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A CASE REPORT ON SEPSIS

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ABSTRACT

Sepsis is a critical condition that arises when the body's immune system reacts excessively to an infection. It is linked to an inflammatory response and a presumed infection. Severe sepsis is identified when sepsis leads to organ dysfunction and reduced tissue perfusion. When sepsis is accompanied by ongoing low blood pressure or the requirement for vasopressors, even after sufficient fluid resuscitation, it is termed septic shock. We present a case of a middle-aged female diagnosed with sepsis, who came to EMR with the features of fever with chills associated with generalized weakness since 3 days, along with Hepatomegaly, Left mild hydronephrosis, Proximal ureter calculous, Left hydrosalpines, and Type II diabetes. The diagnosis is confirmed by Sonography of abdomen and pelvis, evidence for organ dysfunction, supported by blood culture and sensitivity test conforming infection, and abnormal laboratory parameters including elevated WBC count, neutrophils, platelet count, C-reactive protein, and decreased haemoglobin, and lymphocytes. Management included antibiotics, anti-diabetics, analgesics, anti-pyretics, proton pump inhibitors, nutritional supplements, dietary supplements, and additional supportive measures, with a stepwise strategy designed to manage the infection and halt the advancement of sepsis.

Keywords: Sepsis, Hepatomegaly, Hydronephrosis, Ureter calculous, Hydrosalpines.

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INTRODUCTION

Sepsis is identified as a systemic condition that arises when microbes invade the healthy areas of the body (Lever & Mackenzie, 2007). Sepsis ranks among the top causes of illness and death globally (Srzić et al., 2022). Sepsis affects people of all ages (Namas et al., 2012). The recent global analysis revealed that around 20 million people die annually due to sepsis, and it affects around 160 million individuals globally. The Global Burden of Disease study stated that most of these fatalities are among the adults aged 20 and above (Woo et al., 2026). Sepsis according to WHO (World Health Organization) mainly results from bacterial infection but can be a consequence of various other infections like viruses, fungi, and parasites. Antimicrobial resistance is the key cause that might result in clinical insensitivity to treatment and may quickly develop into sepsis and septic shock. And patient's found with drug-resistant pathogens were shown to have a high risk of mortality. According to the CDC Guidelines, sepsis is usually caused by infections of the gastrointestinal tract, lungs, skin, or urinary tract Sepsis may cause tissue damage, and organ failure leading to death if it is not treated. Pathophysiology of sepsis involves an infection, which leads to activation of immune system and release of inflammatory mediators and cytokines. Due to excessive inflammatory response, it causes vasodilation, increased vascular permeability, and impaired tissue function, which leads to sepsis and organ dysfunction (ATrain Education, n.d.). As per the WHO, some of the common signs and symptoms of sepsis are fever, confusion, shivering, difficulty breathing, clammy, weak pulse, hypotension (low blood pressure), and decreased urine output. The common symptoms in children are pale skin, lethargy, difficulty waking up, and convulsions. Symptoms in children under 5 years of age include frequent vomiting, lack of urination. The coexistence of microbial infection and a systemic inflammatory response is necessary for the diagnosis of sepsis. However, clinical assessment remains as the primary approach, as signs and symptoms vary depending upon the type of pathogen, site of infection, and disease progression. Laboratory investigations like white blood cell count, neutrophil count, creatinine levels, and C-reactive protein support the diagnosis of sepsis. Treatment of sepsis involves early diagnosis, identification and control of the infection source, administration of antimicrobial therapy, vasopressors such as nor-epinephrine may be required for persistent hypotension. Supportive therapy includes sustaining proper levels of ventilation, oxygenation, blood pressure, cardiac output according to the patient's condition. Antibiotic therapy should be

monitored and modified according to the culture and sensitivity results (ATrain Education, n.d.).

CASE PRESENTATION

A 49-year-old female patient who is a known case of Sepsis with Hepatomegaly, Left mild hydronephrosis, Proximal ureter calculous, Left hydrosalpines, presented with fever with chills associated with generalized weakness since 3 days. On detailed history, the patient was married, and had a history of type II diabetes mellitus. The patient does not have significant past surgical history, family history and social history. She underwent Sonography of abdomen and pelvis, which was abnormal with Hepatomegaly, Left mild hydronephrosis, Proximal ureter calculous, Left hydrosalpines. The CRP level was found to be 134.24 mg/L, which is significantly higher than the normal value of <5mg/L, suggesting the presence of an infection. All other laboratory investigations are presented in Table 1. Considering all clinical and investigation findings, a planned treatment was developed for the patient. While she was admitted to hospital, she was treated with antibiotics, anti-diabetics, analgesics, anti-pyretics, proton pump inhibitors, anticonvulsants, nutritional supplements, dietary supplements, and other supportive care (Table 2). The patient was planned to receive antimicrobial therapy to control infection, supportive treatment to reduce symptoms, and to reduce progression of sepsis.

Table 1: Relevant parameters of the case

Sl. No.	Laboratory parameter	Measured value	Reference range
1	WBC	20100/cu.mm ↑	(4400-11000)/cu.mm
2	RBC	3.20million/cu.mm ↓	(3.80-5.50)million/cu.mm
3	Haemoglobin	7.8g/dl ↓	(12-15)g/dl
4	Haematocrit	24.5% ↓	(34-48)%
5	MCV	76.5fl ↓	(80-96)fl
6	MCH	24.2pg ↓	(27-31)pg
7	MCHC	31.6g/dl ↓	(32-37)g/dl
8	Platelet Count	728000/cu.mm ↑	(150000-400000)/cu.mm
9	RDW	15.4% ↑	(11.6-14)%
10	Neutrophils	82% ↑	(40-75)%
11	Lymphocytes	8% ↓	(20-45)%
12	Serum Sodium	131mmol/ ↓	(134-145)mmol/
13	C-Reactive Protein	134.24mg/L ↑	(<5.00)mg/L
14	Serum Creatinine	1.20mg/dl ↑	(0.60-1.10)mg/dl

Microbiology

Blood Culture and Sensitivity

Specimen	Blood
Organism Isolated	Escherichia coli

Table: Antibiotic Sensitivity and Resistance Profile

S. No	Antibiotic/Culture	Sensitivity/Resistance
1	Amoxicillin/Clavulanic Acid	Resistance
2	Trimethoprim/Sulfamethoxazole	Resistance
3	Ciprofloxacin	Resistance
4	Levofloxacin	Sensitive
5	Gentamicin	Sensitive

Technical Notes

Blood culture has been done by the automated method using 3D BacAlert system.

Note: Levofloxacin and Doxycycline are tested by routine disc diffusion testing as per CLSI guidelines.

Escherichia coli is BETA – LACTAMS EBSL (CTX-M LIKE) EXTENDED SPECTRUM BETA – LACTAMASE HL CEPHALOSPORINASE (AmpC)

Note: This isolate is an ESBL producer.

ESBL: Extended spectrum beta lactamase are enzymes that confer resistance to most beta-lactam antibiotics, including Penicillins, Cephalosporins, and the Monobactam (Aztreonam).

Suggested to avoid the above group of drugs, as it may lead to clinical failure.

Table 2: Drug chart

Sl. No.	Drug name	Generic name	Dose	ROA	FREQ
1	T. RIBOFLAVIN	Riboflavin	10mg	PO	OD
2	T. SAFROFER LP	Ferric Pyrophosphate with Vitamin C, Vitamin B12 and Folic acid tablets	1 Tab	P/N	OD
3	NEB DUOLIN	Ipratropium bromide/Levosalbutamol	500mcg/1.25mg	P/N	BD
4	NEB BUDECORT	Budesonide	0.5mg	P/N	BD
5	INJ. PIPTAZ	Piperacillin/Tazobactam	4gm/500mg	IV	TID

Sl. No.	Drug name	Generic name	Dose	ROA	FREQ
6	T. LEVOFLOX	Levofloxacin	500mg	PO	OD
7	T. PANTOP	Pantoprazole	40mg	PO	OD
8	INJ NEOMOL	Paracetamol	100ml	IV	TID
9	T. BECOBANK FORTE	Mecobalamin, Alpha Lipoic Acid, Pyridoxine and Folic Acid Capsules	1 Tab	PO	OD
10	T. QNERVE SR	Pregabalin/Methylcobalamin	75mg/1500mcg	PO	OD
11	T. DOLO	Paracetamol	650mg	PO	TID
12	T. GLIMY	Glimepiride	3mg	PO	OD

DISCUSSION

In this case study, a 49-year-old female patient with Hepatomegaly, Left mild hydronephrosis, Proximal ureter calculous, Left hydrosalpines, and Type II Diabetes mellitus was diagnosed with Sepsis. Sepsis is a clinical condition and is a systemic response to infectious agents like bacteria, viruses, fungi, and other parasitic organisms. Sepsis may also develop when bacterial components such as lipopolysaccharide (LPS) from gram negative bacteria, and lipoteichoic acid from gram positive bacteria release and interact with Toll-like receptors (TLRs) and stimulate an inflammatory response. Bacteria primarily cause sepsis, this condition can also be triggered by other microorganisms like viruses, fungi, and parasites (Ward., 2012). If sepsis is untreated, it may lead to tissue damage, organ failure, and eventually death. Sepsis affects people of all ages and is more likely in patients with underlying conditions that increase susceptibility to infection as reported by Namas et al. Majority of the sepsis related deaths occur in adults, specifically those aged 20 years and older, according to the study by the Global Burden of Disease as reported by Woo et al. In this study, the patient presented with fever with chills associated with generalized weakness which are common symptoms of sepsis. The patient underwent Ultrasonography of abdomen and pelvis, which revealed Hepatomegaly, Left mild hydronephrosis, Proximal ureter calculous, Left hydrosalpines. And laboratory findings like marked leucocytosis, neutrophilia, elevated levels of CRP, Blood culture that confirmed the presence of Escherichia coli bacteria, and elevated levels of serum creatinine suggested renal involvement. Collectively, all these clinical, laboratory, microbiological, and imaging findings performed a pivotal role in diagnosis confirmation of sepsis. The blood culture helps to identify the causative pathogen. Elevated creatinine levels suggested renal

involvement, it is important because acute kidney dysfunction may occur as part of organ failure due to sepsis. However, the severity and rate of the creatinine rise should be evaluated whether the patient meets the standard for acute kidney injury (Singer et al., 2016). The ultrasonography which revealed proximal ureter calculous, Left hydrosalpines, indicating urinary tract obstruction. And the patient has a comorbidity of Type II Diabetes Mellitus which may also have increased the patient's susceptibility to infection, and it is one of the important comorbidity in patients with sepsis (Costantini et al., 2021). The microbiological findings are essential for guiding antimicrobial therapy. According to the ISDA Guidance, the isolated E.coli is a gram-negative bacteria and was reported as ESBL-producing organism. The antimicrobial susceptibility testing showed resistance to amoxicillin/clavulanic acid, trimethoprim/sulfamethoxazole, and ciprofloxacin, while the isolate was susceptible to levofloxacin, and gentamicin. ESBL production is generally associated with β-lactam agents, and resistance to non-β-lactam agents is determined by antimicrobial susceptibility testing (ISDA, 2026). Management of sepsis includes prompt antimicrobial therapy, along with symptomatic treatment to control infection, to prevent organ dysfunction and progression of the condition. Antibiotic therapy should be monitored and modified according to the culture and sensitivity results (ATrain Education, n.d.). In this case, the patient was treated with antibiotics to treat infection, anti-diabetics to control diabetes mellitus, analgesics to treat fever, anti-pyretics to reduce pain, proton pump inhibitors to prevent gastric irritation, nutritional supplements and dietary supplements to maintain the levels of iron, haemoglobin and essential nutrients, and other supportive care, with step-up approach planned to control infection and prevent further progression of sepsis.

CONCLUSION

This case highlights the importance of early detection of sepsis, as timely diagnosis was vital. Early confirming the diagnosis early through imaging studies such as ultrasonography, along with abnormal laboratory, microbiology findings, allows antimicrobial therapy to begin promptly and a step-by-step management approach to be followed, which helps to prevent progression of sepsis and improve clinical outcomes.

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ABBREVIATIONS

WBC: White Blood Cells, RBC: Red Blood Cells, MCV: Mean Corpuscular Volume, MCH: Mean Corpuscular Haemoglobin, MCHC: Mean Corpuscular Haemoglobin Concentration, RDW: Red cell Distribution Width.

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