



# Black pearl in urology: Inadvertent anastomosis of gonadal vein to ureter leading to malpositioning of stent into the inferior vena cava

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## ABSTRACT

Double- J (JJ) stents are commonly used in urological procedures. Minor and self limiting complications are common following JJ stenting. Malpositioning of JJ stent into the vascular system is a rare and a possibly fatal complication. We are reporting a case of a malpositioned JJ stent in the inferior vena cava (IVC), during Boari flap procedure for post-hysterectomy ureterovaginal fistula. Patient had undergone hysterectomy three months previously, and had ureterovaginal fistula possibly due to iatrogenic intraoperative injury. Patient underwent right-sided ureteroneocystostomy with Boari flap one week previously at other institute. Patient was admitted in our institution with complaints of fever, pain in abdomen and vomiting. In view of the symptoms of the patient, cross-sectional imaging with computed tomography scan was done which revealed an intraoperatively malpositioned JJ stent in the IVC, and well healed Boari flap was seen.

**Keywords:** Boari flap; JJ stent; malpositioned; ureterovaginal fistula.

## Introduction

Double-J (JJ) stents are commonly used during both endoscopic and open urological procedures, and they are both inserted through retrograde and antegrade routes. Despite of being commonly used JJ stent insertion is not free of complications, with common complications being irritative voiding symptoms, encrustation and migration. Most of the complications are minor and self limiting. Intravascular migration of JJ stent is a rare and a fatal complication.<sup>[1]</sup> We are hereby reporting a rare case of JJ stent being malpositioned into inferior vena cava (IVC) during Boari flap procedure due to misidentification of gonadal vein as ureter.

## Case presentation

A 40-year-old female patient was referred to the hospital with complaints of fever, pain abdomen and recurrent vomiting. She underwent right- sided ureteroneocystostomy with Boari flap for post-hysterectomy ureterovaginal fis-

tula one week previously. Hysterectomy was performed three months previously at same external center. Patient was admitted and proper resuscitation was done. Routine blood parameters were tested, and cross- sectional imaging was done in view of persistent fever and vomiting. Total leucocyte count was 13610/mm<sup>3</sup> and hemoglobin 8.6 gm/dL. Serum creatinine was 0.50 mg/dL and electrolytes were within normal limits. Patient's urine culture showed growth of extended spectrum beta-lactamase producing *Klebsiella pneumoniae* sensitive to tigecycline. Computed tomography (CT) of the abdomen demonstrated lower end of JJ stent in the bladder, which was malpositioned into the IVC, through a tubular structure adjacent to the bladder likely to be gonadal vein. The upper coil of the stent was lying at IVC-right atrium junction (Figure 1, 2). The entire right ureter was seen in continuity with presence of ureterovaginal fistula. After examination of CT scan it was inferred that during Boari flap procedure, the flap had been anastomosed to gonadal vein which was apparently

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Figure 1. Computed tomogram showing malpositioned stent in the suprarenal inferior vena cava



Figure 3. Postoperative nephrostographic image is showing free flow of contrast material down to the ureter



Figure 2. Reconstructed computed tomographic image is showing malpositioned stent with proximal end visualized outside the course of the normal ureter

misidentified as ureter. With the cardiovascular surgery team for standby the malpositioned stent was removed and percutaneous nephrostomy was placed. After stabilization of general condi-

tion and control of sepsis, the patient underwent exploration. Intraoperatively Boari flap was seen which was well healed. Right ureter was identified and a stented ureteroneocystostomy was performed with lateral side of Boari flap. Postoperative course was uneventful, nephrostomy was removed on 5<sup>th</sup> day postoperatively after performing nephrostogram which revealed smooth passage of contrast through ureter into the bladder (Figure 3). JJ stent was removed six weeks postoperatively.

## Discussion

Double-J stents are commonly used in urological operative practice. Minor complication caused by stents are irritative voiding symptoms, hematuria, encrustation and migration. Rare complications includes knotting, ureteric perforation with extra-anatomic stent placement and intravascular migration of stent.<sup>[2]</sup> Intravascular migration is a very rare but reported complication of JJ stenting.<sup>[3]</sup> The mechanism behind intravascular migration of the stent can be simultaneous perforation of adjacent walls of ureter and vein while negotiation of the guidewire. The stent then enters into the vascular system, with subsequent proximal migration. Malpositioning of JJ stent into the vascular system has also been reported in urological literature.<sup>[4,5]</sup> It was postulated that during surgery the gonadal vein was misidentified as ureter, which was anastomosed to the Boari flap. This tends to occur when there is intraoperative bleeding leading to poor vision, and misidentification of the anatomical structures. We also postulate a similar occurrence in our case, in which the surgeon has mis-

takenly anastomosed gonadal vein to the Boari flap, which was further confirmed by the cross-sectional imaging performed at our center. Our patient did not have any hematuria, which is difficult to explain. The possible cause of absence of hematuria may be the thrombosis of gonadal vein as a consequence of previous surgery. The thrombosed gonadal vein, which could be dilated might have given the false impression of ureter intraoperatively which lead to the complication. This can be avoided by proper knowledge of anatomical structures and their prompt identification as they lie in close proximity. In difficult and redo urological surgeries, it is imperative to identify the anatomical structures. Ureter should be identified by peristalsis, and efflux of urine. Fluoroscopic guidance during stent placement can help to avoid such deleterious complication.

The options available for the treatment of such a malpositioned or migrated J stent are radiological/ endoscopic or open procedures depending upon the location of the stent. In our case we performed a staged procedure, in the first stage we removed the stent endoscopically. In the second procedure, we performed the reconstruction in which the ureter was anastomosed to the Boari flap. We are reporting the present case in view of rare but possible complication of intravascular positioning of JJ stent. The take-home message is that proper identification of anatomical structures should be done intraoperatively, especially in difficult situations such as complex reconstructive and redo procedures.

**Informed Consent:** Written informed consent was obtained from patient who participated in this case.

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**Conflict of Interest:** The authors have no conflicts of interest to declare.

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