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Case Report

Unusual Presentation of Carcinoma Prostate with Brain Metastasis: A Case Report and Treatment Review

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Abstract

Brain metastases arising from prostate cancer are rare and typically occur late in the course of the disease. Most patients have widespread metastasis before developing brain metastases from prostate cancer. We report the case of a 68-year-old male with long history of BPH presented with symptomatic brain metastasis. Treatment of the metastatic site included tumor resection and adjuvant stereotactic radiation treatment (RT) to the surgical bed, followed by steroids, anticonvulsant and ADT, resulting in a favorable outcome.

Keywords: Brain Metastases; Prostate Cancer; Radiation Treatment (RT)

Introduction

The lifetime risk of death from prostate cancer is 3% and the lifetime risk of a diagnosis of prostate cancer is 17% [SEER] Program. The incidence of carcinoma prostate varies widely between countries and ethnic populations. The lowest yearly incidence rates occur in Asia (1.9 cases per 100,000 in Tianjin, China) and the highest in North America and Scandinavia, especially in African Americans (272 cases per 100,000). Mortality also varies widely among countries, the highest being in Sweden (23 per 100,000 per year) and the lowest in Asia (< 5 per 100,000 per year in Singapore, Japan and China) [1]. Brain metastasis occurs in approximately 25% of patients with malignant disease, and, conversely, 50% of neoplasms in the brain are metastatic. Unlike melanoma and carcinomas of the lung, breast, kidney, and colon, it is rare for prostate carcinoma to metastasize to the central nervous system. Prostate cancer commonly metastasizes to the pelvic lymph nodes, axial skeleton and lungs [2]. The very low frequency of CNS involvement is probably because the brain parenchyma is resistant for the growth and development of the metastatic foci by prostate cancer cells. Estimates of the frequency of brain metastasis reported in autopsy series vary from 1% to 6% in patients with a pre-mortem diagnosis of prostate carcinoma [3-6]. Treatment and prognosis vary and depend on initial stage, Gleason score, and level of prostate-specific antigen (PSA). Localized prostatic adenocarcinoma can be treated with either surgery with adjuvant or salvage radiation or radical radiation alone. Adjuvant hormonal therapy is used for patients with high-risk disease. We present a case of 68 years old gentlemen who presented with symptomatic brain metastasis from a prostatic adenocarcinoma.

Case Summary

A 68 year old gentleman with long standing benign prostatic hyperplasia presented with complaints of progressive weakness of right half of body associated with slurring of speech and memory disturbance for two months. He has had no history of headache, vomiting, seizure or cranial nerve involvement. He was investigated with NCCT head which was suggestive of mixed solid cystic left parietal lobe mass with surrounding white matter edema, likely Glioblastoma. He underwent left parietal osteoplastic craniotomy and tumor decompression of left parietal SOL. Intraoperative findings were: Cystic component containing xanthochromic fluids. HPR: Poorly differentiated carcinoma, diffusely positive for AMCACR, focal positive for PSA and show no expression for cytokeratin 7 and 20, p63, TTF-1, synaptophysin, chromogranin and CD56. Final diagnosis: Metastasis of high grade prostatic adenocarcinoma.

In view of high grade prostatic adenocarcinoma a FDG avid PET MRI was done which revealed enlarged prostate gland with degenerative changes in the central gland. FDG avid T2 hypointense lesion (SUV max 6.04) with diffusion restriction is seen involving the right peripheral lobe: PIRADS 5, extending involving the left peripheral lobe infiltrating the capsule posteriorly on right side effacing the recto-prostatic fat planes and the right neurovascular bundle, abutting the rectum and the pelvic floor and involving the right seminal vesicle. Multiple FDG avid bilateral nodular lung lesions, enlarged avid mediastinal nodes, FDG avid marrow lesions are seen involving S3-S5, iliac bone and head of bilateral femur. PSA- 25 ng/ml. Trucut biopsy: Acinar adenocarcinoma, PNI +ve on right lobe. Gleason Score 4+5 = 9, ISUP grade group-5.

He received adjuvant Fractionated Stereotactic Radiotherapy to residual tumor and tumor cavity with margins to a total dose of 23 Gy in 8 fractions along with dexamethasone and anticonvulsant and was started with Androgen deprivation therapy and zoledronic acid and was advised for close follow up.

Discussion

Prostatic Adenocarcinoma with isolated brain metastasis demonstrates an atypical course and relatively long-term survival. Although the brain parenchyma is relatively resistant to meets from prostatic adenocarcinoma, generally once cancer has spread to the brain parenchyma, leptomeninges, or skull, patients experience neurologic symptoms, including headache, focal deficits, or seizures [7].

Large number of postmortem studies have confirmed the rarity of brain metastasis derived from prostatic adenocarcinoma [8]. In a large autopsy study, Saitoh., *et al.* [9] reported no cases of isolated brain metastasis. Moreover, CNS involvement occurred only subsequent to metastatic involvement of other sites. Clinically apparent brain metastases are rare and typically develop in the terminal phases of illness once the cancer is castrate-resistant and has spread to multiple sites and other visceral organs [8,10-13].

The specific MRI characteristics of brain metastases from prostate cancer have not been well established in the literature. These lesions have a highly variable imaging appearance and may be difficult to differentiate from metastases originating from other primary tumor sites. One-third of the patients have at least one hemorrhagic brain metastasis, similar to more classically hemorrhagic metastases from melanoma, RCC, breast cancer, thyroid cancer, and choriocarcinoma. The enhancement pattern seen varies from purely solid, to mixed cystic and solid, to ring-like. The patient in our case report had solid and cystic component with perilesional edema. The non-hemorrhagic brain metastases are hyperintense on T2 weighted imaging and hypointense on T1 weighted imaging [14].

The incidence of brain metastases from prostate cancer has been reported to range between 0.2% and 2.0% in several prior studies [12-15]. In a recent study of 16,280 patients from MD Anderson, the incidence of brain metastasis was only 0.6%. The overall median survival in this study was just 1 month (95% CI: 0.8 to 1.2 months). Patients receiving palliative radiotherapy experienced an improved median survival of 3.5 months (95% CI: 2.4 to 4.6 months).

For decades, surgical resection with adjuvant WBRT has been the standard of care for solitary metastases in the brain. This combined therapy strategy has been evaluated in randomized studies and found to significantly reduce the risk of recurrence when compared with surgical resection or WBRT alone [19-22]. These studies, however, did not include any patients with prostate cancer brain metastases patients.

Due to concerns of WBRT-related neurotoxicity and the risk of neurocognitive side effects, the application of high dose radiation to the postoperative surgical bed through stereotactic radiosurgery has been increasing in clinical practice. Stereotactic radiosurgery alone following surgical resection of a brain metastasis has the potential to limit long-term neurocognitive side effects and improve local control as compared to WBRT [23,24].

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