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Surgical Wound Infection Due to Sepsis in a Patient with Chronic Kidney Disease: A Case Report

Randolph Serep Marantuan [a,b*]

[a] *Department of Anesthesiology, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia.*
[b] *Regional General Hospital, Dr. Chasbullah Abdulmadjid, Bekasi, Indonesia.*

Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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Case Report

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ABSTRACT

Background: Chronic Kidney Disease (CKD) is a progressive condition that causes a gradual Background: Chronic Kidney Disease (CKD) is a progressive condition that causes gradual decline in kidney function and increases patient susceptibility to infection. One of the serious complications that can occur in CKD patients is sepsis, especially if there is an untreated infection, such as a surgical wound infection. The combination of CKD and sepsis worsens the prognosis and requires comprehensive and multidisciplinary management.

Aim: The study aims to examine patients who have chronic kidney disease and have a surgical wound infection caused by Sepsis Et Causa.

Case Report: A 62-year-old female patient came to the Emergency Department of CAM Hospital, Bekasi, with complaints of a surgical wound seeping since ± 1 hour before hospitalisation. The wound was initially swollen for 5 months before hospitalisation, and fluid came out of the swelling.

**Corresponding author: Email: randolph.marantuan@uki.ac.id;*

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Nausea (+), vomiting (-), defecation dbn. For the past few months, the patient complained of persistent fatigue, decreased appetite, and discomfort in the stomach. In addition, the patient's urination frequency increased at night, discolouration (-), blood (+), foam (+). ICU management focuses on fluid resuscitation to improve tissue perfusion, broad-spectrum antibiotics to treat surgical site infections, and organ support, including cardiovascular stabilisation with vasopressors if needed, renal management with close monitoring of fluids and electrolytes, and respiratory support with mechanical ventilation. The prognosis of this patient is affected by the combination of severe sepsis and CKD 4a, which increases the risk of mortality without aggressive therapy.

Conclusion: Based on the analysis, patients with a diagnosis of CKD 4a and Sepsis et causa surgical wound infection require intensive care in the ICU due to clinical conditions that show signs of multi-organ dysfunction due to severe sepsis. Wound infection in the surgical wound that developed into a right psoas abscess became the main source of infection that contributed to the occurrence of sepsis, exacerbated by the underlying condition of CKD 4a. Decreased kidney function (eGFR 21 mL/minute/1.73 m²), increased creatinine, metabolic acidosis, and anaemia due to CKD worsen the body's ability to fight infection. Clinically, the patient showed symptoms of hypotension, tachycardia, low oxygen saturation, and leukocytosis, which were supported by qSOFA scores of 2 and SOFA 5, confirming the presence of a systemic inflammatory response with dysfunction in the respiratory, cardiovascular, and renal systems. Based on the analysis, patients with a diagnosis of CKD 4a and Sepsis et causa surgical wound infection require intensive care in the ICU due to clinical conditions that show signs of multi-organ dysfunction due to severe sepsis. The patient's prognosis depends on the speed and effectiveness of intervention, considering that sepsis in patients with comorbid CKD has a significant risk of mortality.

Keywords: CKD 4a; sepsis; surgical site infection; psoas abscess; ICU care.

1. INTRODUCTION

Chronic kidney disease (CKD) is a progressive disease with no cure and high morbidity and mortality that occurs commonly in the general adult population, especially in people with diabetes and hypertension (Kalantar-Zadeh et al., 2021). It is a medical condition characterised by a gradual and permanent decline in kidney function, defined as kidney damage or a decrease in the glomerular filtration rate (GFR) lasting for three months or more. Diagnostic criteria include one or more of the following: Glomerular Filtration Rate (GFR) less than 60 mL/min/1.73 m²; albuminuria, as defined by urinary albumin greater than 30 mg per 24 hours or a urinary albumin-to-creatinine ratio greater than 30 mg/g; abnormalities in the urinary sediment; histologic or imaging abnormalities suggestive of kidney damage; and a history of kidney transplantation (Kalantar-Zadeh et al., 2021, International Society of Nephrology, 2022, Romagnani et al., 2018). CKD can also be classified into five stages based on the severity of the decline in kidney function, with stage 1 indicating normal or increased GFR (>90 mL/min/1.73 m²) and stage 5 indicating end-stage renal failure (<15 mL/min/1.73 m²) (Romagnani et al., 2018, Senan et al., 2021, Chen et al., 2019).

The primary causes of CKD vary by setting, with those that are common and well-studied, such as diabetes, hypertension, and glomerulonephritis. Still, the causes of CKD are not fully understood (Deng et al., 2025). Epidemiological data show that chronic kidney disease can be found at all ages, but the elderly ≥ 60 years, have a higher risk of suffering from chronic kidney disease. Patients with CKD exhibit an elevated cardiovascular risk manifesting as coronary artery disease, heart failure, arrhythmias, and sudden cardiac death (Jankowski et al.,2021; Francis et al., 2024).

Chronic kidney disease is also more common in men than women with a ratio of 3: 1.6, 7 A systematic review and meta-analysis of 100 studies involving a total of 6,908,440 patients, reported a global prevalence of 13.4% for chronic kidney disease stages 1–5 and 10.6% for stages 3–5 (Arora, 2023, GBD Chronic Kidney Disease Collaboration, 2020). The US prevalence reported a drastic increase in the prevalence of chronic kidney disease in several age groups, with an increase of 6% in the 18-44 age group, 12% in the 45-64 age group, and 38% in the ≥ 65 age group (Tomlinson & Clase, 2019). The prevalence of chronic kidney disease was higher in men than in women. In a study, the prevalence of chronic kidney disease in men was 9.6% and

in women 8.6% (GBD Chronic Kidney Disease Collaboration, 2020).

The Ministry of Health of the Republic of Indonesia, through Riskesdas 2018, reported the prevalence rate of chronic kidney disease diagnosed by doctors in Indonesia in 2018, reaching 3.8 per thousand of the Indonesian population. This prevalence rate has increased significantly when compared to the Riskesdas 2013 report on the prevalence of chronic kidney disease, which was 2 per thousand of the total population of Indonesia (Nasution et al., 2020, Ministry of Health of the Republic of Indonesia, 2018). The highest prevalence was in North Kalimantan province, which was 6.4 per thousand, while the lowest prevalence was in West Sulawesi province, with a prevalence of 1.8 per thousand. According to the Riskesdas report, the most common chronic kidney disease sufferers in Indonesia are in the 65-74 year age group, with a higher incidence in men. The percentage of chronic kidney disease sufferers undergoing hemodialysis in Indonesia is 19.3% (Nasution et al., 2020, Ministry of Health of the Republic of Indonesia, 2018). A study on the global burden of chronic kidney disease reported that there were 1.2 million global deaths due to chronic kidney disease. The study also estimates that by 2040, chronic kidney disease will be the fifth leading cause of death globally (Ministry of Health of the Republic of Indonesia, 2018). PAHO (Pan American Health Organisation) reported the mortality rate of chronic kidney disease during 2019. The mortality rate of chronic kidney disease in 2019 was 254,028 total deaths. The age-standardised death rate of chronic kidney disease is estimated to be 15.6 deaths per 100,000 population (Pan American Health Organization, 2021).

The pathophysiology of chronic kidney disease involves a slow, progressive, and irreversible loss of renal function and structure. The mechanisms that cause this depend on the underlying disease. However, the progressive damage to the structural and functional components of the surviving nephrons is mediated by vasoactive molecules, which cause increased hemodynamics and capillary pressure in the glomerulus (Gyurászová et al., 2020, Thaha et al., 2019, Chelluboina & Vemuganti, 2019). This process is an adaptation process that can last for a short time, followed by a maladaptation process in the form of sclerosis of the remaining nephrons. In the maladaptation process, nephron function will decline progressively and cause disturbances in the balance of water and electrolytes (especially sodium and potassium). The progression of chronic kidney disease may continue until the patient requires renal replacement therapy, such as dialysis (Yoshida et al., 2020).

2. CASE REPORT

A 62-year-old female patient came to the Emergency Room of CAM Bekasi Hospital on December 8, 2024 with complaints of a seeping surgical wound since ± 1 hour before the operation. The wound was initially swollen for 5 months before the operation, this morning fluid came out of the swelling. Nausea (+), vomiting (-), defecation dbn. For the past few months, the patient has complained of constant fatigue, decreased appetite, and discomfort in the stomach. In addition, the patient's urination frequency has increased at night, discolouration (-), blood (+), foam (+). The patient complained of a history of right kidney stones that had been operated on about 6 months ago at Anna Hospital. In addition, the patient also has a history of hypertension that has been controlled with amlodipine 10 mg. The patient's blood pressure is currently stable with the therapy given. The patient underwent surgery for right kidney stones for indications of right nephrolithiasis at Anna Hospital about 6 months previously (Simanjuntak & Wahyono, 2020).

Physical Examination

Examination was conducted on December 8, 2024.

- **Body Weight**: 65 kg
- **Height**: 160 cm
- **BMI**: 25.39 (overweight)
- **General Condition**: Appears severely ill
- **Consciousness**: Compos mentis
- **ASA**: 2

Vital Signs

- **Blood Pressure**: 179/83 mmHg
- **Pulse Rate**: 83 bpm
- **Respiratory Rate**: 20 breaths/min
- **Temperature**: 36.7°C
- **Oxygen Saturation**: 98%

General Status

- **Head**: Symmetrical, normocephalic
- **Eyes**: Normal, no conjunctival anaemia, no hyperemia, no scleral icterus, direct light reflex +/+, indirect light reflex +/+

- **Ears**: Normotia, symmetrical
- **Nose**: No turbinate hypertrophy, no septal deviation, no discharge
- **Mouth**: No pale mucosa, no coated tongue
- **Neck**: No lymph node enlargement

Thorax

- **Inspection**: Symmetrical chest wall movement, intercostal retraction present
- **Palpation**: Symmetrical vocal fremitus
- **Percussion**: Resonant bilaterally
- **Auscultation**: Normal vesicular breath sounds +/+, no rhonchi, no wheezing

Heart

- **Inspection**: Point of maximal impulse (PMI) not visible
- **Palpation**: PMI palpable two fingerbreadths
- **Percussion**: Right heart border at the right sternal line at the level of the 4th intercostal space (ICS), left heart border at the left midaxillary line at the level of the 5th ICS
- **Auscultation**: Regular S1-S2 heart sounds, no additional heart sounds

Abdomen: Soft, no tenderness on palpation, no pain on percussion, positive bowel sounds.

Extremities: No visible fractures/dislocations, no oedema in all extremities, warm peripheries.

Skin: Within normal limits.

Wound Status: Erythema and abscess observed on the right psoas region.

DIAGNOSIS

Pre-Operative Diagnosis

1. Chronic Kidney Disease (CKD) stage 4A
2. Surgical wound infection due to right psoas abscess
3. Hypertension
4. Multiple right nephrolithiasis

Post-Operative Diagnosis

1. Sepsis due to surgical wound infection
2. Post-operative right ureteroscopy (URS)
3. Insertion of the right DJ stent
4. Surgical exploration

Management

- **Emergency Department (ED)**
  - Wound toilet
  - IV Fluids: Ringer Lactate at 20 drops/min
  - Ketorolac injection 30 mg, 3 times daily
  - Omeprazole injection 40 mg, twice daily
  - Ceftriaxone injection 2 g, once daily
  - Metronidazole injection 500 mg, 3 times daily
- **Surgical Procedures**
  - Right ureteroscopy (URS)
  - Insertion of right DJ stent
  - Anesthesia: General anesthesia

3. DISCUSSION

The patient who came with complaints of an oozing surgical wound, and had a history of kidney stone surgery and hypertension, showed symptoms that suggested sepsis, which was further exacerbated by a right psoas abscess as a source of infection. On initial arrival, the patient showed signs of severe infection with hypotension, tachycardia, and difficulty breathing, which were consistent with severe sepsis. Laboratory examinations supported the diagnosis of sepsis, with leukocytosis (55.4 thousand/uL), increased procalcitonin (>100), and decreased albumin (2.30 g/dL), indicating a systemic inflammatory reaction. The patient's renal function was also impaired with increased creatinine (2.46 mg/dL) and low eGFR (21 mL/min/1.73), indicating acute renal dysfunction. In management, the patient received appropriate antibiotic therapy, as well as fluid support and medications to stabilise blood pressure and renal function (Sinusi & Hargono, 2021).

3.1 Diagnosis of Chronic Kidney Disease 4a

The diagnosis of Chronic Kidney Disease (CKD) stage 4A is determined based on several main criteria. At this stage, the estimated glomerular filtration rate (eGFR) is between 15 - 29 mL/min / 1.73 m², which indicates severe and irreversible kidney damage. At this stage, significant proteinuria is often defined as a urinary albumin-creatinine ratio ≥ 300 mg / g (or ≥ 30 mg/mmol), which indicates further kidney damage. If using direct proteinuria measurements, urinary protein excretion of more than 500 mg in 24 hours can also be considered an important indicator (Ammirati, 2020, Lee, 2021, Dimeski & Treacy, 2022).

Table 1. Assessment and plan for surgical management

Time	Subjective (S)	Objective (O)	Assessment (A)	Plan (P)
12-17-2024 ICU day 1	Post op URS dextra, insertion of DJ stent dextra, exploration. Complaints cannot be assessed	KU: Looks sick. Seriously Consciousness:Under the influence of medication BP: 84/63 mmHg Temperature: 36oC HR: 127x/minute RR: 24x/minute SpO2: 90% on ETT Drain (+) in the left abdomen Diuresis 0.33 cc/kgBW/hour Fluid intake 2050 cc, output 380 cc Fluid balance (+) 1670 cc Hb 11.4 g/dL L 55.4 thousand/uL Ht 33.5 g/dL Platelets208 thousand/uL Albumin 2.30 g/dL GDS 126 mg/dL Na 133 mmol/L K 3.4 mmol/L Cl 93 mmol/L	1. Post Op URS dextra 2. Insertion of DJ stent dextra 3. Exploration 4. Sepsis et causa surgical wound infection	1. Plan 2. AP/PA chest x-ray 3. Plain BNO post op 4. ABG Fluids 1. Ringer Lactate 400 mL 2. Tutosol 400 mL 3. Modor 100:10 mg/10 cc 4. NaCl 0.9% Injection 1. Ceftriaxon e 1x2 gr 2. Metronide zole 3x500 mg 3. Dexketopr ofen 2x1 amp 4. Omeprazole e 2x1 amp 5. Furosemide 1x40 mg, 6 hours post op 6. Drip paracetam oil 3x1 gr 7. ethylpre dnisolone 1x6.25 mg Orally 1. Bisoprolol 1x2.5 mg 2. Ramipril 1x1.5 mg 3. Atorvastati n 1x40 mg 4. Chana 3x2 tab
12-18 2024 ICU day 2	The complaint cannot be reviewed	KU: Looks seriously ill Consciousness: Compos mentis BP: 103/66 mmHg Temperature: 36.5oC HR: 93x/minute RR: 19x/minute SpO2: 99% 10.30 WIB extubated GDS 222 mg/dL Procalcitonin > 100 Ureum 27 mg/dL Creatinine 2.46 mg/dL eGFR 21mL/min/1.73 AGD results: pH 7.417 PCO2 25.4 PO2 117.1 HCO2 16.7 BE -6.2 SAT O2 97.8 AA DO2 355.5	1. Post Op 2. URS dextra 3. Insertion of DJ stent dextra 4. Exploration 5. Sepsis et causa surgical wound infection	1. BNO plain post op 2. AGD + FG 3. Check PCT Fluid 1. Ringer Lactate 500 mL Injection 1. Ceftriaxon e 1x2 gr 2. Metronide zole 3x500 mg 3. Dexketopr ofen 2x1 amp 4. Omeprazole 2x1 amp 5. Drip paracetam oil 3x1 gr 6. Methylpre dnisolone 1x6.25 mg 7. Meropene m 3x1 gr Orally 1. Bisoprolol 1x2.5 mg 2. Ramipril 1x1.5 mg 3. Atorvastati n 1x40 mg 4. Chana 3x2 tab

Time	Subjective (S)	Objective (O)	Assessment (A)	Plan (P)
12-19-2024 ICU day 3	Complaint cannot be reviewed	KU: Looks severely ill Consciousness: compos mentis BP: 138/102 mmHg Temperature: 36oC HR: 103x/minute RR: 22x/minute SpO2: 99% Rib retraction + Slem +/+ Albumin 2.7 g/dL	1. Post Op URS dextra 2. Insertion of DJ stent dextra 3. Exploration 4. Sepsis etcausa surgical wound infection	BNO plain pos op Fluid 1. Ringer Lactate Injection 1. Meropene m 3x1 gr 2. Metronide zole 3x500 mg 3. Dexketopr ofen 2x1 amp 4. Omeprazole e 2x1 amp 5. Drip paracetam oil 3x1 gr 6. Methylpre dnisolone 1x6.25 mg 7. Perdipine Oral 8. Bisoprolol 1x2.5 mg 9. Ramipril 1x1.5 mg 10. Atorvastati n 1x40 mg 11. Chana 3x2 tab

Table 2. Diagnostic analysis of chronic kidney disease 4a

Cases	Theory
Anamnesis: • RPS: Constant fatigue, decreased appetite, GI disturbances (nausea), Nocturia, Blood (+), and foamy urine (+). • RPD: right nephrolithiasis, hypertension controlled with amlodipine 10 mg. • Surgical history: Right nephrolithiasis surgery 6 months ago	• Persistent fatigue: A typical symptom of CKD due to anaemia or retention of uremic toxins. • Decreased appetite: Possibly related to uremia syndrome. • Nausea: A common symptom of uremia in patients with advanced CKD • Nocturia: A typical symptom of CKD due to decreased urine concentrating ability of the kidneys (Kalantar-Zadeh et al., 2021, International Society of Nephrology, 2022, Romagnani et al., 2018) • Blood (+): Hematuria indicates possible glomerular damage or urinary tract infection (UTI). • Foam (+): Proteinuria, an important sign of chronic kidney damage • Hypertension: a major risk factor for the development of CKD (Forbes & Gallagher, 2020) • Nephrolithiasis right: contributes to long-term kidney damage (Forbes & Gallagher, 2020)
Physical examination: • BMI: 25.39 (overweight). • Vital signs: hypertension (179/83 mmHg)	Overweight contributes as a risk factor for CKD through the mechanism of chronic inflammation and metabolic stress. The combination with hypertension can accelerate the progression of CKD (Forbes & Gallagher, 2020). Hypertension is the main cause and complication of CKD. The mechanism involves glomerulosclerosis due to increased intraglomerular pressure and activation of RAAS (Renin-Angiotensin-Aldosterone System), which causes vasoconstriction and glomerular fibrosis. Uncontrolled hypertension accelerates the decline in eGFR (Forbes & Gallagher, 2020)
Supporting examination: Kidney function • Urea: 50 mg/dL (normal: 20–40 mg/dL) → Increased. • Creatinine: 2.46 mg/dL (normal: 0.5–1.3 mg/dL) → Increased. • eGFR: 21 mL/minute/1.73 m² (normal: ≥90 mL/minute/1.73 m²) → Stage 4 CKD Urinalysis • Clarity: Cloudy (normal: Clear). • Occult Blood: +2 (normal: negative).	• eGFR < 30 mL/min/1.73 m² indicates CKD stage 4a. Increased creatinine indicates decreased renal nephron function due to structural damage. Urea is increased due to retention of nitrogenous toxins in CKD.26 • Occult Blood (+2): Indicates hematuria which often occurs in glomerular damage. Nitrite and Bacteria (+): Urinary tract infection (UTI), which is common in CKD patients due to decreased immune system. Leukocyte Esterase and Leukocytes (+): Evidence of inflammation in the urinary tract. Turbidity: Proteinuria or pyuria consistent with CKD. Proteinuria, hematuria, and infection are hallmarks of progressive CKD.26

Cases	Theory
• Nitrite: Positive (normal: negative). • Leukocyte Esterase: +2 (normal: negative). • Bacteria: +1 (normal: negative). • Erythrocytes: 5–10 /LPB (normal: ≤2). • Leukocytes: 15–20 /LPB (normal: ≤5). • • pH: 5.5 (normal: 5.0–6.0) Hematology • Erythrocytes: 3.55 million/uL (normal: 4–5 million/uL) → Decreased. • Hemoglobin: 9.6 g/dL (normal: 11–14.5 g/dL) → Anemia. • Hematocrit: 28.9% (normal: 37–47%) → Low. ABG • HCO3: 16.7 mmol/L (normal: 22–26 mmol/L) → Metabolic acidosis. Non-contrast Urography: • Grade 2 right hydronephrosis. • Multiple right nephrolithiasis. • Right psoas abscess.	• Anaemia: A hallmark symptom of CKD, due to deficiency of erythropoietin produced by the kidneys. Normochromic normocytic anaemia is common in CKD due to erythropoietin deficiency, micro blood loss, or uremia.26 • Metabolic acidosis: Accumulation of uremic toxins that disrupt acid-base balance. Metabolic acidosis is common in advanced CKD because the kidneys fail to excrete hydrogen and ammonium ions.26 • Hydronephrosis indicates chronic obstruction that can worsen CKD. Chronic kidney stones further damage nephrons through inflammation and fibrosis. Renal obstructive diseases, such as nephrolithiasis, are one cause of progressive CKD.26
Daily Follow-up: • Day 1 Post-Op: Albumin low: 2.3 g/dL (normal: 3.5–4.5 g/dL). • Blood pressure: 84/63 mmHg → Hypotension. • eGFR: Still 21 mL/min/1.73 m². • Day 2 Post-Op: Procalcitonin: >100 mg/mL → Severe sepsis. Urea: 27 mg/dL → Stable. Creatinine: 2.46 mg/dL → Stable. • Day 3 Post-Op: Albumin increased: 2.7 g/dL. O_2 saturation: 99%.	Supporting the diagnosis of CKD 4a, with supporting factors: low eGFR and high creatinine consistent with CKD stage 4a. Proteinuria and hematuria, signs of progressive kidney damage. Normochromic normocytic anaemia due to erythropoietin deficiency. Metabolic acidosis is a complication of advanced CKD. Hydronephrosis and nephrolithiasis as factors that worsen kidney function. Infection (UTI and psoas abscess) worsens kidney function through systemic inflammation 26

Additional examinations, such as renal ultrasonography, are useful for assessing kidney structure and looking for the underlying cause of damage, while blood tests are needed to measure creatinine levels, electrolytes, and other parameters to assess kidney function and potential related complications. In CKD stage 4A, patients may experience a variety of symptoms, such as fatigue, nausea, loss of appetite, itching of the skin, changes in urination patterns, and muscle pain and cramps. Common complications in this stage include hypertension, anaemia, mineral and bone problems, and cardiovascular disease, which require further medical attention (Goligorsky, 2020, Forbes & Gallagher, 2020).

3.2 Diagnosis of Sepsis Et Causa of Surgical Wound Infection

Sepsis et causae of surgical wound infection is a serious condition that occurs due to the body's systemic response to infection at the surgical site, which can cause organ dysfunction and lead to death if left untreated. This condition is often caused by contamination of the surgical wound by pathogenic bacteria such as Staphylococcus aureus or Escherichia coli. The diagnosis of sepsis, especially that caused by postoperative wound infection, involves several important steps to ensure proper identification and treatment. The diagnosis of sepsis is based on the presence of systemic symptoms of inflammation (SIRS) accompanied by evidence of infection. SIRS criteria include body temperature > 38°C or < 36°C, heart rate > 90 beats/minute, respiratory rate > 20 breaths/minute, and abnormal leukocyte count (leukocytosis or leukopenia) (Gyawali et al., 2019). In the context of postoperative wound infection, a complete history is essential to identify symptoms such as fever, pain in the surgical area, and other signs of infection. Laboratory tests are also needed to support the diagnosis, including serum lactate level measurement, blood culture, and blood gas analysis to evaluate tissue perfusion status. In addition, organ dysfunction assessment using the SOFA (Sequential Organ Failure Assessment) system can help determine the severity of sepsis and guide further treatment (Forbes & Gallagher, 2020, Ammirati, 2020, Lee, 2021, Dimeski & Treacy, 2022).

3.3 ICU Management in CKD 4a and Sepsis Et Causa of Surgical Wound Infection

The patient was admitted to the ICU with a diagnosis of CKD 4a and Sepsis et causa to a surgical wound infection based on the results of anamnesis, physical examination, and supporting examinations. This patient has a history of CKD 4a which is characterised by a decrease in eGFR of 21 mL/minute/1.73 m², high creatinine (2.46 mg/dL), and increased urea (50 mg/dL). This decrease in kidney function is also accompanied by complications of anaemia (Hb 9.6 g/dL) due to erythropoietin deficiency, as well as metabolic acidosis indicated by low HCO_3 (16.7 mmol/L). As a patient with advanced CKD, this condition exacerbates the patient's susceptibility to infection due to uremic immune dysfunction, including impaired neutrophil and lymphocyte function, which contributes to the progression of wound infections (Forbes & Gallagher, 2020).

The sepsis in this patient was triggered by a surgical wound infection, characterised by an oozing wound and chronic swelling with a right psoas abscess seen on radiological examination. Urinalysis showed positive nitrite, positive leukocyte esterase, positive bacteria, and hematuria, indicating systemic infection. This condition was confirmed by laboratory results showing leukocytosis (19.4 thousand/uL) and procalcitonin >100 ng/mL, which specifically indicates severe infection or sepsis. Clinically, the patient showed symptoms of hypotension (84/63 mmHg), tachycardia (127x/min), and low SpO_2 (90% on ETT) on the first postoperative day, all of which indicate cardiovascular and respiratory dysfunction due to severe sepsis (Gotts & Matthay, 2016). Assessment using the qSOFA score showed a value of 2 (increased respiration and hypotension), indicating a high risk for severe sepsis (Agarwal & Nath, 2020). In addition, the patient's SOFA score reached 5, with contributions from respiratory dysfunction (low PaO_2/FiO_2, suspected from SpO_2 90%), renal dysfunction (high creatinine and low eGFR), and cardiovascular hypotension. This condition indicates multiorgan dysfunction (MODS) which requires aggressive treatment in the ICU. The patient met the criteria for intensive care due to hemodynamic instability, impaired oxygenation, and the risk of progressive organ failure if not treated promptly (World Health Organization, 2018, Ahmed et al., 2019).

The primary goals of ICU care are hemodynamic stabilisation, organ support, and systemic infection control. Hemodynamic stabilisation is necessary because patients exhibit signs of hypotension due to sepsis, which can compromise tissue perfusion. Organ support includes mechanical ventilation to improve

Table 3. Diagnostic analysis of sepsis ET causa of surgical wound infection

Cases	Theory
• Initial condition: Post-right kidney stone surgery (6 months previously). • Main complaint: Surgical wound seeping since ± 1 hour before admission, swollen for 5 months. • Physical examination: Wound appears swollen, inflamed (erythema) with abscess on psoas dextra. • Supporting examination: Leukocytosis: 19.4 thousand/uL (normal: 5–10 thousand/uL). • Procalcitonin >100 ng/mL → severe sepsis. • Urinalysis: Nitrite (+), leukocyte esterase (+), bacteria (+), hematuria (+). • Radiology: Right psoas abscess (hypodense lesion) in the post-operative area. • Right hydronephrosis and multiple left cysts. • Signs of Organ Dysfunction: Impaired organ perfusion: Hypotension, oliguria, eGFR 21 mL/min/1.73 m² (renal compromise). Metabolic acidosis (HCO_3 16.7 mmol/L). Daily Follow-Up Results in ICU Day 1 • Blood Pressure: 84/63 mmHg (hypotension). • HR: 127x/minute (tachycardia). • RR: 24x/minute (tachypnea). • O2 saturation: 90% (on ETT). • Albumin:2.30 g/dL (hypoalbuminemia). • Hb: 11.4 g/dL (mild anaemia). • Leukocytes: 55.4 thousand/uL (severe leukocytosis). • eGFR: 21 mL/minute/1.73 m² (severe renal impairment). Day 2 • HR: 93x/min (mild tachycardia). • Procalcitonin >100 ng/mL: Sign of severe sepsis. • pH: 7.417, HCO3: 16.7 mmol/L → Metabolic acidosis Day 3 • BP: 138/102 mmHg (hypertension). • HR: 103x/min (tachycardia). • RR: 22x/min (mild tachypnea). • Rib retraction and mucus secretion production (mild respiratory distress). • Albumin: 2.7 g/dL (still low).	qSOFA38 Criteria • Respiration 24x/minute (first day post-op) (RR ≥ 22 times/minute): 1 • Blood pressure 84/63 mmHg (first day post-op) (SBP ≤ 100 mmHg): 1 • No significant change in consciousness (compos mentis): 0 Total qSOFA Score: 2 → High possibility of sepsis, need further evaluation. SOFA39 Criteria ● Respiration: 2 ● Coagulation: 0 ● Liver: 0 ● Cardiovascular: 1 ● Kidney: 2 ● Central Nervous: 0 Total SOFA Score: 5 → Indicates multiorgan dysfunction (respiratory, renal, and cardiovascular). The diagnosis of Sepsis et causa surgical site infection is supported by:33-36 • Increased leukocytes, high procalcitonin, and a clear source of infection (psoas abscess). • Hypotension, leukocytosis, decreased renal perfusion, and impaired organ function during follow-up suggest organ dysfunction due to sepsis. • High creatinine and low eGFR support the presence of sepsis-related renal impairment and pre-existing CKD 4a.

oxygenation and renal function monitoring to manage metabolic acidosis, fluid imbalance, and toxin retention due to CKD 4a. Systemic infection control is achieved through broad-spectrum antibiotics targeted to surgical site infections and psoas abscesses. Patients also require fluid resuscitation to restore tissue perfusion, and additional interventions such as vasopressors if hypotension persists (Forbes & Gallagher, 2020). Advantages of ICU admission include intensive monitoring of vital signs and organ function, allowing early detection of clinical deterioration. The ICU also provides rapid access to medical interventions, such as vasopressors, emergency dialysis, or aggressive fluid therapy. With organ support facilities, the ICU allows for stabilisation of respiratory function through mechanical ventilation and management of renal impairment due to CKD. In addition, the ICU allows for optimisation of sepsis therapy by closely monitoring the patient's response to antibiotics and fluids. Overall, intensive care in the ICU aims to prevent further deterioration, including septic shock or multiple organ failure, and to increase the patient's chances of achieving clinical improvement (Ahn et al., 2021). The patient's prognosis is highly dependent on the speed and effectiveness of the interventions provided (Indonesian Nephrology Association, 2015). Management of the patient in the ICU focuses on fluid resuscitation to improve tissue perfusion, broad-spectrum antibiotics to treat surgical site infection, and organ support, including cardiovascular stabilisation with vasopressors if needed, renal management with close monitoring of fluids and electrolytes, and respiratory support with mechanical ventilation. The prognosis of this patient is affected by the combination of severe sepsis and CKD 4a, which increases the risk of mortality without aggressive therapy. Therefore, timely management of wound infection, blood pressure control, and stabilisation of renal function are the top priorities in the management of this patient (Gyawali et al., 2019, World Health Organization, 2018, Gotts & Matthay, 2016).

4. CONCLUSION

Based on the analysis, patients with a diagnosis of CKD 4a and Sepsis et causa surgical wound infection require intensive care in the ICU due to clinical conditions that show signs of multi-organ dysfunction due to severe sepsis. Wound infection in the surgical wound that developed into a right psoas abscess is the main source of infection that contributes to the occurrence of sepsis, exacerbated by the underlying condition of CKD 4a. Decreased kidney function (eGFR 21 mL/minute/1.73 m²), increased creatinine, metabolic acidosis, and anaemia due to CKD worsen the body's ability to fight infection. Clinically, the patient showed symptoms of hypotension, tachycardia, low oxygen saturation, and leukocytosis, supported by qSOFA scores of 2 and SOFA 5, confirming the presence of a systemic inflammatory response with dysfunction in the respiratory, cardiovascular, and renal systems. The main goals of ICU care are to overcome hemodynamic instability, support organ function, and control systemic infection with broad-spectrum antibiotics and fluid resuscitation. The presence of ICU facilities allows for intensive monitoring, rapid intervention, and organ support such as mechanical ventilation for respiration, as well as renal management to overcome CKD complications. With aggressive therapy and integrated management, ICU care aims to prevent disease progression to septic shock or more severe multi-organ failure, while increasing the patient's chances of clinical recovery. The patient's prognosis depends on the speed and effectiveness of intervention, considering that sepsis in patients with comorbid CKD has a significant risk of mortality.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology.

CONSENT

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

Agarwal, A., & Nath, K. A. (2020). Pathophysiology of chronic kidney disease progression: Organ and cellular considerations. In *Chronic Renal Disease* (2nd ed., pp. 263–278). https://doi.org/10.1016/B978-0-12-815876-0.00018-8

Ahmed, H. G., Alzayed, F. S. M., et al. (2019). Etiology of chronic kidney disease (CKD) in Saudi Arabia. *International Journal of Medical Research & Health Sciences, 8*(5), 177–182.

Ahn, Y. H., Kang, H. G., & Ha, I. S. (2021). Risk factors for the progression of chronic kidney disease in children. *Child Kidney Disease*, *25*, 1–7. https://doi.org/10.3339/jkspn.2021.25.1.1

Ammirati, A. L. (2020). Chronic kidney disease. *Revista da Associação Médica Brasileira*, *66*(Suppl 1), S3–S9. http://dx.doi.org/10.1590/1806-9282.66.S1.3

Arora, P. (2023). Chronic kidney disease. *Medscape*. https://emedicine.medscape.com/article/238798-overview

Chelluboina, B., & Vemuganti, R. (2019). Chronic kidney disease in the pathogenesis of acute ischemic stroke. *Journal of Cerebral Blood Flow & Metabolism*, *39*(10), 1893–1905. https://doi.org/10.1177/0271678X19866733

Chen, T. K., et al. (2019). Chronic kidney disease diagnosis and management. *JAMA, 322*(13), 1294–1304. https://doi.org/10.1001/jama.2019.14745

Deng, L., Guo, S., Liu, Y., Zhou, Y., Liu, Y., Zheng, X., ... & Shuai, P. (2025). Global, regional, and national burden of chronic kidney disease and its underlying etiologies from 1990 to 2021: A systematic analysis for the Global Burden of Disease Study 2021. *BMC Public Health*, *25*(1), 636.

Dimeski, G., & Treacy, O. (2022). Biochemical tests for diagnosing and evaluating stages of chronic kidney disease. In *IntechOpen* (Vol. 2, pp. 59–74). https://doi.org/10.5992/intechopen.1000205

Forbes, A., & Gallagher, H. (2020). Chronic kidney disease in adults: Assessment and management. *Clinical Medicine*, *20*(2), 128–132.

Francis, A., Harhay, M. N., Ong, A. C., Tummalapalli, S. L., Ortiz, A., Fogo, A. B., ... & International Society of Nephrology. (2024). Chronic kidney disease and the global public health agenda: An international consensus. *Nature Reviews Nephrology*, *20*(7), 473–485.

GBD Chronic Kidney Disease Collaboration. (2020). Global, regional, and national burden of chronic kidney disease, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. *The Lancet, 395*(10225), 709–733. https://doi.org/10.1016/S0140-6736(20)30045-3

Goligorsky, M. S. (2020). Chronic kidney disease: A vicarious relation to premature cell senescence. *The American Journal of Pathology*, *190*(6), 1–8. https://doi.org/10.1016/j.ajpath.2020.01.016

Gotts, J. E., & Matthay, M. A. (2016). Sepsis: Pathophysiology and clinical management. *BMJ*, *353*, i1585. https://doi.org/10.1136/bmj.i1585

Gyawali, B., Ramakrishna, K., & Dhamoon, A. S. (2019). Sepsis: The evolution in definition, pathophysiology, and management. *SAGE Open Medicine*, *7*, 1–8. https://doi.org/10.1177/2050312119835043

Gyurászová, M., Gurecká, R., et al. (2020). Oxidative stress in the pathophysiology of kidney disease: Implications for noninvasive monitoring and identification of biomarkers. *Oxidative Medicine and Cellular Longevity*, 2020, Article ID 5478708, 1–11. https://doi.org/10.1155/2020/5478708

Indonesian Nephrology Association (Pernefri). (2015). *8th report of Indonesian renal registry*. Indonesia: Pernephri.

International Society of Nephrology. (2022). KDIGO 2021 clinical practice guideline for the management of blood pressure in chronic kidney disease. *Kidney International, 102*(5S), S1–S127.

Jankowski, J., Floege, J., Fliser, D., Böhm, M., & Marx, N. (2021). Cardiovascular disease in chronic kidney disease: Pathophysiological insights and therapeutic options. *Circulation*, *143*(11), 1157–1172.

Kalantar-Zadeh, K., Jafar, T. H., Nitsch, D., Neuen, B. L., & Perkovic, V. (2021). Chronic kidney disease. *The Lancet, 398*(10262), 786–802. https://doi.org/10.1016/S0140-6736(21)00519-5

Lee, V. (2021). Advances in chronic kidney disease pathophysiology and management. *Australian Journal of General Practice (AJGP)*, *50*(4), 188–192.

Ministry of Health of the Republic of Indonesia. (2018). *2018 National Riskesdas Report*. http://repository.bkpk.kemkes.go.id/3514/1/Laporan%20Riskesdas%202018%20Nasional.pdf

Nasution, S. H., Syarif, S., & Musyabiq, S. (2020). Chronic kidney disease stage 5 based on age determinants, gender, and etiological diagnosis in Indonesia in 2018. *JK Unila, 4*(2), 157–160.

Pan American Health Organization. (2021). *The burden of kidney diseases in the Region of the Americas, 2000–2019*. https://www.paho.org/en/enlace/burden-kidney-diseases

Romagnani, P., Remuzzi, G., et al. (2018). Chronic kidney disease: A global perspective. *Nature Reviews Nephrology, 3*(17088), 1–24.

Senan, E. M., Al-Adhaileh, M., et al. (2021). Diagnosis of chronic kidney disease using effective classification algorithms and recursive feature elimination techniques. *Hindawi*, 2021, Article ID 1004767, 1–10. https://doi.org/10.1155/2021/1004767

Simanjuntak, T. D., & Wahyono, T. Y. M. (2020). The relationship between type 2 diabetes mellitus and chronic kidney disease in Indonesian population in 2014–2015 (data analysis of IFLS 5). *Indonesian Journal of Health Epidemiology, 4*(2), 37–42.

Sinusi, R., & Hargono, A. (2021). Diabetes, hypertension, obesity, and smoking as risk factors for chronic kidney disease in productive age. *Periodical Journal of Epidemiology, 9*(1), 88–95. https://doi.org/10.20473/jbe.v9i12021.88–95

Thaha, M., Widiana, I. G. R., et al. (2019). The role of inflammation in chronic kidney disease. *Indonesian Journal of Kidney and Hypertension (InaKidney)*, *2*(3), 4–13.

Tomlinson, L. A., & Clase, C. M. (2019). Sex and the incidence and prevalence of kidney disease. *Clinical Journal of the American Society of Nephrology, 14*(11), 1557–1559. https://doi.org/10.2215/CJN.11030919

World Health Organization. (2018). *WHO sepsis technical expert meeting, 16–17 January 2018*. https://apps.who.int/iris/bitstream/handle/10665/330086/WHO-HIS-SDS-2018.7-eng.pdf

Yoshida, Y., Kashiwabara, K., Hirakawa, Y., et al. (2020). Conditions, pathogenesis, and progression of diabetic kidney disease and early decline in Japan. *BMJ Open Diabetes Research & Care, 8*, e000902. https://doi.org/10.1136/bmjdrc-2019-000902

Yoshida, Y., Kashiwabara, K., Hirakawa, Y., et al. (2020). Conditions, pathogenesis, and progression of diabetic kidney disease and early decline in Japan. *BMJ Open Diabetes Research & Care*, *8*, e000902. https://doi.org/10.1136/bmjdrc-2019-000902

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