Injury to the lower urinary tract complicates 2.9% to 5.3% of all major vaginal and urogynecologic surgical procedures. Several authors have recommended the routine use of intraoperative cystoscopy during urogynecologic procedures. To evaluate possible injury to the lower urinary tract during intraoperative cystoscopy, the concomitant use of diuretics with indigo carmine dye has been advocated; efflux of dye is hypothesized to indicate functional patency of the urinary tract. This report describes a case in which a partial ureteral obstruction was present at the time of intraoperative cystoscopy—despite the observation of diuresis caused by furosemide. This case indicates that the efflux of indigo carmine-stained urine from both ureteral orifices is not conclusive evidence of the absence of ureteral insult during intraoperative cystoscopy.

Injury to the lower urinary tract complicates 2.9% to 5.3% of all major vaginal and urogynecologic surgical procedures. Several authors have recommended the routine use of intraoperative cystoscopy—with intravenous indigo carmine dye contrast—during urogynecologic procedures. Furthermore, the addition of an intravenous diuretic has been advocated to reduce the time from administration of the dye to its visualization in the bladder, particularly in cases in which more than 10 minutes have elapsed since intravenous injection of the dye. We found that a partial ureteral obstruction can be present at the time of intraoperative cystoscopy, but it may go undetected because of the diuresis caused by furosemide.

Report of Case
A 65-year-old woman reported to a urogynecology office with a protruding vaginal mass. The clinical examination revealed cystocele, enterocele, and uterine prolapse of grade III, based on the Baden-Walker halfway system. The patient subsequently underwent vaginal hysterectomy and bilateral salpingo-oophorectomy, enterocele repair, sacrospinous ligament fixation, perineorrhaphy, and cystoscopy. The enterocele was repaired using 2-0 polypropylene suture (Prolene; Ethicon Inc, Somerville, NJ). The suture incorporated bilateral uterosacral ligaments, cul-de-sac peritoneum, and the endopelvic fascia of the vagina. Two additional 2-0 sutures (Maxon; United States Surgical Corp, Norwalk, Conn) were similarly placed.

A cystoscopy was performed using a 70-degree cystoscope (Karl Storz Endoscopy, Culver City, Calif). Following the intravenous administration of indigo carmine dye, a diuretic—furosemide—was administered intravenously to enhance the excretion of the dye. Among our findings at this stage of the procedure were normal bladder mucosa, as well as efflux of indigo carmine-stained urine from the left (Figure 1) and right (Figure 2) ureteral orifices. Sacrospinous ligament fixation and perineorrhaphy were accomplished by use of methods similar to those described by Nichols.

On postoperative day 2, the patient complained of chills and was noted to have a temperature of 102.7°F (39.3°C). Blood and urine cultures were negative, and the patient’s white blood cell count was 6.2×10^9/µL. Her serum creatinine level increased from 0.8 mg/dL on postoperative day 1 to 1.5 mg/dL on postoperative day 3. A computed tomographic scan of the abdominopelvic region revealed mild left-sided hydronephrosis.

The patient was taken to the operating room, where a retrograde pyelogram was performed. Complete obstruction of the lower third of the left ureter was noted. Attempts to pass a double-J ureteral stent into the left ureter were unsuccessful. The right kidney and ureter were normal.

Next, the vaginal cuff was opened to allow the removal of the enterocele sutures. The stent was then easily passed into the left ureter and renal pelvis. Subsequently, the patient’s fever resolved, and tests indicated that her renal function returned to normal. The patient had an intravenous pyelogram (IVP) performed six weeks later, when the stent was removed. A final IVP two months after stent removal revealed a normal left kidney and ureter.
Comment
According to Jabs and Drutz, injuries to the lower urinary tract are reported to be as high as 5.3% during pelvic and urogynecologic surgical procedures. These and other researchers have also noted that routine use of intraoperative cystoscopy to evaluate ureteral integrity has been shown to effectively reduce the sequelae of operative injury to the lower urinary tract.1,2 A cystoscopic finding of efflux of urine from both ureteral orifices and the absence of bladder trauma are generally regarded as eliminating the possibility of iatrogenic lower urinary tract injury.5 Unfortunately, as seen in the current case, the efflux of indigo carmine-stained urine following the concomitant administration of a diuretic does not guarantee normal ureteral patency. A partially obstructed ureter may appear to have normal patency in such a scenario. Possibly as the result of the progression of inflammation and scarring in the immediate postoperative period, the partial obstruction may progress to complete obstruction.6

We believe that the partial obstruction of the ureter in the current case was caused by placement of the culdoplasty sutures in too lateral of a position. Placement of these sutures either lateral to, or distal on, the uterosacral ligament will result in greater likelihood of kinking of the ureter.

A search of the literature through the US National Library of Medicine’s MEDLINE database (using the keywords intraoperative cystoscopy, cystoscopy, pelvic surgery, vaginal surgery, and ureter) failed to identify any citation regarding the use of diuretics concomitantly with intravenous dye during intraoperative cystoscopy. We found one reference to the use of intravenous dye and diuretics in the obstetrics/gynecology literature.3 Consequently, there is little supportive evidence to guide decision making during intraoperative cystoscopy when both intravenous dye and diuretics are used.

Conclusion
The current case leads us to discourage the use of diuretics during intraoperative cystoscopy. In addition, we recommend careful interpretation of results from intraoperative cystoscopy when spillage of dye is observed from both ureteral orifices.

References