Total Papillary Necrosis

FIGURE 6-36
Schematic of the progressive stages of the papillary form of renal papillary necrosis and their associated radiologic changes seen on intravenous pyelography. Papillary necrosis occurs in one of two forms. In the medullary form, also termed partial papillary necrosis, the inner medulla is affected; however, the papillary tip and fornices remain intact. In the papillary form, also termed total papillary necrosis, the calyceal fornices and entire papillary tip are necrotic. In total papillary necrosis shown here, the lesion is characterized from the outset by necrosis, demarcation, and sequestration of the papillae, which ultimately slough into the pelvis and may be recovered in the urine. In most of these cases, however, the necrotic papillae are not sloughed but are either resorbed or remain in situ, where they becomes calcified or form the nidus of a calculus. In these patients, excretory radiologic examination and computed tomography scanning are diagnostic. Unfortunately, these changes may not be evident until the late stages of RPN, when the papillae already are shrunked and sequestered. In fact, even when the papillae are sloughed out, excretory radiography can be negative.

The passage of sloughed papillae is associated with lumbar pain, which is indistinguishable from ureteral colic of any cause and is present in about half of patients. Oliguria occurs in less than 10% of patients. A definitive diagnosis of RPN can be made by finding portions of necrotic papillae in the urine. A deliberate search should be made for papillary fragments in urine collected during or after attacks of colicky pain of all suspected cases, by straining the urine through filter paper or a piece of gauze. The separation and passage of papillary tissue may be associated with hematuria, which is microscopic in some 40% to 45% of patients and gross in 20%. The hematuria can be massive, and occasionally, instances of exsanguinating hemorrhage requiring nephrectomy have been reported. (From Eknoyan and coworkers [8]; with permission.)

FIGURE 6-37
Schematic of the progressive stages of the medullary form of renal papillary necrosis and their associated radiologic appearance seen on intravenous pyelography. In partial papillary necrosis the lesion begins as focal necrosis within the substance of the medullary inner stripe. The lesion progresses by coagulative necrosis to form a sinus to the papillary tip, with subsequent extrusion or resorption of the sequestered necrotic tissue. The medullary form of papillary necrosis is commonly encountered in persons with sickle cell hemoglobinopathy. The incidence of radiographically demonstrative papillary necrosis is as high as 33% to 65% in such persons.
CONDITIONS ASSOCIATED WITH RENAL PAPILLARY NECROSIS

- Diabetes mellitus
- Urinary tract obstruction
- Pyelonephritis
- Analgesic nephropathy
- Sickle hemoglobinopathy
- Rejection of transplanted kidney
- Vasculitis
- Miscellaneous

Avoided in these patients because of dye-induced nephrotoxicity. When sought, papillary necrosis has been reported in as many as 25% of cases. Analgesic nephropathy accounts for 15% to 25% of papillary necrosis in the United States but accounts for as much as 70% of cases in countries in which analgesic abuse is common. Papillary necrosis also has been reported in patients receiving non-steroidal anti-inflammatory drugs.

Sickle hemoglobinopathy is another common cause of papillary necrosis, which, when sought by intravenous pyelography, is detected in well over half of cases.

Infection is usually but not invariably a concomitant finding in most cases of RPN. In fact, with few exceptions, most patients with RPN ultimately develop a urinary tract infection, which represents a complication of papillary necrosis: that is, the infection develops after the primary underlying disease has initiated local injury to the renal medulla, with foci of impaired blood flow and poor tubular drainage. Infection contributes significantly to the symptomatology of RPN, because fever and chills are the presenting symptoms in two thirds of patients and a positive urine culture is obtained in 70%. However, RPN is not an extension of severe pyelonephritis. In most patients with florid acute pyelonephritis, RPN does not occur.

Diabetes mellitus is the most common condition associated with papillary necrosis. The occurrence of capillary necrosis is likely more common than is generally appreciated, because pyelography (the best diagnostic tool for detection of papillary necrosis) is avoided in these patients because of dye-induced nephrotoxicity. When sought, papillary necrosis has been reported in as many as 25% of cases. Analgesic nephropathy accounts for 15% to 25% of papillary necrosis in the United States but accounts for as much as 70% of cases in countries in which analgesic abuse is common. Papillary necrosis also has been reported in patients receiving non-steroidal anti-inflammatory drugs.

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References