BILATERAL PERCUTANEOUS NEPHROSTOMY AS TREATMENT FOR SEVERE HEMORRHAGIC CYSTITIS

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Summary.- OBJECTIVE: To report a case of severe hemorrhagic cystitis successfully treated by bilateral percutaneous nephrostomy.

METHODS: The case of a 67-year-old female patient who had monosymptomatic gross hematuria with clots is reported.

RESULTS: Standard conservative treatments failed and the patient developed a clot-retention plugged bladder. Endoscopic evacuation and electrocoagulation of bleeding areas was unsuccessful. Due to persistent hematuria and development of renal failure and hemodynamic instability, bilateral percutaneous nephrostomy was performed. At 24 hours, hematuria ceased, patient recovered hemodynamic stability, and no additional blood transfusions were required.

CONCLUSIONS: Bilateral percutaneous nephrostomy may be a valuable option for the treatment of hemorrhagic cystitis when standard conservative measures have failed and as a prior step to performance of other more invasive procedures.

Keywords: Hemorrhagic cystitis. Percutaneous nephrostomy.

INTRODUCTION

Hemorrhagic cystitis (HC) is defined as diffuse acute or chronic bleeding from bladder mucosa of a variable etiology and severity. Mild, moderate, and severe forms of HC may be distinguished based on the severity of its clinical presentation (1). Mortality in severe HC may be up to 4%, and the morbidity rate associated to the condition is much higher.

Many therapeutic options with a different degree of invasiveness have been reported for hemorrhagic cystitis. These include hyperhydration, continuous bladder irri-
gation with serum, systemic administration of antifibrinolytic agents, endoscopic electrocoagulation of bleeding vessels, instillation of different agents in the bladder (silver nitrate, formaline, aluminium, or prostaglandins), hyperbaric oxygen therapy, surgical bladder tamponade, embolization/ligature of hypogastric arteries, surgical urinary diversion, and cystectomy.

We report a case of severe hemorrhagic cystitis successfully resolved by performing bilateral percutaneous nephrostomy after failure of standard conservative treatments. More invasive surgical procedures were not required.

CASE REPORT

The case of a 67-year-old female patient with no remarkable urological history reporting monosymptomatic gross hematuria with clots for the past 2 days is reported. Conservative management with bladder catheterization and a washing circuit with physiological saline was initially decided. At 24 hours the patient showed anemia and hypotension requiring vasoactive amines and transfusion of multiple units of packed red cells. A CT scan of abdomen and pelvis showed a bladder fully occupied by a big bladder clot and moderate secondary bilateral ureterohydronephrosis (Figure 1).

One liter of clots were evacuated by endoscopy. Bladder mucosa was hyperemic, with diffuse bleeding and no evidence of intravesical lesions. Electrocoagulation of several areas with active bleeding was performed.

The patient was admitted to the intensive care unit with orotracheal intubation and support treatment with vasoactive amines. Intravenous aminocaproic acid was added to treatment. After 24 hours, the bladder was plugged again and the patient continued to show anemia and hemodynamic instability despite transfusion of 10 units of packed red cells.

We therefore decided to perform bilateral percutaneous nephrostomy (PCN) to solve the obstructive problem caused by bladder occupation and try and reduce bleeding at that level.

Ultrasound and X-ray-guided bilateral percutaneous nephrostomy was uneventfully performed under general anesthesia in the Valdivia position, placing 8 Ch catheters through the lower calyx (Figure 2).

The patient significantly improved 24 hours after bilateral PCN. Hematuria ceased, and no additional blood transfusions were required. Vasoactive amines and orotracheal intubation were removed two days later, and patient was discharged from the intensive care unit on the fourth day.

Once the acute condition was resolved, an endoscopic review of the bladder was performed, at which biopsies were taken. The pathological study found as the only remarkable change the presence of an eosinophilic material around the submucosal blood vessels. This substance was stained with Congo red stain, acquiring an apple green color under exposure to polarized light with birefringence, which confirmed that it was amyloid (Figure 3). Immunohistochemical study of the lesion with monoclonal antibodies (mc1 clone) specific against amyloid protein AA was positive, which allowed for diagnosis
of secondary bladder amyloidosis (type AA). The postoperative course was uneventful. Nephrostomies were removed at 20 days, and patient was discharged at one month.

After 6 months of follow-up, the patient has not experienced hematuria again and is pending studies to rule out systemic involvement by amyloidosis.

DISCUSSION

Hemorrhagic cystitis is defined as diffuse acute or chronic bleeding from bladder mucosa of a variable etiology and severity. The most common causes of HC include chemotherapeutic treatment with cyclophosphamide and its derivatives and pelvic radiotherapy. Other potential causes of HC include antibiotics (penicillins), non-steroidal anti-inflammatory drugs, environmental toxins (anielines), infectious diseases (viral, bacterial, fungal, and parasitosis), and systemic diseases (collagen disease, amyloidosis) (2).

DeVries (1) proposed a classification of HC as mild, moderate, and severe based on the severity of its clinical presentation. Thus, severe HC is defined as hemorrhage requiring transfusion of 6 or more units of packed red cells to maintain the hemodynamic stability of the patient because of its duration and refractoriness to standard conservative therapeutic measures such as continuous bladder irrigation or administration of antifibrinolytic agents. Severe hemorrhagic cystitis has a 4% mortality, and a much greater associated morbidity.

Many therapeutic options have been proposed to manage hemorrhagic cystitis. Some authors have proposed increasingly invasive treatments depending on symptom severity and refractoriness of the condition (2). Conservative therapeutic options include hyperhydration, continuous bladder irrigation with manual evacuation of intravesical clots, and administration of antifibrinolytic agents. When standard conservative measures fail, endoscopic clot evacuation followed by electrocoagulation of bleeding vessels may be performed. Other therapeutic measures include hyperbaric oxygen therapy, well tolerated by patients, and intravesical instillation of different agents (silver nitrate, aluminium, prostaglandins, or formaline), inducing many side effects (3,4). As a final step, the following have been reported as valid options for a refractory condition: embolization/ligature of both hypogastric arteries (5), cystotomy and bladder tamponade (6), surgical urinary diversion (7) and, as a last resort, cystectomy (8).

In the case reported, because of persistent bleeding despite use of the standard conservative measures and endoscopic evacuation of clots with electrocoagulation of bleeding vessels, we chose an alternative with an intermediate invasiveness, a urinary diversion by bilateral percutaneous nephrostomy.

Percutaneous nephrostomy is an easy to perform standard endourological procedure showing a low mortality (<1%) and morbidity (<10%). The procedure allows for temporary and reversible urinary diversion and is less invasive than surgical urinary diversions (cutaneous ureterostomy, ureterosigmoidostomy, cutaneous ureteroileostomy). Both percutaneous nephrostomies were performed with the patient in a supine position as described by Gabriel Valdivia in 1987 (9). This position is used at our center for percutaneous nephrolithotomy. A supine position has various advantages over the prone position, both technical advantages for patients and advantages for anesthesia, particularly in patients with hemodynamic instability and on mechanical ventilation such as the one reported here.

To our knowledge, use of this procedure to treat hemorrhagic cystitis has only been reported in two articles in the international medical literature (10,11).

Urinary diversion by bilateral percutaneous nephrostomy for the treatment of severe HC has a dual value. On the one hand, by decreasing urinary flow to the bladder, rupture of friable mucosal blood vessels due to bladder overdistention is prevented. In addition, local levels of urokinase, a fibrinolytic enzyme synthesized by the liver and released in urine, are decreased, thus favoring hemostasis. This theory is supported by the effectiveness of local or systemic administration of antifibrinolytic drugs (epsilon-aminocaproic acid, tranexamic acid, and aprotonin). However, studies measuring urinary bladder excretion of urokinase in patients before and after urinary diversion are required to confirm this hypothesis.

Some authors have proposed association of ureteral occlusion with a balloon catheter to the percutaneous procedure. We think that this procedure is not necessary.
because almost all urine flows through the nephrostomy catheter, which opposes less resistance to flow than the ureter (12).

In our case, because of persistence of hemorrhagic cystitis and hemodynamic instability of the patient, a less invasive procedure than the previously reported surgical techniques was decided. By performing bilateral percutaneous nephrostomy, bladder overdistention was prevented, renal function of the patient was improved, and bleeding stopped at 24 hours. Percutaneous nephrostomies were subsequently removed with no sequelae for the patient. This adds to the low morbidity and mortality associated to the procedure the advantage of its reversibility, in contrast to open surgical procedures, which would be reserved as the final step in the therapeutic algorithm for hemorrhagic cystitis.

CONCLUSIONS

Bilateral percutaneous nephrostomy is a minimally invasive and reversible procedure that may be a valuable option for the treatment of severe hemorrhagic cystitis. We propose that this procedure is included in the therapeutic algorithm for hemorrhagic cystitis when more conservative measures fail and as a step prior to performance of more invasive surgical procedures.

REFERENCES AND RECOMMENDED READINGS
(*of special interest, **of outstanding interest)