CASE 6.2
Acute Kidney Injury | Level 3

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LEARNING OBJECTIVES

1. Identify risk factors for and evidence of acute kidney injury (AKI).
2. Categorize the severity of a patient's AKI.
3. Identify medication-related problems.
4. Synthesize medication-related plans to improve renal insufficiency and alleviate harm due to renal insufficiency.
5. Develop monitoring parameters for a patient with AKI.

CHIEF COMPLAINT: Worsening fever, SOB, and fatigue for 10 days and unresponsive on the day of admission (36 hours ago)

History of Present Illness: The patient is an 8-year-old female with a 10-day history of wheezing, SOB, increased work of breathing, fatigue, and a dry, hacking cough. On day 3, she was started on cefdinir for a community-acquired pneumonia. She felt better for a few days, but the fevers persisted and her mother recorded an oral temperature of 104°F the day before admittance (day 6 of cefdinir treatment). Her mother stated that the patient had a decreasing appetite over the past few days. Her symptoms continued to worsen; she started "talking funny" and eventually became unresponsive yesterday afternoon. The mother called 911 and the patient was brought directly to the hospital. On admission, she was described as being in warm septic shock and intubated. Blood cultures were drawn (before the first dose of antibiotics), antibiotics were started, and she was sent to the pediatric intensive care unit. Inotropic support has been needed to maintain hemodynamic stability. A chest x-ray revealed an overwhelming right-sided pneumonia.

Review of Systems: Intubated and sedated patient

Birth History: Full term, vaginal

Past Medical History: Mild persistent asthma (well controlled, last asthma admission 13 months ago, discharged from the ED), allergic rhinitis

Past Surgical History: None

Social History: Lives with parents (married 20 years; mother is 40 and father is 42) and two older siblings (brother is 11 and sister is 15)

Family History: Brother—asthma; mother and father—healthy

Diet: Normal for age, until current issue (see History of Present Illness)

Immunizations: Up to date per records on file, received influenza vaccine this year

Allergies: Environmental, shellfish (hives, swelling)

MEDICATION HISTORY

Medication	Sig	Start Date	End Date	Taking	Authorizing Provider
Cetirizine (1 mg/mL)	2.5 mg (2.5 mL) po qhs	3 yr ago		Yes	Dr. Ferriat
Fluticasone 100 mcg/ Salmeterol 50 mcg	2 inhalations twice daily	08/10/2012		Yes	Dr. Wilmer
Albuterol	4 times daily prn wheezing	08/10/2012		Yes	Dr. Wilmer
Cefdinir (125 mg/5 mL)	175 mg (7 mL) po bid x 7 days	7 days PTA		Completed	Dr. Ferriat
Multivitamin	po daily in a.m.	3 yr ago		Yes	Dr. Ferriat

PTA = prior to admission.

PHYSICAL EXAM

On admission:

BP 75/35 mm Hg | Pulse 150 beats per min (bounding) | Temp 39.0°C (oral) | RR 13 breaths per min | Wt 25 kg | Ht 125 cm SpO_2 78% on room air | SvO_2 71% | capillary refill <1 second

Today:

BP 100/62 mm Hg | Pulse 100 beats per min Temp (max) 37.8°C (rectal) | RR 20 breaths per min (ventilated) | Wt 26.7 kg | Ht 125 cm SpO_2 95% (intubated) | $ScvO_2$ 85% | capillary refill 1 second

I/O (PAST 24 HOURS): 2,900 mL/350 mL

UOP (PAST 24 HOURS): 325 mL

UOP (PAST 12 HOURS): 100 mL

LDA: Intubated, double lumen PICC, arterial line, NG tube

GENERAL APPEARANCE: Patient is intubated and sedated

EYES: Pupils dilated, minimal reactivity to light

EARS: TMs clear bilaterally

THROAT: Clear mucous membranes, currently intubated

NECK: Moderate lymphadenopathy present

LUNGS: Intubated, rails still noted

HEART: RRR

ABDOMEN: Distended, bowel sounds faint but noted

MUSCULOSKELETAL: Edematous, warm, dry extremities

SKIN: Pitting edema noted, no pressure sores noted

NEUROLOGICAL: Adequately sedated, minimal pain/agitation reported per nursing

DIAGNOSTIC TESTS

BLOOD AND SPUTUM CULTURES ON ADMISSION: Gram + cocci in clusters in 2/2 bottles (preliminary)

CHEST X-RAY: Extensive pulmonary edema consistent with RLL and RUL pneumonia

ECG: No abnormal rhythms, QTc 390 ms

MEDICATIONS SINCE ADMISSION

COMPLETED MEDICATIONS

Rocuronium (10 mg/mL) 25 mg IV once

Ketamine (10 mg/mL) 25 mg IV once

Lidocaine (10 mg/mL) 25 mg IV once

0.9% NaCl 500 mL bolus × 3 on admission

0.9% NaCl at 100 mL/hr (D/C'd after 3 hours)

Gentamicin (10 mg/mL) 62 mg IV once

Meropenem (20 mg/mL in D5%W) 1,000 mg IV once

Vancomycin (5 mg/mL in D5%W premixed) 375 mg IV once over 1 hour

Cosyntropin (0.25 mg/mL) 0.25 mg IV once

Midazolam IV (5 mg/mL) IV continuous infusion, max rate of 0.8 mL/hr = 0.16 mg/kg/hr

Fentanyl IV (10 mcg/mL) IV continuous infusion, max rate of 10.0 mL/hr = 4 mcg/kg/hr

Norepinephrine (16 mcg/mL) IV continuous infusion, max rate of 37.5 mL/hr = 0.4 mcg/kg/min