Greece.

[2]Belfast Health and Social Care Trust, Belfast, UK.

[3]Department of Anaesthesiology and Intensive Care Medicine, Aristotle University of Thessaloniki, AHEPA University Hospital, Thessaloniki, Greece.

[4]Department of Health Sciences, School of Sciences, European University Cyprus 6, Diogenous Str, 2404 Nicosia, Cyprus.

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Introduction

Pericardial Tamponade (PT) that develops early after cardiac surgery presents significant diagnostic challenges, is frequently overlooked, and is often identified only in its later stages, differing from PT seen with other medical conditions. While no definitive agreement exists, the literature distinguishes between early (<72 hours) and late (>72 hours) tamponade based on the time elapsed since the surgery [1]. The clinical signs of PT can be unspecific; thus, a high degree of initial suspicion is required to establish the diagnosis [2].

PT is one of the most feared life-threatening complications with mortality rates up to 30%. The incidence of PT after cardio surgery ranges from 0.5% to 8.8%. Early postoperative PT is a life-threatening emergency of paramount importance to any cardiac surgeon caring for either acquired or congenital heart disease. PT is defined by fluid accumulation in the pericardial sac, requires early diagnosis and immediate action [2]. The hemodynamic effects of an effusion can vary from negligible to severe, potentially causing cardiogenic shock with symptoms that range from acute to subacute. Acute PT, a form of cardiogenic shock occurring within minutes, leads to a drop in cardiac output, resulting in hypotension, cool extremities, and elevated jugular venous pressure, often caused by bleeding from trauma, aortic dissection, or medical procedures. Prompt diagnosis is the key to reducing the mortality risk for patients with cardiac tamponade [3].

There are several conditions that can cause hemodynamic instability in post-cardiac surgery patients including failed graft, sepsis, bleeding, pulmonary embolism, tamponade, and cardiac arrhythmias. Therefore, rapid stabilization and differential diagnosis are crucial for life-saving interventions to be performed. However, assessment of these undifferentiated post-cardiac surgery patients is challenging due to non-specific symptoms and signs [4]. More insight into the diagnostic accuracy of Transthoracic Echocardiography (TTE) and Transoesophageal Echocardiography (TEE) will therefore help multidisciplinary teams in the Intensive Care Unit (ICU) to interpret the echocar-

diographic results. Therefore, daily decision-making process at the bedside in case of hemodynamic deterioration after cardiac surgery in the early postoperative period on the ICU or later on the surgical ward could be more accurate and life saving [1].

Patient presentation: This is a clinical case study of a 63 year-old Caucasian-Mediterranean male with severe Mitral Valve (MV) regurgitation. The patient admitted as an outpatient in a University Hospital, on September 2023, for a scheduled pre-procedure checkup. He had a scheduled open surgery for inguinal hernia repair. His past medical history included appendectomy at the age of 20 and tonsillectomy at the age of 17. Allergies not known and he was on levodopa/ benserazide hydrochloride for the Parkinson disease. His BMI was 26 kg/m^2. According to the social medical history the patient was non- smoker, married with two children, retirement and fully independent in his daily activities.

Initial work-up: According to the pre- procedure checkup check list patient had chest X-ray, blood tests, ECG and clinical examination. The finding on clinical examination according to ABCDE algorithm was systolic murmur. The medical team referral the patient for further evaluation and management of his cardiovascular condition. The first heart echocardiogram has shown severe MV regurgitation and the patient referral to the cardiac catheterization laboratory for coronary angiography. After that patient referred to the cardiothoracic team for open cardiothoracic surgery Mitral Valve Replacement (MVR).

Diagnosis and management: According to the recommendations of ESC/EACTS 2021 Class IIa Level B, the surgical team decided the mechanical prosthesis for MVR. The patient admitted at the Cardiothoracic Surgical Intensive Care Unit (CICU) for the postoperative monitoring and care. Patient was sedated, intubated and ventilated on a volume control mode with FiO_2=90% and Spo_2=100%. Patient admitted hemodynamically unstable with sinus tachycardia up to 140 bpm (Figure 1), blood pressure 88-100/52-63 mmHg. Inotrope drugs and crystalloids were administered to maintain blood pressure, cardiac output and organ perfusion. The cardiac monitoring through the Swan Ganz catheter was on set with Cardiac Output 3.4-3.9 L/min and SVO_2 65%. Patient also had chest tubes and urine catheter with baseline 50 ml and 100 ml respectively. Additionally, patient admitted hypothermic (T=35.1^{0}C) and used a warming blanket to rewarm gradually the patient. The fourth postoperative hour arterial blood gases had shown normal levels of pO_2 and pCO_2 and low levels of hemoglobin and patient transfused as the protocol [5]. The chest tubes output was between the normal limits but the patient keeps going to be hemodynamically unstable, on sinus tachycardia and with low hemoglobin levels. Eight postoperative hours the patient became normothermic but the doses of the inotrope drugs and crystalloids increased to maintain the blood pressure. Despite of there was no excessive bleeding from the chest tubes, the arterial blood gases had shown again low levels of the hemoglobin levels. The patient transfused with one more unit of blood and platelets. There were no Beck's triad or Kaussmal's sign and a bedside cardiac echo and chest X-ray were requested to rule out the diagnosis of early PT. The findings of the echo and chest X-ray were non pericardial effusion. The clinical condition of the patient was the same for the next 2 hours and the patient need blood transfusion for the third time. The patient being hemodynamically unstable the nurse in charge was requested a TEE. Even though the negative findings from the bedside ECHO and the chest X-ray the clinical presentation of the patient persist deteriorate. For that reason, the multidisciplinary team requested and performed a TEE to rule out the PT diagnosis. After the TEE performed the diagnosis of Early PT confirmed and patient went immediately to the Operation Room (OR) for reopening procedure. The ventilation parameters and the arterial blood gases results the first eleven

Table 1: Ventilation parameters and arterial blood gases values.

Post op time	1st	4th	7th	8th	10th	11th
Airway	Intubated	Intubated	Intubated	Intubated	Intubated	Intubated
Type of Oxygenation/ ventilation	SIMV/VC	SIMV/VC	SIMV/VC	SIMV/VC	SIMV/VC	SIMV/VC
Fio_2	100%	70%	50%	50%	50%	50%
PEEP/PS	6/16	6/16	6/16	6/16	6/16	6/16
RR/pRR	14/-	14/-	15/-	15/-	15/-	15/-
MV	7.5	8.9	8.9	8.9	8.9	8.9
TV	550	550	600	600	600	600
pH	7.28	7.27	7.33	7.30	7.28	7.34
pO_2	564	256	258	257	235	205
pCO_2	44.8	43.1	40.1	42	40	41.1
sO_2	99.7	99	99.3	99.6	99	99
HCO_3/BE	20.3/-5	19.2/-6.4	20.7/-4.4	20.1/-5.3	18.3/-7.6	21.4/-5
Hb/ Hct	9.2/28.7	7.8/24	8.5/26.4	9.1/28.3	10/30.5	8.9/27.5
K^+	4.9	5	5.3	5.5	5.1	5
Na^+	139	137	138	138	138	141
Ca^{++}	1.15	1.29	1.24	1.22	1.15	1.13
Lactate/Bill	3.3/0.8	4.7/0.9	6.1/2.4	6.1/2.4	4.9/2.1	4.9/1.7
Glucose	170	206	173	175	147	132

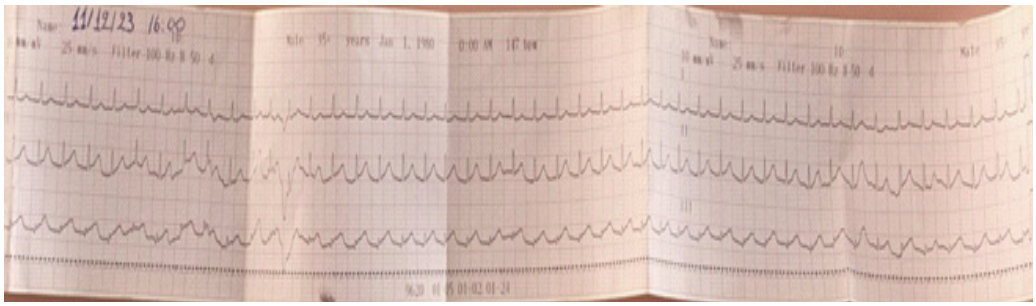

Figure 1: Post-operative ECG.

Table 2: Heamodynamic parameters and drug infusion doses.

Post-op time	1st	4th	7th	8th	10th	11th
Blood pressure (mmHg)	90/54	100/63	95/60	113/72	100/65	100/67
Heart rate (beats per min)	140	137	94	93	82	82
Temperature °C	35.1	35	36	36	35.8	35.8
CVP	13	13	10	10	15	14
PAP	39/16	33/15	31/13	28/12	34/18	31/19
CO L/min /SVO_2%	5/65	4.8/65	4/57	4/58	3.6/54	3.1/50
Adrenaline infusion (mcg/kg/min)/ (ml/hr)	0.1/67	0.1/67	0.07/47	0.1/67	0.09/60	0.1/67
Noradrenaline infusion (mcg/kg/min)/ (ml/hr)	0.22/18	0.22/18	0.23/19	0.23/19	0.23/19	0.23/19
Urine output	100	200	100	100	100	50
Bulau (output per hour)	0	20	30	110	150	30

post-operative hours before the reopening are presented in (Table 1). Similarly, the hemodynamics parameters and the drug infusion doses are illustrated in (Table 2).

Follow up: The patient admitted again in CICU hemodynamically stable and extubated the 1st postoperative day. The 4th postoperative day transferred to the cardiothoracic ward and followed an intensive rehabilitation and physiotherapy treatment. The patient discharged from the hospital on the 10th postoperative day.

Conclusion

In the first days after cardiac surgery, the occurrence of life-threatening situations such as PT must be anticipated. Given that symptoms can be atypical, it is essential to utilize the full range of diagnostic tools to accurately identify the source of the complaints, whether cardiac or non-cardiac [2]. Early postoperative cardiac tamponade requires a high index of suspicion and thorough investigation, as the diagnostic accuracy within the first 24 hours is notably poor, with a positive predictive value of only 58% [1]. Therefore, if tamponade is suspected during this critical period, immediate clinical action, such as re-exploration, may be necessary to mitigate risks and manage the condition effectively.

Recognition of PT often necessitates the use of advanced imaging techniques in conjunction with clinical evaluation to avoid diagnostic delays and enable timely interventions, such as pericardiocentesis or direct surgical procedures [6]. TEE can be particularly valuable when TTE fails to provide definitive results, especially in cases involving loculated effusions with clots [3]. When there is a suspicion of PT or an imminent threat, clinical decision-making must be prompt, with a low threshold for performing pericardiocentesis to prevent severe outcomes [3].

The key message is that the role of a multidisciplinary team is crucial for enhancing diagnostic accuracy, particularly when patient symptoms are atypical and deterioration is evident. Effective cooperation and co-decision-making between ICU staff, anesthesiologists, and surgeons are essential for improving patient outcomes and ensuring timely management of life-threatening conditions such as PT [1,2].

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