COMPREHENSIVE CLINICAL CASE STUDY

Acute Kidney Injury with Pneumonia Complication

PATIENT INFORMATION

Patient ID:	CS-2024-001
Name:	Mr. Theodore Martinez
Age:	77 years
Gender:	Male
Date of Admission:	March 15, 2024
Hospital:	Metropolitan Medical Center
Attending Physician:	Dr. Sarah Chen, MD
Department:	Internal Medicine

CHIEF COMPLAINT

77-year-old male presenting with acute kidney injury (AKI), fever, productive cough, and respiratory distress following 3-day illness progression.

HISTORY OF PRESENT ILLNESS

Mr. Martinez was in his usual state of health until 3 days prior to admission when he experienced the sudden onset of a shaking chill followed by high fever (temperature reaching 38.6°C). Subsequently, he developed a productive cough with rusty-colored sputum, progressive fatigue, and lethargy. His symptoms have progressively worsened over the past 72 hours, with persistent fever, increased cough frequency, and the development of shortness of breath.

The patient reports decreased oral intake due to poor appetite and nausea. He denies chest pain, but acknowledges mild dyspnea on exertion that has worsened to dyspnea at rest. He has noticed decreased urine output over the past 24 hours. No recent travel, sick contacts, or changes in medications prior to illness onset.

PAST MEDICAL HISTORY

1. Hypertension - well-controlled on current regimen for past 8 years
2. Prostate adenocarcinoma - diagnosed 5 years ago, treated with external beam radiation

therapy, currently in remission
3. Osteoarthritis - primarily affecting knees and lower back
4. Benign prostatic hyperplasia - managed conservatively
5. History of kidney stones - last episode 3 years ago

CURRENT MEDICATIONS

1. Hydrochlorothiazide 25 mg daily
2. Lisinopril 10 mg daily
3. Ibuprofen 400 mg as needed for arthritis pain
4. Multivitamin daily
5. Calcium carbonate 1000 mg twice daily

SOCIAL HISTORY

Mr. Martinez is a retired construction foreman who lives with his spouse of 52 years. He has a 30 pack-year smoking history but currently smokes only 2-3 cigarettes per day. Alcohol consumption is minimal, approximately 1 drink per week. He denies illicit drug use. He remains active with gardening and light home maintenance activities.

FAMILY HISTORY

Father: Died at age 82 from myocardial infarction, history of diabetes and hypertension
Mother: Died at age 79 from stroke, history of atrial fibrillation
Siblings: Two brothers, one with diabetes, one with prostate cancer
Children: Three adult children, all healthy

PHYSICAL EXAMINATION

Temperature:	38.6°C (101.5°F)
Blood Pressure:	90/60 mmHg
Heart Rate:	110 bpm, regular
Respiratory Rate:	24 breaths/minute
Oxygen Saturation:	88% on room air
Weight:	82 kg (181 lbs)
Height:	175 cm (5'9")
BMI:	26.8 kg/m²

SYSTEM EXAMINATION

General: Elderly male appearing acutely ill, mildly dehydrated with dry mucous membranes. Alert and oriented x3 but appears fatigued.

HEENT: Normocephalic, atraumatic. PERRLA, EOMI. Dry mucous membranes, no oral lesions. Neck supple, no lymphadenopathy or thyromegaly.

Cardiovascular: Tachycardic, regular rhythm. No murmurs, rubs, or gallops. Peripheral pulses present but weak. No peripheral edema.

Pulmonary: Tachypneic with mild accessory muscle use. Decreased breath sounds at right lung base with coarse crackles. Dullness to percussion over right lower lobe.

Abdominal: Soft, non-tender, non-distended. Normal bowel sounds. No hepatosplenomegaly or masses palpated.

Extremities: No cyanosis, clubbing, or edema. Good range of motion despite mild arthritis changes in knees.

Neurological: Alert and oriented x3. Cranial nerves II-XII intact. Motor strength 5/5 in all extremities. DTRs 2+ and symmetric.

LABORATORY RESULTS

Test	Result	Reference Range
White Blood Cell Count	16,000/mcL	4,500-11,000/mcL
Neutrophils	70%	50-70%
Bands	20%	0-5%
Lymphocytes	10%	20-40%
Hemoglobin	10.2 g/dL	13.5-17.5 g/dL
Hematocrit	32%	41-53%

MCV	88 fL	80-100 fL
Sodium	140 mEq/L	136-145 mEq/L
Potassium	5.4 mEq/L	3.5-5.1 mEq/L
Chloride	100 mEq/L	98-107 mEq/L
Bicarbonate	19 mEq/L	22-28 mEq/L
BUN	40 mg/dL	7-20 mg/dL
Creatinine	3.8 mg/dL	0.7-1.3 mg/dL
Glucose	102 mg/dL	70-99 mg/dL

URINALYSIS

Parameter	Result	Reference
Specific Gravity	1.010	1.003-1.030
Protein	Trace	Negative
Glucose	Negative	Negative
Blood	Negative	Negative
Leukocyte Esterase	Negative	Negative
RBC	1/hpf	0-2/hpf
WBC	1-2/hpf	0-5/hpf
Casts	Granular casts present	None
Urine Sodium	40 mEq/L	Variable
FENa	2.41%	<1% (prerenal)
FEurea	53%	<35% (prerenal)

IMAGING STUDIES

Chest X-Ray: Right lower lobe consolidation consistent with pneumonia. No pleural effusion or pneumothorax. Heart size normal.

Renal Ultrasound: Normal kidney size and echogenicity bilaterally. No hydronephrosis, stones, or masses identified. Good cortical-medullary differentiation preserved.

CLINICAL ASSESSMENT

Primary Diagnoses:
1. Acute Kidney Injury (AKI) - likely acute tubular necrosis secondary to sepsis and dehydration
2. Community-acquired pneumonia - right lower lobe
3. Sepsis secondary to pneumonia
4. Dehydration

Secondary Diagnoses:
5. Acute on chronic kidney disease
6. Hypertension
7. History of prostate cancer - in remission
8. Osteoarthritis

TREATMENT PLAN

Immediate Management:
• IV fluid resuscitation with normal saline 1-2 L bolus, then maintenance fluids
• Empiric antibiotic therapy: Ceftriaxone 1g IV daily + Azithromycin 500mg daily
• Oxygen supplementation to maintain SpO2 >92%
• Monitor urine output with Foley catheter
• Serial monitoring of renal function and electrolytes

Supportive Care:
• NPO initially, advance diet as tolerated
• DVT prophylaxis with sequential compression devices
• Hold nephrotoxic medications (ACE inhibitor, diuretics)
• Pain management with acetaminophen (avoid NSAIDs)
• Pulmonary toilet and incentive spirometry

CLINICAL COURSE

Hospital Day 1-3: Patient responded well to IV antibiotics and fluid resuscitation. Blood pressure stabilized, fever curve downtrended. Repeat creatinine remained elevated at 3.8 mg/dL despite adequate hydration.

Hospital Day 4-7: Gradual improvement in respiratory symptoms. Patient began producing less sputum, oxygen requirements decreased. Creatinine began to trend downward to 2.8 mg/dL by day 5, and 2.0 mg/dL by discharge.

DISCHARGE PLANNING

Discharge Medications:
• Azithromycin 250mg daily x 3 more days
• Resume Lisinopril 5mg daily (reduced dose)
• Hold hydrochlorothiazide until nephrology follow-up
• Acetaminophen 650mg q6h PRN pain (avoid NSAIDs)

Follow-up Care:
• Primary care physician in 1 week
• Nephrology consultation in 2 weeks
• Repeat chest X-ray in 6 weeks
• Monitor renal function in 3-5 days

POST-DISCHARGE COMPLICATIONS

Two weeks post-discharge, patient returned for follow-up with complaints of increased joint pain due to prolonged bed rest during hospitalization. He had been self-medicating with celecoxib (Celebrex) for osteoarthritis pain. Laboratory studies showed creatinine increased to 2.5 mg/dL. Patient was counseled to discontinue NSAID use immediately.

Repeat laboratory studies 2 weeks after discontinuing celecoxib showed improvement in renal function with creatinine returning to 1.5 mg/dL, approaching his baseline of 1.4 mg/dL from one month prior to admission.

PATIENT EDUCATION POINTS

• Importance of medication compliance and avoiding nephrotoxic agents
• Recognition of signs/symptoms requiring immediate medical attention
• Proper hydration and infection prevention strategies
• Safe pain management alternatives to NSAIDs
• Regular monitoring of kidney function
• Smoking cessation counseling provided

This case demonstrates the complex interplay between acute illness, chronic conditions, and medication management in elderly patients. The development of AKI in the setting of pneumonia-induced sepsis, combined with the subsequent nephrotoxic injury from NSAID use, highlights the importance of careful medication reconciliation and patient education in preventing avoidable complications.

Document prepared: May 23, 2025
Case Study #: CS-2024-001