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## Case Studies in Acute Renal Failure; Scabies: A Case Study

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# Chapter 1—Case Studies in Acute Renal Failure

Christine L. Boutzale, MD, and Richard J. Simons, MD, FACP

## I. INTRODUCTION

Acute renal failure (ARF) is triggered by an extremely diverse group of etiologies. The mortality of this condition remains high (possibly as high as 80% in intensive care settings). Death often results from complications such as infection or gastrointestinal bleeding. New therapies continue to emerge, but clinicians must understand the etiologies of ARF to prevent its occurrence and to start appropriate treatment early.

Although ARF is largely a hospital-acquired phenomenon, it is important to realize that the differential diagnosis for ARF depends on whether the patient is an outpatient or an inpatient. Approximately 80% of ARF cases occur in the inpatient setting. The classic categories for ARF include prerenal, renal, and postrenal causes. This article discusses 6 of the most common presentations of renal failure and provides illustrative case studies where appropriate. A brief overview of the causes, clinical findings, laboratory findings, and treatments will accompany each case. Glomerulonephritis can present as ARF, but it will not be discussed in this article.

## II. PRERENAL ACUTE RENAL FAILURE

### CASE PATIENT I PRESENTATION

Patient 1 is a 34-year-old man who is hospitalized with nausea, vomiting, and abdominal pain of 3 days duration. He has a history of alcohol and drug abuse. His medical history is unremarkable, and he is not on any medications. Admission laboratory values reveal a serum sodium level of 152 mg/dL. His potassium is 2.8 mg/dL, chloride is 124 mg/dL, and bicarbonate is 14 mg/dL. Blood urea nitrogen (BUN) is 96 mg/dL, and serum creatinine is 3.7 mg/dL. Blood glucose is 756 mg/dL. Serum calcium is 7.4 mg/dL, and his leukocyte count is 8000/mm<sup>3</sup>. Amylase is 256 U/dL

(normal, 0–140 U/dL), and lipase is 400 U/L (normal < 140 U/L). Urinalysis reveals hyaline casts, glucosuria, and ketonuria; no blood, protein, leukocytes, or other casts are seen in the urine. The patient is hydrated vigorously. He is diagnosed with diabetic ketoacidosis and acute pancreatitis; he is treated appropriately. A contrast computed tomography (CT) scan reveals prominent ascites throughout the abdomen involving the perirenal spaces, transverse mesocolon, and colonic gutters. The pancreas is edematous, and fatty stranding can be seen. The ileum and sigmoid colon are thickened. A left pleural effusion is present.

### • What is the apparent cause of patient 1's ARF?

- A) Prerenal secondary to decreased circulatory volume
- B) Direct renal toxicity
- C) Obstructive uropathy
- D) Diabetic nephropathy

### DISCUSSION

**The correct answer is A.** The category of prerenal ARF has many causes (**Table 1**). Azotemia results from decreased renal blood flow when the kidneys sense a decrease in effective circulatory volume, whether from systemic causes (such as hypoalbuminemic state) or from local causes (such as bilateral renal artery stenosis). As renal blood flow decreases, the glomerular filtration rate (GFR) decreases accordingly. This patient had 3 of the main causes of decreased effective circulatory volume: vomiting, osmotic diuresis, and third spacing. Third-space fluid losses also occur with severe burns, nephrosis, cirrhosis, or heart failure. The decrease in effective circulatory volume results in reduced perfusion to the brain and other vital organs, thereby activating the baroreceptors. Angiotensin II, norepinephrine, and antidiuretic hormone concentrations increase, resulting in vasoconstriction. Sodium and water reabsorption increase. The kidneys depend on this mechanism of increasing arteriolar resistance to maintain adequate glomerular filtration.

# Chapter 2—Scabies: A Case Study

David R. Adams, MD

## I. INTRODUCTION

Scabies is a contagious dermatitis caused by infestation with the *Sarcoptes scabiei* mite. The dermatitis is caused by a delayed cutaneous hypersensitivity reaction to the mite.<sup>1–6</sup> This condition typically presents with generalized severe, persistent pruritus that can be distressing to patients and is often their reason for seeking care. Mites are usually spread by skin-to-skin contact, although the organism can live on inanimate objects such as clothing or furniture for up to a few days. Because skin findings are variable, a diagnosis of scabies is easily missed. The condition may persist for years if undiagnosed.

## II. CASE PATIENT 6

Patient 6 is a 74-year-old obese man with stable diabetes, hypertension, and hypercholesterolemia who presents to his internist before his next scheduled appointment with what he calls “the worst itch of my life.” Examination reveals that patient 6 has dry skin and hemosiderin deposits on his lower legs. Faint red papules with a few excoriations are found on his abdomen and arms. Patient 6 reports that his itching started about 6 weeks ago and is worse at bedtime. Three months before the onset of itching, he was started on atorvastatin for elevated cholesterol. No other pertinent changes in medications or health history are noted. About 1 month before the rash began, patient 6 stayed with his son’s family in New York for 1 week.

The physician discontinues atorvastatin for patient 6 and schedules a follow-up examination. At follow-up, patient 6 reports worsened itching despite the discontinuation of atorvastatin and the use of over-the-counter treatments. During this visit, the rash is noted to involve his penis, and more extensive involvement is noted on his torso and extremities. A dermatologic consultation is ordered.

Patient 6 and his wife both present to the dermatologist at their wits’ end. The patient says he has never had such persistent itching, and his wife is now experiencing similar symptoms. Skin examination reveals sim-

ilar findings observed by his internist with the exception of one linear “burrow” and a few small papules on patient 6’s right hand and wrist (**Figure 2**). A careful scraping sample is taken using mineral oil. Microscopic examination of this scraping reveals a single moving *S. scabiei* mite, oval eggs, and mite feces (**Figure 3**).

- What are the most notable features of patient 6’s history and physical examination?
- What is involved in a differential diagnosis of scabies?

## DISCUSSION

### History, Physical Examination, and Diagnosis

Patient 6’s history is most pertinent for the “worst itch of his life.” Important aspects of patient 6’s history are (1) the fact that his itching and rash did not resolve after discontinuation of his anticholesterol medication, which can cause such symptoms, and (2) his stay with his son’s family, where the scabies infestation was most likely acquired. Anyone can be affected by scabies, but the condition is most commonly seen in patients with HIV and in those who are elderly, immunosuppressed, or institutionalized. Itching often occurs after 1 month of infestation, when a delayed immune response to mite antigen occurs. Household members often acquire scabies, as did patient 6’s wife. Associated pruritus is often worse at bedtime and can interfere with or prevent sleep.<sup>1–6</sup>

In cases of scabies, skin examination ranges from no apparent rash to generalized erythroderma. Excoriations are often noted from intense itching. Secondary impetiginization can occur and, rarely, cellulitis or bacteremia can complicate an infestation. When patient 6 first presented to his physician, he appeared to have itching out of proportion with his initial rash, an indicator of potential scabies. Gradually, his rash has become more extensive (**Figure 4**). Patient 6 does have stasis dermatitis on his lower extremities, but this rash has no relation to the scabies infestation. The papular eruption on his penis is another clue that suggests scabies, and the single burrow on his wrist is the most diagnostic finding from the skin examination. Scabies mites are often found between fingers, on wrists or feet, near the axilla or antecubital fossa, around the belt-line or umbilicus, around nipples in