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Case Report

Anaesthetic management and surgical debridement of Fournier's gangrene in a 65-year-old male in acute decompensated heart failure in a resource-limited tertiary hospital: A case report.

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Abstract

Emergency surgical interventions in patients with significant cardiovascular comorbidities present complex anaesthetic challenges, particularly in resource-limited settings. Fournier's gangrene is a rapidly progressive necrotising infection that requires urgent surgical debridement. This further complicates the management of severe cardiac dysfunction.

This case report presents the anaesthetic management of a 65-year-old male patient with Fournier's gangrene and acute heart failure. He had dilated cardiomyopathy with an ejection fraction of 26%, with comorbid atrial fibrillation, obesity, hypertension, diabetes, and sepsis. He presented in respiratory distress, renal impairment, and, functionally, New York Heart Association Class IV.

A right radial arterial line and an internal jugular central line were inserted, with a low-dose dobutamine infusion initiated prior to induction. He was induced slowly with etomidate and midazolam, with fentanyl and lignocaine given for blunting the sympathetic response. Sevoflurane was used for anaesthesia maintenance, with inotropic support in the form of adrenaline added intra-operatively. Fluid requirements were 11.7ml/kg. he remained intubated and transferred to ICU, where inotropes were weaned off, and respiratory recovery was achieved. He improved and was followed up post-operatively over three months.

The case illustrates that optimal outcomes are achievable in patients with severe heart failure and sepsis through careful pre-operative optimisation, judicious induction, appropriate inotropic support, and postoperative critical care, in a resource-limited environment.

Keywords: Congestive heart failure, sepsis, fluid resuscitation, cardiovascular instability, resource-limited, Fournier's gangrene.
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Introduction

Anaesthesia for patients with acute, decompensated cardiac failure is associated with a significantly increased risk of mortality, with a 90-day mortality of 2 % [1,2].

Fournier's gangrene is a rare, rapidly progressing, and life-threatening necrotizing soft tissue infection predominantly affecting the perineal, genital, and perianal regions. Characterized by its fulminant course and high mortality, it necessitates prompt recognition and aggressive intervention [3].

The purpose of this case report is to highlight the complexities of managing a cardiac patient presenting for an emergency non-cardiac surgical procedure in a resource-limited tertiary hospital in South Africa, outlining practical considerations that may support clinicians faced with similar high-risk emergencies.

Case report

Pre-operative assessment

Presenting a 65-year-old male, who was seen in the emergency theatre for surgical debridement of perineal sepsis, with a history of heart failure and atrial fibrillation due to dilated cardiomyopathy. He had hypertension, diabetes mellitus type 2 and Grave's disease which had been treated with radioactive iodine. His medication included thyroid hormone, furosemide, enalapril, carvedilol, spironolactone, rivaroxaban, isosorbide mono-nitrite, metformin and paracetamol.

Rivaroxaban was stopped 72 hours prior and substituted with calciparine therapeutic dose given subcutaneously

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eight hourly Amoxycillin/clavulanic acid and clindamycin were given intravenously.

Examination

He had a Body Mass Index of 38kg/m^2. Respiratory rate at rest was increased at 30breaths/min. Pulse rate of 84/min, irregularly irregular, with a blood pressure of 100/62mmHg, was noted. The room air finger arterial saturation was 92%.

He had distended jugular veins, and 2+ bilateral pitting oedema was noted. The left dorsalis pedis pulse was not palpable. Airway was assessed as a Mallampati III. Genitourinary examination revealed a swollen, discoloured scrotum with foul-smelling discharge.

We assessed him as being in acute, decompensated cardiac failure, New York Heart Association Classification IV and an American Society of Anaesthesiology (ASA) classification of 4E.

Investigations

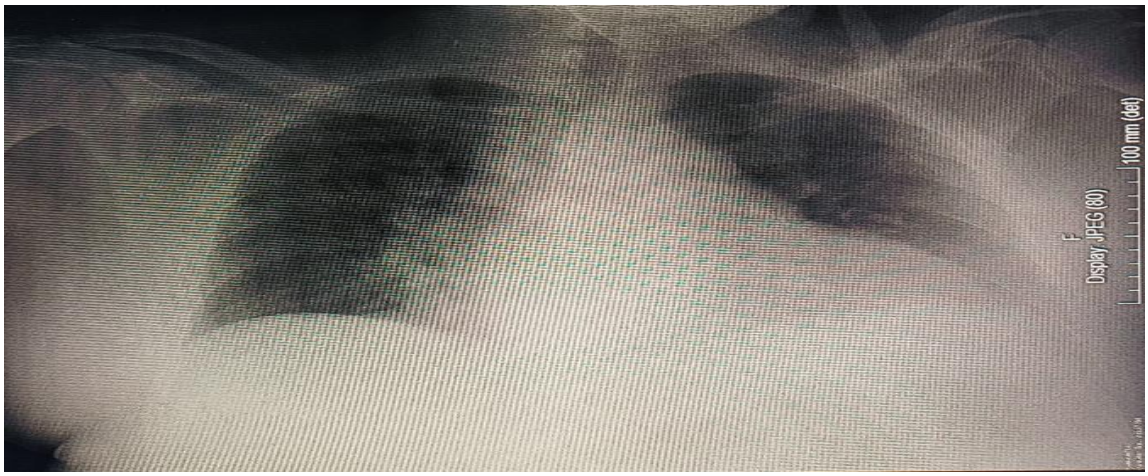
Blood tests were done with a full blood count revealing Haemoglobin of 10.5g/dL, White Cell Count of 14.88 x10^9/L, and C-Reactive Protein of 193mg/L. He also had an acute kidney injury, with urea of 13.9 mmol/L and a creatinine of 166µmol/L with an Estimated Glomerular Filtration Rate of 37µmol/ml. The International Normalized Ratio was 1.35 (Table 1).

Table 1: Table showing blood investigation results. Showing elevated inflammatory markers, low haemoglobin level, and renal dysfunction. Hyponatremia and poorly controlled Diabetes with HbA1c of 7.5% is also noted.

Test	Results	Reference
White cell count (*10^9/L)	14.88	3.92 – 10.40
Haemoglobin (g/dL)	10.5	13.4 – 17.5
Platelet count (*10^9/L)	221	171 – 388
Sodium (mmol/L)	129	136-145
Potassium (mmol/L)	5.5	3.5 – 5.1
Urea (mmol/L)	13.9	2.1 – 7.7
Creatinine (umol/L)	166	64- 104
Estimated Glomerular filtration rate (mL/min/1.73m^2)	37	>60
Calcium (mmol/L)	2.34	2.20-2-55
INR	1.35	2-3
C- reactive protein (mg/L)	193	<10
HbA1c (%)	7.5	<6.5

The chest X-ray showed cardiomegaly with bilateral basal opacities in the lungs (Image 1). Cardiac echocardiography revealed an Ejection Fraction of 26%, with a dilated left ventricle and a sclerotic mitral valve. Arterial blood gas showed a respiratory alkalosis picture with a Ph of 7.48, PCO2 of 29mmHg, he was on room air at FiO2 of 0.21, with a PaO2 of 85mmHg. The bicarbonate was 21.6 with a base excess of -1.9. His electrolytes showed a hyponatremia of 123mmol, a hypocalcaemia of 1.02, and a potassium of 4.3.

Image 1: Chest X-ray showing cardiomegaly with bilateral basal opacities.



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Intra-operative management:

Routine ASA monitors were applied to the patient, and a right radial arterial line was inserted. A central venous catheter was placed, and an infusion of dobutamine 0.5mcg/kg/min started prior to induction.

A co-induction with Etomidate (90mcg/kg) and Midazolam (18mcg/kg) was given slowly and titrated to effect to avoid significant hemodynamic shifts. Lignocaine 200 mg and fentanyl (1mcg/kg) were also given on induction, and anaesthesia was maintained with end-tidal sevoflurane of 1.3% and FiO2 of 0.45.

Rocuronium (0,45mg/kg) was used for intubation and muscle relaxation. Morphine (3.6mcg/kg) was given for analgesia. He tolerated the induction of anaesthesia but became hypotensive during the debridement and required the addition of an adrenaline infusion intra-operatively at 0.05mcg/kg/min.

A total of 700ml of Ringer's lactate, 1 unit of red packed cell, and 1-unit fresh frozen plasma were given, equating to a total fluid intake of 11.7ml/kg. In the end, blood loss was 250 ml, and the intra-operative urine output, which was purulent 2000ml (the urine included mostly pus). No intraoperative furosemide was warranted.

Post-operative management and progress

Post-operatively, the patient remained intubated in the Intensive Care Unit (ICU) for four days, whereafter he was extubated to 2L/min of oxygen via nasal prongs. He was weaned off adrenaline infusion after 24hours of his ICU admission. He was discharged from the ICU on day five to continue antibiotics, wound care, and chest physiotherapy.

He was discharged home 9 days post-debridement, on his known chronic treatment. We followed him up over a period of 3 months, and he recovered well.

Discussion

Patients in acute heart failure requiring non-cardiac surgery face a much higher risk of death within three months at 2%, compared to 0.39% for those without heart failure [1].

Heart failure is a clinical syndrome whose signs and symptoms result from the heart's inability to sufficiently support the body's metabolic demands because of structural and functional issues. This is supported by considerably elevated natriuretic peptide levels and demonstrably clear pulmonary or systemic congestion [4].

Acutely decompensated heart failure manifests with exceedingly prominent signs and symptoms of deep systemic and pulmonary congestion, including considerably laboured breathing and large peripheral and pulmonary oedema, accompanied by markedly impaired peripheral perfusion, demonstrably evidenced by low blood pressure, a significantly accelerated heart rate and impaired kidney function [5].

Sepsis is a life-threatening condition causing organ dysfunction, this occurs because of the body's abnormal response to infection [2,6]. Sepsis combined with cardiac dysfunction considerably increases the risk of death, requiring immediate treatment [2,6].

A recent study showed important reliability in using biomarkers to predict and detect intra-operative cardiac events. This phenomenon has been consistently observed several times over the past two decades [7].

Considerate deliberation of the surgical procedure, the type of cardiomyopathy and the severity of heart failure is necessary when selecting the appropriate anaesthetic for these patients [8].

The goal in this situation is to achieve the lowest level of myocardial depression or alteration to the afterload with anaesthetic management [8], whereas, in low ejection fraction, the goal is to ensure there is forward blood flow, which increases inotropy without triggering or worsening ischemia, and achieving the preoperative functional level [9].

Patients with sepsis and pre-existing heart failure were found to receive less fluid during resuscitation; however, available data indicate that orthodox fluid resuscitation targets do not raise the risk of complications and may enhance their outcomes [10]. In our case, the patient received a total of 11.7ml/kg, which was given over 3 hours. This shows he had room for more fluid resuscitation if warranted.

With regards to induction techniques, two groups of patients with reduced ejection fraction were compared; the findings showed that induction with fentanyl (30mcg/kg) only, as opposed to diazepam, thiopentone, and fentanyl, resulted in no change in ejection fraction [11].

Etomidate is commonly used in patients with coronary artery disease, especially those presenting with poorly functioning left ventricles undergoing non-cardiac surgery, and its use presented lesser cardiovascular events and hemodynamic changes when compared with a propofol-based anaesthesia [12].

In our setting, critical care management is commonly hindered by resource limitations. First line medications in septic shock like noradrenaline are not always available in theatre. Consultants who have specialized in

cardiac anaesthesia are also scarce. ICU beds, while bedded, are often beset with delayed access due to infrastructural constraints and bed turnover delay.

Conclusion

In order to successfully manage a patient in acute decompensated heart failure presenting for emergency non-cardiac surgical condition, consideration must be made with regards to adequate risk stratification, extensive patient history of co-morbidities and treatment, intra-operative goals and post operative plans.

Although significant advancements have been made in the management of sepsis in the context of acute decompensated heart failure, it remains important to underscore the successful management strategies employed by resource-limited institutions.

Consent

Informed consent for publishing anonymously was given verbally by the patient and signed by his brother. After recovery, the patient was able to sign the consent himself.

Conflict of interest

No conflicts of interest.

Funding statement

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