Human Pathology (2017) 64, 186–190

Human PATHOLOGY

www.elsevier.com/locate/humpath

Case study

Transformation of prostatic adenocarcinoma to well-differentiated neuroendocrine tumor after hormonal treatment☆

Syed Gilani MD[a], Charles C. Guo MD[a,*], Elsa M. Li-Ning MD[b], Curtis Pettaway MD[c], Patricia Troncoso MD[a]

[a]Department of Pathology, The University of Texas MD Anderson Cancer Center, Houston, TX 77030-4009
[b]Department of Genitourinary Medical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX 77030-4009
[c]Department of Urology, The University of Texas MD Anderson Cancer Center, Houston, TX 77030-4009

Received 6 October 2016; revised 14 December 2016; accepted 3 January 2017

Keywords:
Prostate cancer;
Adenocarcinoma;
Carcinoid;
Neuroendocrine differentiation;
Hormonal treatment

Summary Carcinoid tumor of the prostate is extremely rare. Here we report a unique case of prostate cancer that underwent complete transformation from conventional adenocarcinoma to carcinoid-like tumor shortly after androgen-deprivation treatment (ADT). The patient was a 59-year-old man who presented with lower urinary tract symptoms. His biopsy specimen demonstrated a high-grade prostatic adenocarcinoma with mixed acinar and ductal features. After ADT for 6 months, the patient underwent radical prostatectomy. The post-ADT tumor showed monotonous neoplastic cells with fine granular chromatin forming rosette-like structures, resembling a carcinoid tumor. No residual conventional adenocarcinoma was present. On immunostain, the tumor cells were diffusely positive for synaptophysin and chromogranin and negative for prostate-specific antigen and prostein. Thus, the carcinoid-like tumor represented complete transformation from prostatic adenocarcinoma to well-differentiated neuroendocrine tumor after ADT. This unique case highlights the important role of ADT in neuroendocrine differentiation of prostate cancer.

1. Introduction

Neuroendocrine (NE) cells are a minute subset of specialized cells in the prostate glands that account for less than 0.5% of all epithelial cells; however, they produce a variety of peptide hormones and regulate cell proliferation, apoptosis, metabolism, angiogenesis, and other biological functions in the prostate [1-3]. On routine hematoxylin and eosin (H&E) examination, NE cells are difficult to distinguish from other epithelial cells in the prostate except for those with Paneth-like features or granular eosinophilic cytoplasm. NE cells are usually recognized by immunoreactivity for NE markers, such as synaptophysin, chromogranin, and CD56 [3]. Although most prostate cancers are composed of adenocarcinoma, pure or de novo NE tumors are extremely rare in the prostate [4,5]. However, on immunohistochemical analysis, most prostate cancers show rare NE cells that are scattered in the adenocarcinoma [1-3]. Several studies have found that NE differentiation is enhanced in prostate cancer when patients undergo androgen-deprivation treatment (ADT) [6,7]. Herein we report a unique case of prostate cancer that underwent a complete transformation from conventional adenocarcinoma to carcinoid-like, well-differentiated NE tumor shortly after ADT.

☆ Disclosures: None.

* Corresponding author: Department of Pathology, Unit 85, The University of Texas MD Anderson Cancer Center, 1515 Holcombe Blvd, Houston, TX 77030-4009.
E-mail address: ccguo@mdanderson.org (C. C. Guo).

http://dx.doi.org/10.1016/j.humpath.2017.01.006
0046-8177/

2. Case report

A 59-year-old man initially presented with gross hematuria, but the clinical evaluation, including cystoscopy and computed tomographic urogram, was unremarkable. Four years later, he developed lower urinary tract symptoms with urinary retention, which required the placement of a Foley catheter. Cystoscopic examination revealed a small papillary tumor in the prostatic urethra, which was resected. Microscopically, the lesion was composed of large cribriform atypical glands with focal papillary formation (Fig. 1A). The papillary structures showed fibrovascular cores lined with pseudostratified atypical columnar cells. Focal comedonecrosis was present in some large atypical cribriform glands. On immunostains, the tumor cells were positive for prostate-specific antigen (PSA), prostate acid phosphatase, prostein (Fig. 1B), and racemase, and were negative for high-molecular-weight cytokeratin and p63. Only a few scattered tumor cells showed positive immunoreactivity for chromogranin (Fig. 1C) and synaptophysin. The overall features were consistent with prostatic adenocarcinoma, Gleason score 9 (4 + 5), with mixed acinar and ductal features. His PSA test showed an elevated level of 11.3 ng/mL (normal <4 ng/mL). Subsequently, he underwent ultrasound-guided transrectal prostate biopsies, which showed high-grade prostate adenocarcinoma with similar features to those in the transurethral resection specimen in 7 of the 14 tissue cores (Fig. 1D). The magnetic resonance imaging revealed enlarged bilateral lymph nodes in the pelvis, which were suspicious for metastatic disease.

He received ADT with Degarelix, a gonadotropin-releasing hormone antagonist, for 6 months. His PSA level dropped to 0.9 ng/mL. Then he underwent a robotic, laparoscopic-assisted radical prostatectomy with bilateral lymph node dissection. Serial sections of the prostate demonstrated a tan, firm, irregular lesion in the left side of the prostate, involving the peripheral and transition zones, with focal extension to the right side. The tumor measured 3.0 × 2.5 cm in the largest cross-sectional dimension with a volume of 6.0 cm^3 using a previously described formula [8]. Microscopically, the tumor was composed of rosette-like structures with monotonous tumor cells (Fig. 2A). The tumor cells had round or oval nuclei with finely granular and evenly distributed chromatin and inconspicuous nucleoli (Fig. 2B). The tumor showed 1 mitotic figure per 10 high-power fields. On immunostains, the tumor cells were negative for PSA and prostein (Fig. 2C) and only focally positive for PSAP and NKX3.1. Interestingly, they showed diffuse strong immunoreactivity for chromogranin (Fig. 2D) and synaptophysin. In addition, the tumor cells were positive for α-methylacyl-CoA racemase, focally positive for CDX-2, and negative for androgen receptor, high-molecular-

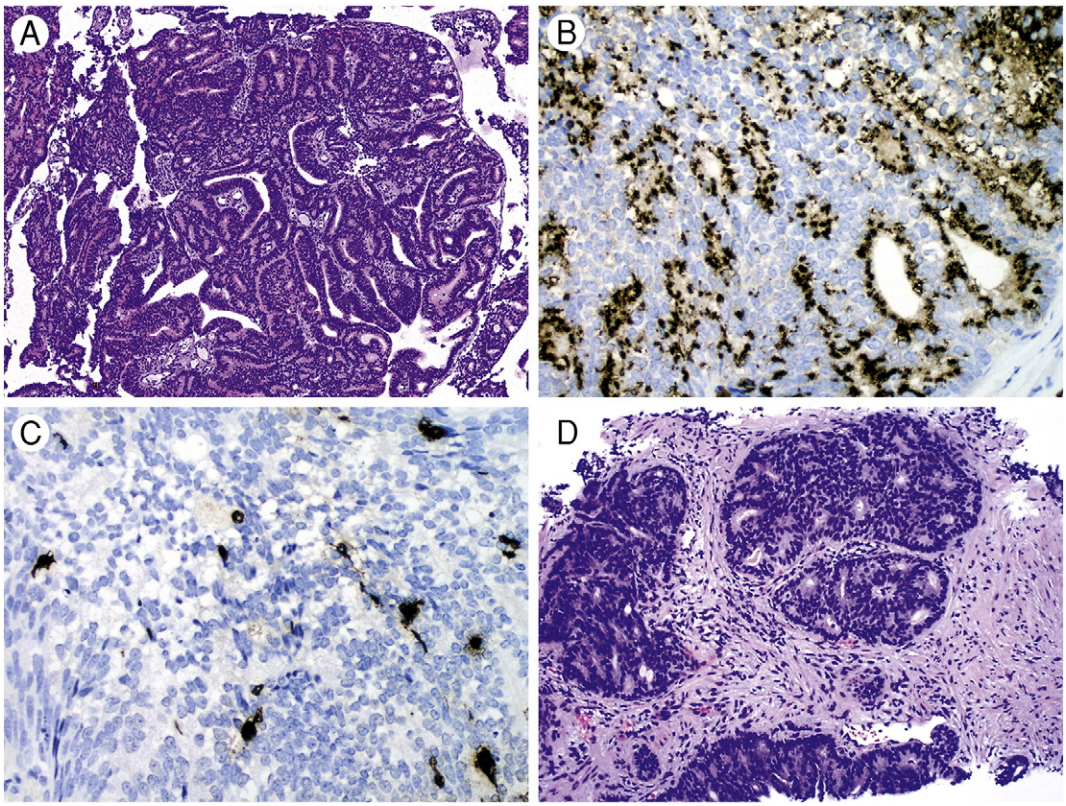

Fig. 1 Prostatic adenocarcinoma before hormonal treatment. A, The transurethral resection specimen showed high-grade prostatic adenocarcinoma composed of atypical cribriform glands with focal papillary structures (H&E, original magnification ×40). Most tumor cells were immunoreactive for prostein (B; immunohistochemical stain, ×100) and only few scattered cells were positive for synaptophysin (C; immunohistochemical stain, ×100). D, The transrectal needle biopsy specimen showed similar high-grade prostatic adenocarcinoma (H&E, ×100).