

CASE REPORT

“Inferior Vena Cava Perforation During Right Percutaneous Nephrostomy: a Case Report with Critical Review”

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INTRODUCTION:

Percutaneous nephrostomy tube placement is commonly performed to relieve urinary obstruction. The percutaneous nephrostomy tract is also used for the treatment of pathologic processes, as for stone removal. Although percutaneous nephrostomy tube placement is a widely accepted and a relatively safe procedure, and it is currently the most commonly performed uro-radiologic intervention, the clinicians should be aware of this procedure and its potential complication¹. Potentially serious complications may occur, including severe bleeding, septicemia and injury to adjacent organs as bowel perforation, splenic injury, pleural injury, liver injury. Major complications rate of up to 7% have been reported².

KEY WORDS: percutaneous nephrostomy PCN, Inferior Vena Cava IVC Perforation

CASE REPORT:

Forty two year old male driver patient from Karbala, presented to the urological emergency department complaining from severe right loin pain for one day duration. His pain was severe agonizing colicky in nature radiated to the right lower abdomen, for which he had taken 4 Diclofenac sodium ampoules during the last day without response. He complained from 3 attacks of vomiting and epigastric upset, and he had history of similar attack of pain on the left side 2 years ago (diagnosed at that time as having left renal stone for which no intervention was taken at that time) and also had history of spontaneous stone passage 4 years ago. He was heavy smoker (4 packs/day) and had no family history of urinary stones formation.

His Urinalysis showed RBC 7-8 /HPF, pus cells

10-12/HPF, trace of albumin and amorphous urate crystals. Hb level was 14.5 gm/dl, random blood sugar 85 mg/dl, blood urea 58mg/dl and his creatinine was 3.3mg/dl.

Abdominal Ultrasound showed 14mm stone at distal 1/3 of right ureter causing mild hydronephrosis and more than 10 different size stones ranging from 7-8mm filling renal calices. Left kidney was of normal size but with decreased parenchymal thickness with staghorn stone of 63mm occupying renal pelvis. Plain abdominal X-ray showed radio-opaque stone at the course of distal right ureter with big size radio-opaque shadow in the left renal area.

Management plan was made, and included hospitalization for supportive measures such as antibiotic, pain killer, relieve the obstruction by right percutaneous nephrostomy till normalization of renal function, then ureteroscopic control of right ureteric stone by laser followed by percutaneous control of left renal staghorn stone by percutaneous nephrolithotomy (PCNL).

During insertion of nephrostomy tube under ultrasound guidance; access needle was inserted to the right PCS and clear urine started coming, and after which dilatation was done sequentially; then a nephrostomy tube was inserted. After declamping of the tube, a gush of frank blood (about 150 cc) passed through the tube.

The blood flow was non-pulsatile. Immediate clamping of nephrostomy and checking of vital signs had been done. Vital signs were normal. At radiology department; ultrasound showed the nephrostomy tube in the PCS. Doppler ultrasound study failed to show injury to Inferior Vena Cava (IVC) or renal vessels. Plain abdominal X-ray finding showed the end of the tube ascending upward in the epigastric area (Figure:1). CT scan (Figure: 2) showed the tube passing through the PCS and emerging out of renal parenchyma to pass closely to the IVC, but could not identify whether it passed through IVC or not.

Nephrostogram under fluoroscopy showed the tube passing through and through the IVC from

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its right to its left side, and the tip located to the left side of IVC(Figure: 3). Team work was established to deal with this case, consisting of interventional radiologist and vascular surgeon in addition to urologist. The distal 6 cm of the tube was withdrawn to be inside IVC as a first step, and all facilitations for the possibility of open exploration was ready.

After 4 hours all vital signs were normal and the ultrasound and Doppler study showed the tip of the tube inside IVC. The tube was removed completely with close observation. After 24

hours, patient's monitoring was completely normal. Two days later; right ureteroscopy showed lower third ureteric stone which was managed by laser lithotripsy (holmium-YAG laser) and Double J (DJ) stent was inserted(Figure: 4).

On the second postoperative day, the patient was discharged home, with normal vital signs, normal renal parameters, free of pain, normal urine output and appointment was made to remove right DJ stent and evaluation of left renal unit.

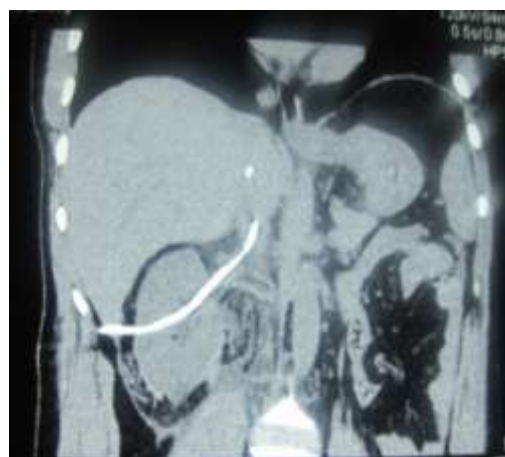


Figure:1 Plain abdominal X-ray shows nephrostomy tube passing to the left side upward

Figure: 2 nephrostomy tube passing through right kidney to left paramedian area upward



Figure: 3 Nephrostogram the contrast ascends upward in the IVC

Figure: 4 Plain abdominal X-ray with J ureteric stent in right ureter

DISCUSSION:

Reported hemorrhage, requiring blood transfusion, following PCN occurs in up to 4%, while documented vascular injury requiring intervention in up to 1% of cases³. Hemorrhage requiring transfusion with or without radiological or surgical intervention is uncommon, but is

certainly a dreaded complication that carries a mortality risk, and it represents 1-4%⁴. The first step in the management of non-pulsatile (non-arterial) bleeding from nephrostomy tube is tube clamping, vital signs checking and major vessel

checking by Doppler Ultrasound; this may be sufficient to control bleeding.

If bleeding recurs with tube de-clamping; the tube removal or pulling must be in the theater and observation with readiness for surgical intervention⁵. Tube removal is usually done under general anesthesia to make the surgeon ready for any intervention, but reviewing literatures showed that most patients did not need surgical intervention. Tube removal can be done without anesthesia but everything must be ready for operation⁵.

The factor which encourages the urologist to remove nephrostomy tube safely from any vein, is his experience with the subclavian catheter for hemodialysis which may be removed safely usually without sequel.

Nephrostomy tube may reach inferior vena cava during de novo percutaneous nephrostomy to drain renal pelvis or following percutaneous nephrolithotomy or following nephrostomy tube exchange⁵. PCN tube may enter any venous branch, through which it reaches the renal vein, then the vena cava or even the right atrium. For this patient, the tube as a whole, comes out of the renal pelvis, and enters the IVC directly from its right aspect and comes out from its other side.

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