# Incidental Discovery of Adenocarcinoma of an Augmented Bladder in a Patient With Myelomenigocele Undergoing Cystolithotomy

**Majdee M. Islam, Amanda F. Saltzman, Alonso Carrasco Jr., and Ty Higuchi**

Bladder malignancy in patients with congenital bladder anomalies who have undergone bladder augmentation is a rare but well-recognized condition. These patients present with locally advanced or metastatic disease and have poor survival. We report a case of a patient with myelomeningocele who was incidentally found to have a high-grade intestinal type adenocarcinoma of her bladder augment at the time of cystolithotomy. This case highlights the need to continue to follow patients with congenital bladder anomalies and highlights the lack of adequate screening methods available. UROLOGY 113: 203–205, 2018. 

Bladder malignancy in patients who have undergone bladder augmentation is well reported, with an incidence 2 times higher than the general population,[1] and presentation at an advanced age and poor survival.[2] It appears that the congenital bladder itself, not the augmentation, increases the risk of malignancy.[3] Currently, the most recognized follow-up protocol for these patients is the Husmann protocol.[4] To date, this protocol has only identified patients with late-stage disease, and it is still unclear if a different screening strategy would identify these patients at an earlier stage.[4] Herein we report a case of a patient with myelomeningocele who was incidentally found to have bladder adenocarcinoma during cystolithotomy.

## CASE PRESENTATION

A 26-year-old woman with lumbar myelomeningocele and shunted hydrocephalus was followed up annually with the Husmann protocol. She had undergone ileocystoplasty, appendicovesicostomy, and antegrade continence enema creation at 9 years old. She had a history of 2 previous cystolithotomies. During her annual follow-up, she had a history of 1-2 symptomatic urinary tract infections, no pain, no gross hematuria, and negative physical examination. She weighed 25.1 kg. Kidney, ureter, and bladder x-ray showed multiple large bladder stones (Fig. 1), but renal and bladder ultrasound was negative for bladder abnormality. She underwent cystolithotomy. After the stones were removed there was inflammation (Fig. 2) on the right lateral bladder wall, but on palpation this felt abnormal. The mass was biopsied and showed high-grade malignancy. Because of the location and friability of the mass, primary closure of the cystotomy was not possible and a partial cystectomy was performed. Final pathology returned high-grade intestinal adenocarcinoma invading into muscularis propria with 2 negative lymph nodes (pT2N0Mx). Subsequent staging imaging revealed no metastatic disease.

After discussion with several experts in the field, we proceeded with radical cystectomy and pelvic lymph node dissection. We performed a hysterectomy, bilateral salpingectomy (ovaries spared), and anterior vaginectomy. We traced back the mesentery of the augment and amputated this using a LigaSure as proximally as possible. The ileal conduit was created in the standard fashion with a Bricker anastomosis. Our pelvic lymph node dissection removed the internal, external, and common iliac nodes with template borders of the aortic bifurcation, node of Cloquet, and the genitofemoral nerve. Total operative time was 8 hours, and estimated blood loss was 300 mL. Final pathology was T0N0Mx with 5 negative lymph nodes. On postoperative day (POD) 62, follow-up imaging demonstrated no disease. However, on POD101, the patient had vaginal bleeding; examination elicited a palpable abnormality and brush biopsy confirmed recurrence. On positron emission tomography-computerized tomography (CT)

*This is a Pediatric Urologic Oncology Working Group case submission that was solicited by* Urology.

**Financial Disclosure:** *The authors declare that they have no relevant financial interests.*

*From the Department of Surgery, Division of Urology, University of Colorado, Aurora, CO*

*Address correspondence to: Amanda Saltzman, M.D., 13123 E 16th Ave, Box 463, Aurora, CO 80045. E-mail: afsaltzman@gmail.com*

*Submitted: August 5, 2017, accepted (with revisions): November 11, 2017*

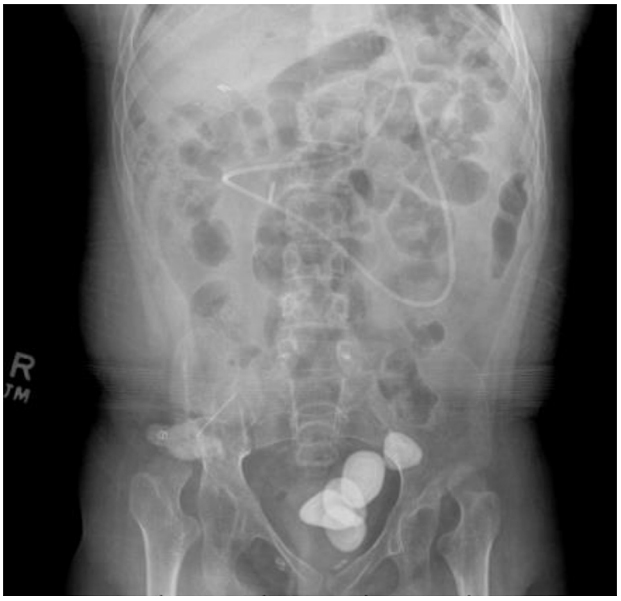

**Figure 1.** °KUB showing large bladder stones. KUB, kidney, ureter, and bladder x-ray.

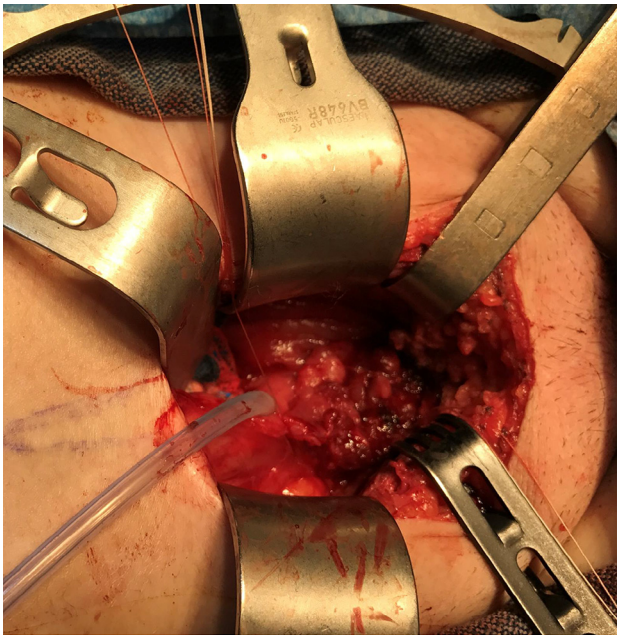

**Figure 2.** °Intraoperative photo of cystotomy with large indurated area suspicious for tumor. (Color version available online.)

she had evidence of pelvic recurrence. After multidisciplinary discussion, the patient underwent adjuvant therapy with 5 cycles of 5-Fluorouracil and 220 Gy of radiation. Post-treatment imaging on POD232 showed stable disease.

## DISCUSSION

The estimated incidence of bladder cancer in patients with congenital bladder anomalies was ~4% in the largest series to date.[5] Adenocarcinoma is the most common histologic type (52%), with urothelial cell carcinoma being the second most common (22%).[6,7] In this series, patients presented at a median age of 51 years, 81% had locally advanced disease, with median survival of 18 months.[5] In a recent systematic review of all patients with spina bifida and bladder cancer,[3] median age at diagnosis is 41 years and 71% presented with locally advanced or metastatic disease. This is in stark contrast to data from the Surveillance, Epidemiology, and End Results database, where median age at diagnosis is 73, 11% present with advanced disease, 5-year survival is ~38%, and few patients (<10%) were found incidentally.[3]

Initial series hypothesized that the bladder augmentation itself increased the risk of malignancy at the interface between the bladder and intestinal segment.[1] However, Austin et al found only 1 out of 8 patients (13%) had a history of bladder augmentation.[2] In the largest series to date there was no significant increased risk of cancer (4.6 vs 2.6%, $P = .54$) following bladder augmentation compared to nonaugmented controls.[5] Lastly, a recent systematic review of all patients with spina bifida and bladder cancer determined that patients with bladder augmentation actually had increased overall survival compared to those who did not.[3] It appears that the congenital bladder itself and not the bladder augmentation increases the risk of bladder cancer in these patients.

With increased awareness about bladder cancer in patients with congenital bladder anomalies, the pediatric community rapidly responded with recommendations for surveillance using standard bladder screening tools (cystoscopy and cytology) starting 10 years after reconstruction,[1-5] with little evidence for these recommendations.[3,6,7]

Higuchi et al[6] followed 50 patients at least 12 years after bladder augmentation with annual cystoscopy. Of 250 cystoscopies over 5 years, only 4 revealed suspicious lesions (1.6%), all of which were biopsied and benign. After 5 years on the annual screening protocol, cystoscopy was stopped due to low event rate. After a median follow-up of 15 years, no bladder cancers were diagnosed. Hamid et al[7] similarly showed no malignancies or dysplasia in 92 asymptomatic patients at a median time of 15 years after augmentation. There was a single case of malignancy identified in a patient with intermittent hematuria and recurrent urinary tract infections, who had a normal screening cystoscopy 18 months prior. If cystoscopy could detect every malignancy, 980 cystoscopies would be required to diagnose 1 over a decade of follow-up.[8]

Higuchi et al[6] found that routine urine cytology is problematic, specifically chronic pyuria, intermittent catheterization, and exfoliated enteric epithelial cells potentially causing artifact. Due to low specificity, high false-positive rate, and the added cost of radiologic studies prompted for false-positives results, annual cytology was abandoned.

Kokorowski et al[8] examined the cost-effectiveness of routine annual cystoscopy and cytology in these patients. In a hypothetical cohort, the individual increase in life expectancy was 2.3 months and average lifetime cost was $55,200 per capita, which is below the commonly accepted willingness-to-pay threshold.[8] The driving factors for this conclusion were the low rates of malignancy and the high numbers of screenings needed to detect a single malignancy, regardless of stage at detection.

In our case, the patient was followed up on the Husmann protocol and did not have indications for further workup. A review of all her precancer diagnostic imaging at multidisciplinary conferences confirmed that there was nothing suspicious. Silent complications can occur in up to 29% of patients presenting for routine follow-up.[8] To date, bladder stones have not been identified as an independent risk factor for malignancy in patients with congenital bladder anomalies.[3] There are numerous techniques to remove bladder stones from these patients, and it is widely known that bladder wall inflammation can appear as an exophytic lesion. In this case if we were unable to palpate the abnormality, it is likely that her diagnosis would have been undiscovered for some time. The patient's malignancy was incidentally discovered, likely contributing to her initial localized disease.

Husmann et al[4] have pioneered a surveillance protocol that has generated one of the largest databases on congenital bladder anomalies. For a start, all patients should have annual medical history (urinary tract infections, hematuria, bladder/pelvic/flank pain, or new incontinence); if abnormal bladder anomalies, urine culture, endoscopy, CT scan, or urodynamics should be considered. All patients should also obtain serum creatinine (or cystatin C), electrolytes, serum B12, and a urinalysis. If urinalysis shows <50 RBCs/HPF, a renal and bladder ultrasound is indicated. If this is abnormal, or if patient has >50 RBC/HPF or gross hematuria, then urine culture, endoscopy, CT scan, or urodynamics should be considered. We encourage all physicians who care for patients with bladder augmentation to utilize this strategy annually.

## CONCLUSION

Based on the current literature and rarity of bladder cancer in patients with augmentation cystoplasty, we do not recommend bladder cancer-specific surveillance. Our patient's malignancy was found incidentally, which is likely the reason for detection at early stage; however, her condition progressed quickly, requiring adjuvant therapy. Close follow-up and immediate aggressive workup of symptoms is necessary because of the higher incidence of bladder cancer and younger age of this population at presentation.

### References


1. Soergel TM, Cain MP, Misseri R, et al. Transitional cell carcinoma of the bladder following augmentation cystoplasty for the neuropathic bladder. *J Urol.* 2004;172:1649-1652.
2. Austin JC, Elliott S, Cooper CS. Patients with spina bifida and bladder cancer: atypical presentation, advanced stage and poor survival. *J Urol.* 2007;178:798-801.
3. Rove KO, Higuchi TT. Monitoring and malignancy concerns in patients with congenital bladder anomalies. *Curr Opin Urol.* 2016;26:344-350.
4. Husmann D, Fox J, Higuchi T. Malignancy following bladder augmentation: recommendations for long-term follow-up and cancer screening. 2011.
5. Higuchi TT, Granberg CF, Fox JA, Husmann DA. Augmentation cystoplasty and risk of neoplasia: fact, fiction and controversy. *J Urol.* 2010;184:2492-2497.
6. Higuchi TT, Fox JA, Husmann DA. Annual endoscopy and urine cytology for the surveillance of bladder tumors after enterocystoplasty for congenital bladder anomalies. *J Urol.* 2011;186:1791-1795.
7. Hamid R, Greenwell TJ, Nethercliffe JM, et al. Routine surveillance cystoscopy for patients with augmentation and substitution cystoplasty for benign urological conditions: is it necessary? *BJU Int.* 2009;104:392-395.
8. Kokorowski PJ, Routh JC, Borer JG, et al. Screening for malignancy after augmentation cystoplasty in children with spina bifida: a decision analysis. *J Urol.* 2011;186:1437-1443.