Case Report

Collision metastasis of prostatic adenocarcinoma and urothelial carcinoma of the bladder

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Abstract

The incidence of concomitant prostate adenocarcinoma found in patients with muscle-invasive bladder carcinoma is not uncommon, reaching up to 21%–28%. However, the presence of collision metastasis involving prostate cancer and bladder cancer within the same lymph node is exceedingly rare, with only 5 cases reported to date in the literature. We report a case of collision metastasis of prostate adenocarcinoma and urothelial carcinoma of the bladder in a 73-year-old man who underwent cystoprostatectomy with bilateral pelvic lymph node dissection for high-grade muscle-invasive urothelial carcinoma. Final pathology revealed a pT3aN2 high-grade urothelial carcinoma and pT3N1 Gleason 4 + 4 = 8 adenocarcinoma of the prostate with 12/40 pelvic lymph nodes positive for urothelial carcinoma. One node was positive for both urothelial carcinoma and prostate adenocarcinoma, confirmed by positive staining by p40 and prostate specific antigen(PSA), respectively. Immunohistochemistry is the sole method of confirming collision metastasis of two primary cancers. In this case, we describe immunohistochemical markers for urothelial carcinoma and prostate adenocarcinoma and their clinical implications. One month postoperatively, our patient began adjuvant leuprolide therapy and cycle 1 of gemcitabine and cisplatin chemotherapy, which he is tolerating well.

Keywords: Bladder cancer, collision metastasis, immunohistochemistry, prostate cancer

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INTRODUCTION

The discovery of incidental prostate cancer in the surgical specimen following radical cystoprostatectomy is not an uncommon finding.[1,2] Numerous retrospective studies have reviewed tissue samples from patients with muscle-invasive bladder urothelial carcinoma and found the incidence of coexisting prostate cancer to be as high as 21%–29.4%.[1-5] The detection of incidental prostate cancer can be challenging before cystoprostatectomy.[2]

Collision metastasis has been described as the meeting of metastatic deposits from two malignant neoplasms arising at independent topographical sites with two distinct histological patterns.[6,7] In the case of concomitant bladder and prostate cancer, both metastasizing to the same lymph node is a rare phenomenon with only 5 cases published in the literature.[8-12] Both the bladder and prostate have lymphatic communication with the external and internal iliac lymph nodes which are typically removed during a radical cystoprostatectomy. Proper distinction between

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intermingling malignancies within one node can be accomplished through immunohistochemical staining for markers such as CK7, CK20, p40, and PSA.[8,13]

CASE REPORT

A 73-year-old male smoker presented with hematuria and a history of recurrent, high-grade, noninvasive bladder cancer. Preoperative PSA was 25.95 ng/ml and staging computerized tomography was negative for lymphadenopathy or any other evidence of distant metastasis. He underwent robotic-assisted radical cystoprostatectomy with extended bilateral pelvic lymph node dissection and intracorporeal ileal conduit. Pathology of the cystoprostatectomy specimen revealed urothelial carcinoma stage pT3aN2 [Figure 1] as well as Gleason 4 + 4 = 8 adenocarcinoma of the prostate stage pT3N1, [Figure 2] involving 25% of the gland with seminal vesicle involvement. Six of twenty-two right pelvic lymph nodes and six of eighteen left pelvic lymph nodes were positive for bladder cancer, including one node which was positive for both bladder and prostate cancer. Immunohistochemical staining for p40 [Figure 3b] and PSA [Figure 4b] were carried out to prove the presence of collision metastasis in the same lymph node. The patient was started on leuprolide injections as well as gemcitabine and cisplatin chemotherapy. He is currently living and tolerating treatment well.

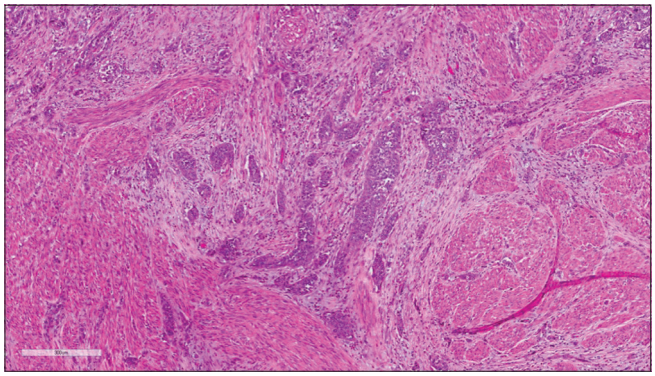

Figure 1: Representative section of tumor from 73-year-old male showing invasive high-grade urothelial carcinoma

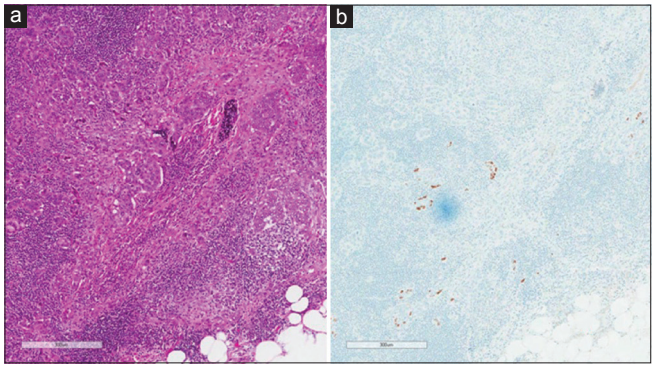

Figure 3: Collision lymph node from 73-year-old male with focus of less differentiated and/or solid islands with more pleomorphic nuclei suggestive of urothelial carcinoma (a), supported by p40 (ΔNp63) immunopositivity (b)

DISCUSSION

Collision metastases of primary prostatic and urothelial carcinomas are a rare phenomenon despite the high incidence of concomitant occurrence of these malignancies. Abdelhady *et al*. reviewed 217 radical cystoprostatectomies from 1987 to 2003 and found 28% to have prostate cancer.[1] Another large scale retrospective study by Pignot *et al*. evaluated the pathology specimens from 4299 men, without clinical suspicion for prostatic malignancy, and found 931 men (21%) to have prostate cancer.[4] In this study, 90.1% of the 931 concomitant bladder cancer and incidental prostate cancer patients had organ-confined prostate cancer. Only 1% (9 cases) were found to have N1 metastatic prostate cancer compared to 25.7% with bladder cancer metastases, and none were noted to have collision metastasis.[4] In the case of our 73 year old patient, 12 out of 40 pelvic nodes were positive for metastatic bladder cancer, one of which also showed metastatic prostate

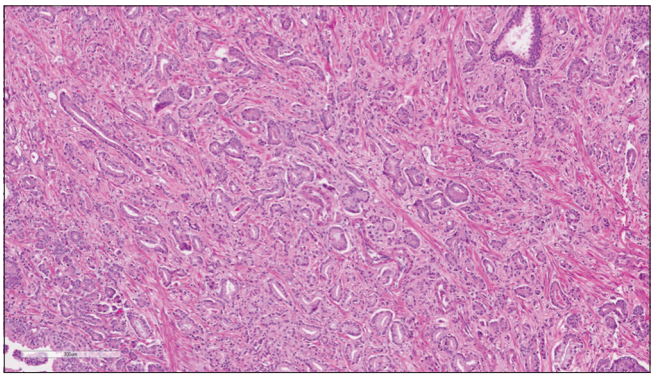

Figure 2: Representative section of prostatic specimen from 73-year-old male showing prostatic adenocarcinoma, Gleason 4 + 4 = 8

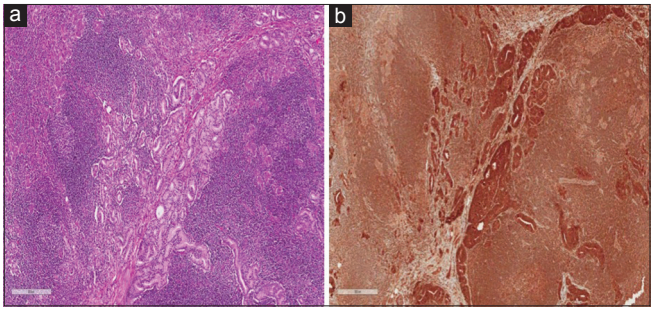

Figure 4: Collision lymph node from 73-year-old male with focus of glandular differentiation with nucleolated relatively rounded nuclei morphologically resembling high-grade prostatic adenocarcinoma (a), supported by PSA immunopositivity (b)

cancer that was confirmed on immunohistochemistry. [Figures 3 and 4].

Immunohistochemistry is the most reliable way to accurately differentiate collision metastasis. Staining can be performed for detection of specific intracellular components such as cytokeratins and intermediate filaments found within the cytoplasmic cytoskeleton of epithelial cells. Positivity for cytokeratins CK7 and CK20 has been shown to indicate urothelial and rule out prostate cancer. The presence of CK7 is seen in 82%–100% of urothelial malignancies while 62%–100% of prostate cancers are negative for CK7/CK20.[14]

The basal cell layer of stratified epithelia (squamous, urothelial, bronchial) normally expresses p63. An isoform which can be used as an immunohistochemical marker for urothelial cancer is ΔNp63 or p40.[13] Overexpression of p40 acts as an oncogene by promoting cell proliferation and survival. Furthermore, when positive in muscle invasive UC, p40 is associated with a more aggressive clinical course and poor prognosis; median survival rate of 11.6, standard deviation (SD) 1.3 months compared to 25, SD 6.4 months.[13] Chuang *et al*. found 82.9% of 35 high-grade urothelial tumors to be positive for p63 variants versus <2% positivity of the 38 prostate cancers.

When looking specifically for prostate cancer, staining for PSA (a glycoprotein produced by prostatic tissue) is an accurate method of detection. Two different studies by Chaung *et al*.[14] and Basily *et al*. [11] found 37/38 (97.4%) and 58/59 (98%) of prostate cancers demonstrated positive PSA staining.[15]

The lymph node in this case was positive for PSA (prostate component) as well as p40 (bladder component), confirming a true collision metastasis. The patient was subsequently started on the appropriate androgen deprivation therapy and adjuvant chemotherapy for both metastatic tumors.

The role of immunohistochemistry is invaluable in the pathological diagnosis of potential collision metastases. There are several different cellular components that can be targeted to help identify specific urologic malignancies including CK7, CK20, p40, PSA, and many others. Immunohistochemical staining should be considered if locally advanced prostate cancer is found at the time of radical cystoprostatectomy with node metastases to rule out nodal involvement of both primary tumors.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Abdelhady M, Abusamra A, Pautler SE, Chin JL, Izawa JI. Clinically significant prostate cancer found incidentally in radical cystoprostatectomy specimens. BJU Int 2007;99:326-9.
2. Terris MK, Freiha FS, McNeal JE, Stamey TA. Efficacy of transrectal ultrasound for identification of clinically undetected prostate cancer. J Urol 1991;146:78-83.
3. Pignot G, Salomon L, Lebacle C, Neuzillet Y, Lunardi P, Rischmann P, *et al*. Prostate cancer incidence on cystoprostatectomy specimens is directly linked to age: Results from a multicentre study. BJU Int 2015;115:87-93.
4. Pignot G, Salomon L, Neuzillet Y, Masson-Lecomte A, Lebacle C, Patard JJ, *et al*. Clinicopathological characteristics of incidental prostate cancer discovered from radical cystoprostatectomy specimen: A multicenter French study. Ann Surg Oncol 2014;21:684-90.
5. Saad M, Abdel-Rahim M, Abol-Enein H, Ghoneim MA. Concomitant pathology in the prostate in cystoprostatectomy specimens: A prospective study and review. BJU Int 2008;102:1544-50.
6. Dodge OG. Gastro-oesophageal carcinoma of mixed histological type. J Pathol Bacteriol 1961;81:459-71.
7. Meyer R. Contribution to the understanding of the naming in the tumor-teach. Zentralbl Allg Pathol 1919;30:291-6.
8. Bhavsar T, Liu J, Huang Y. Collision metastasis of urothelial and prostate carcinomas to the same lymph node: A case report and review of the literature. J Med Case Rep 2012;6:124.
9. Ergen A, Balbay MD, Irwin M, Torno R. Collision metastasis of bladder and prostate carcinoma to a single pelvic lymph node. Int Urol Nephrol 1995;27:743-5.
10. Karni-Schmidt O, Castillo-Martin M, Shen TH, Gladoun N, Domingo-Domenech J, Sanchez-Carbayo M, *et al*. Distinct expression profiles of p63 variants during urothelial development and bladder cancer progression. Am J Pathol 2011;178:1350-60.
11. Bassily NH, Vallorosi CJ, Akdas G, Montie JE, Rubin MA. Coordinate expression of cytokeratins 7 and 20 in prostate adenocarcinoma and bladder urothelial carcinoma. Am J Clin Pathol 2000;113:383-8.
12. Chu P, Wu E, Weiss LM. Cytokeratin 7 and cytokeratin 20 expression in epithelial neoplasms: A survey of 435 cases. Mod Pathol 2000;13:962-72.
13. Wang N, Zee S, Zarbo R. Coordinate expression if cytokeratins 7 and 20 defines subsets of carcinomas. Appl Immunohistochem 1995;3:99-107.
14. Chuang AY, DeMarzo AM, Veltri RW, Sharma RB, Bieberich CJ, Epstein JI, *et al*. Immunohistochemical differentiation of high-grade prostate carcinoma from urothelial carcinoma. Am J Surg Pathol 2007;31:1246-55.
15. Brandler TC, Aziz MS, Rosen LM, Bhuiya TA, Yaskiv O. Usefulness of GATA3 and p40 immunostains in the diagnosis of metastatic urothelial carcinoma in cytology specimens. Cancer Cytopathol 2014;122:468-73.