Retroperitoneal Hemorrhage after Percutaneous Nephrostomy

Sixty-two kidneys in 57 patients were studied by computed tomography (CT) after percutaneous nephrostomy. Clinically unsuspected retroperitoneal hematomas were detected in eight kidneys (13%). In eight other patients, extrarenal collections of contrast material were noted. In none of the cases was a large hematoma seen or surgical intervention required.

Percutaneous nephrostomy has become an accepted technique for decompression of the renal collecting system [1, 2]. Evaluation of subcapsular or retroperitoneal hemorrhage after percutaneous nephrostomy is difficult by clinical means, and hence data are lacking concerning its incidence. Serendipitously, we had noted subcapsular or perirenal hematoma during computed tomography (CT) performed 1–2 days after percutaneous nephrostomy in two asymptomatic patients. To study this phenomenon, a 1 year prospective study was designed to evaluate all patients undergoing percutaneous nephrostomy for evidence of subcapsular, perirenal, or pararenal hemorrhage by CT scanning.

Subjects and Methods

During a 1 year period we attempted to obtain postprocedure CT scans in all patients undergoing nephrostomy tube placement. Because of scheduling errors seven patients failed to have a CT scan within 36 hr of nephrostomy tube placement and were excluded from the series. Pediatric patients were also excluded so as to avoid unnecessary radiation exposure (five patients). Fifty-seven patients were included in the study. Forty-eight were from Rhode Island Hospital and nine were from National Naval Medical Center, Bethesda. All patients were referred by urologists because of supravesical obstruction with azotemia and/or infection, urinary fistula, or a need for tube placement for a stone extraction or dissolution. Bleeding parameters were within normal limits as determined by platelet count, prothrombin time, and partial thromboplastin time.

In five patients bilateral nephrostomies were placed yielding a total of 62 kidneys drained by percutaneous nephrostomy. The Seldinger technique was used in 56 kidneys and the trocar-cannula technique in six kidneys. Renal localization was achieved with fluoroscopic or combined sonographic/fluoroscopic control, except in one case where sonography alone was used for percutaneous nephrostomy tube placement.

Briefly, both nephrostomy techniques, which are well described, begin with the initial placement of a 22 gauge needle into the collecting system [3–5]. After aspiration of urine, contrast material is injected to image the system for fluoroscopic placement of the percutaneous nephrostomy tube. In the Seldinger variation, an 18 gauge needle with an outer sheath is then placed percutaneously via a posterolateral approach through the renal parenchyma into the collecting system. Fascial dilators are successively passed over the guide wire to allow placement of an 8–10 French nephrostomy tube. The direct-stick trocar technique used the 7–11 French Sacks catheter (Elecath). Patients having percutaneous stone extraction were scanned by CT before dilation above 10 French.

Unenhanced CT was performed 6–36 hr after tube placements from the level of the liver to the pelvis. The patients were scanned randomly on either a GE 9800, GE 8800, or Ohio...
Nuclear Delta scanner. During CT evaluation, attention was paid to the retroperitoneum, especially the site of nephrostomy tube placement.

Results

Review of the CT scans of the 62 kidneys after nephrostomy tube placement disclosed 44 without evidence of complications. Two kidneys demonstrated thickened perirenal fascia. Scans of eight kidneys showed collections of contrast material in the retroperitoneum. These collections occupied the perirenal space in five cases, conforming predominately to the posterior part (fig. 1). The largest collection was $8 \times 2 \times 4$ cm. In three cases, posterior pararenal collections were observed. These did not displace the kidney; the largest collection measured $5 \times 4 \times 2$ cm. The eight extravascular fluid collections occurred only with nephrostomy tubes placed via the Seldinger technique.

CT demonstrated hemorrhage involving eight kidneys. All patients were asymptomatic. Hemorrhages were subcapsular in two (fig. 2), perirenal in four, and posterior pararenal in two kidneys (fig. 3). The smallest hemorrhage was subcapsular, measuring $5 \times 3 \times 2$ cm, while the largest was posterior pararenal, measuring $6 \times 4 \times 6$ cm. All patients were asymptomatic. Postnephrostomy hemorrhage occurred with both the Seldinger and trocar-cannula techniques.

There was clinical suspicion of hemorrhage after nephrostomy tube placement in only one case. An elderly man was diverted by a single percutaneous nephrostomy tube for bilateral ureteral obstruction secondary to prostatic carcinoma. A drop in hematocrit from 46% to 36% during the 12 hr after the procedure led to the clinical diagnosis of retroperitoneal hemorrhage. However, CT showed no evidence of hemorrhage, and hemodilution was accepted as the etiology of the decreased hematocrit.

Discussion

After its introduction in this country in 1954, percutaneous nephrostomy was a rarely performed procedure until the growth of interventional radiology in the late 1970s [4]. Today, percutaneous nephrostomy is performed more often than surgical nephrostomy and has an increasing list of indications [1, 2, 4].

Sepsis and tube dislodgment are accepted complications of percutaneous nephrostomy [5]. Massive hemorrhage requiring embolization or surgery is a rare but recognized complication occurring in about 1% of percutaneous nephrostomies [6]. Macroscopic hematuria, on the other hand, is much more common, occurring in nearly all patients [5]. If hematuria clears in 72 hr, it is considered to be self-contained and requires no further evaluation.

Clinically, there is little to suggest the presence of retroperitoneal hemorrhage after percutaneous nephrostomy. Several recent series in the nephrology literature indicate a surprisingly high incidence of hemorrhage after renal biopsy [7-9]. While only 1%–2% of these postbiopsy hemorrhages were suspected clinically, a 60%–85% incidence of hematomas was noted by CT. In the sole case in our series in which there was clinical suspicion of hemorrhage, no hematoma was noted by CT.
We detected only a 13% hematoma rate in our patients after percutaneous nephrostomy. Several hypotheses can be advanced to explain the discrepancy in hematoma rate by renal biopsy (60%–85%) versus percutaneous nephrostomy (13%). First, percutaneous nephrostomy uses an 18 gauge needle versus the 14 gauge Vim-Silverman cutting needle routinely used for renal biopsy. Second, cutting and tearing of tissue is necessary for recovering biopsy material. With percutaneous nephrostomy, the parenchyma, hypothetically, is pushed aside and the track is tamponaded with a nephrostomy tube. Third, percutaneous nephrostomy uses a posterolateral approach, while with biopsy, a direct posterior approach, closer to the renal vessels, is used.

Collections of contrast material in the retroperitoneum were noted in the scans of eight kidneys (fig. 1). However, these collections appeared to be of no clinical significance. Contrast material and urine are mixed in the renal pelvis during antegrade pyelography. The retroperitoneal collections probably occur by leakage from the renal pelvis during the track dilation and exchange of dilators and catheters inherent in the Seldinger technique. Potentially, this implies that when pyonephrosis is present, infected material from the renal pelvis would enter the extrarenal compartment in about 13% of patients.

Thickened fasciae were noted in two patients on postnephrostomy CT. Both patients were septic with pyonephrosis. The renal inflammation may have caused the perirenal fasciae to thicken. CT was not performed before percutaneous nephrostomy; hence we are unable to state whether these fascial changes actually preceded percutaneous nephrostomy.

In summary, percutaneous nephrostomy has a low rate of associated bleeding and hematoma formation. The 13% occurrence of subcapsular or extrarenal hematoma appears to be of no clinical significance. If a subcapsular or retroperitoneal hematoma is noted incidentally after percutaneous nephrostomy, generally it should be of no concern if there is no clinical suspicion of bleeding.

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