

her chronic kidney failure at home.

Pathophysiology

Early in the course of progressive renal failure, the child remains asymptomatic with only minimal biochemical abnormalities. Unless the presence of CKD is detected in the process of routine assessment, signs and symptoms that indicate advanced renal damage frequently emerge only late in the course of the disease. Midway in the disease process, as increasing numbers of nephrons are totally destroyed and most others are damaged to varying degrees, the few that remain intact are hypertrophied but functional. These few normal nephrons are able to make sufficient adjustments to stresses to maintain reasonable degrees of fluid and electrolyte balance. Definitive biochemical examination at this time will reveal restricted tolerance to excesses or restrictions. As the disease progresses to the end stage, because of a severe reduction in the number of functioning nephrons, the kidneys are no longer able to maintain fluid and electrolyte balance, and the features of uremic syndrome appear.

The accumulation of various biochemical substances in the blood resulting from diminished renal function produces complications such as the following:

Retention of waste products, especially BUN and creatinine

Water and sodium retention, which contributes to edema and vascular congestion

Hyperkalemia of dangerous levels

Metabolic acidosis of a sustained nature because of continual hydrogen ion retention and bicarbonate loss

Calcium and phosphorus disturbances, resulting in altered bone metabolism, which in turn causes growth arrest or retardation, bone pain, and deformities known as **renal osteodystrophy**

Anemia caused by hematologic dysfunction, including a shortened life span of RBCs, impaired RBC production related to decreased production of erythropoietin, prolonged bleeding time, and