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Dural metastases from prostate carcinoma: A systematic review of the literature apropos of six patients

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ABSTRACT

Intracranial metastases are a rare manifestation of prostate carcinoma and the dura mater is the most affected site. We report a series of six patients with dural prostate metastases (DPM) and perform a systematic review of the current literature in order to depict imaging trademarks of this condition. This review points to a magnetic resonance imaging (MRI) pattern of meningeal involvement characterized by a diffuse smooth thickening, nodular appearance or dural-based masses. We also demonstrate an osteoblastic pattern of lesions, particularly in sphenoid wing, by computed tomography (CT) scans. We suggest that these imaging findings may support an elevated index of suspicion of DPM in elderly men, including those patients without urologic symptoms.

1. Introduction

Intracranial metastases are uncommon in prostate carcinomas, occurring in 1–6% of autopsy series, particularly in advanced stages [1]. In most cases, the dura mater is affected [2], and the prostate carcinoma represents the main source of dural metastases [3].

Our aim is to describe a series of six patients with histologically confirmed DPM. We also conducted a critical review of the current literature to emphasize the relevant demographic, clinical and imaging characteristics of this particular presentation of prostate carcinoma.

2. Methods

The literature search was conducted using the PubMed database and included all types of publications and patients of all ages and medical subsets. It was restricted to human studies written in English, published in or before March 2009. To obtain a homogenous and more comparable list, the search keywords were limited to "intracranial prostate metastases", "intracranial prostate metastasis", "prostate dural metastases" and "prostate dural metastasis". We included 17 reports (21 patients) [4–20]. In order to obtain complementary clinical and paraclinical data, all available figures and descriptions were reviewed, including test results from 4 patients who received magnetic resonance imaging (MRI), 15 patients who received computed tomography (CT) scans, and an additional 2 patients who received both examinations.

Our series of six patients was obtained from January 2003 to March 2009. We only included patients with confirmed pathologic diagnosis of primary prostate adenocarcinoma for whom image review was available. The six patients in our series were examined using multiplanar MRI at 1.0 T and 1.5 T, which covered the whole brain, aligned with the bicommissural line. Imaging parameters were identical for all patients (24 cm FOV, 5 mm thickness, 0.5 mm gap, 224×512 matrix). The protocol included T1- and T2-weighted images and FLAIR sequences with appropriated parameters. Multiplanar T1-weighted images were also obtained after the administration of intravenous contrast (gadolinium 0.1 mmol/kg) with additional fat suppression pulse. We included data from CT scans in the axial and coronal planes to evaluate bone structures. Accessible clinical and demographic characteristics were selected by the authors from the institutional registers. All data were compared with previously reported data.

3. Results

Thirty-one articles matched the search criteria parameters; however, 14 reports were excluded because they were not clearly related to our topic of study and/or images were not available. Relevant findings are described in Table 1. The average age of the patients was 66.0 years, and the majority of cases had disseminated metastases at the time of neurological onset (13/21: 61.9%).

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Table 1
Data of the 21 reviewed patients.

Author/year	Age	Years after primary diagnosis/others metastases	Presentation	Locations	Method/number of dural lesions	Lesions main features
Sweets/2009 [4]	48	4/no	Seizures	Left parietal	MRI/one focal lesion	Brain edema
Lyons/2006 [5]	57	3/yes	Headache, right hemiparesis, seizures	Left fronto-parietal region	CT/one large lesion	Mimicking meningioma, blood supply from scalp vessels, brain edema
Confavreux/2006 [6]	69	7/yes	Headache, deteriorating mental status, VI CN palsy	Right temporal (larger)	MRI/disseminated linear dural lesions + multiple nodular lesions	Disseminated dural lesions, brain edema
Lath/2005 [7]	58	NS/no	Headache, seizures, nausea, vomiting	Right frontal	CT + MRI/disseminated linear dural lesion + one large nodular lesion	Mimicking meningioma, hyperostosis, brain edema
Cone/2005 [8]	76	10/yes	Headache, confusion	Left temporal (larger), disseminated	MRI/disseminated linear dural lesions + multiple nodular lesions	Disseminated dural lesions, brain edema
Inamasu/2004 [9]	77	9/no	Headache, vomiting, drowsy, hoarseness, dysphagia	Posterior fossa	CT + MRI/disseminated linear dural lesion + one large nodular lesion	Occipital bone destruction, hyperostosis, cerebellar hemorrhage, brain edema
Bentley/2003 [10]	57	7/yes	Headache, nausea, vomiting, deteriorated conscious level, III CN palsy	Left fronto-parietal region	CT/one large lesion	Significant intracranial mas effect and brain edema
Chiang/2003 [11]	61	5/yes	Dysarthria, seizures, confusion	Left frontal	CT/one large lesion	Brain edema and mass effect
Chiang/2003 [11]	62	4/yes	Weakness in right extremities and poor memory	Left parietal	CT/one large lesion	Calcification and brain edema
Tagle/2002 [12]	80	NA/no	Right hemiparesis	Left frontal	CT/one large lesion	Mimicking meningioma, hyperostosis, brain edema
Lindsberg/1999 [13]	76	3/yes	Slow speech, disphagy, left hemiparesis, limb ataxia	Sphenoid wings	CT/two focal lesions	Hyperostosis in the sphenoid wings, brain edema
Sutton/1996 [14]	70	NA/yes	Weakness, dizziness, left hemiparesis	Right parietal (larger)	CT/one large lesion	Central hemorrhage, no skull lesions
Sutton/1996 [14]	62	NA/no	Nausea, vomiting, anorexia, weight loss, left-sided weakness	Posterior fossa	CT/one focal lesion	Pons + cerebellar peduncle extension, no skull lesions
Capito/1991 [15]	65	NA/yes	Headache, ataxia, drowsiness, left hemiparesis	Posterior fossa	MRI/one large lesion	Feeding vessel arose from right vertebral artery, brain edema
Burbridge/1989 [16]	73	1/yes	Confusion, left hemiparesis	Right sphenoid greater wing	CT/one large lesion	Extension to orbit and sphenoid sinus, brain edema
Burbridge/1989 [16]	62	1,5/yes	Progressive weakness	Right cerebellum, frontal and temporal lobes	CT/multiple focal lesions	Subdural fluid collection, brain edema
Matsumoto/1986 [17]	79	NA/no	Headache, diplopia (VI CN palsy)	Right sphenoid sinus	CT/one large lesion	Bone destruction of the dorsum sellae and clivus
Bucci/1985 [18]	62	3/no	Headache, lethargy, confusion, papilledema	Right fronto-parietal region	CT/subdural hematoma. No mass was depicted	Subdural fluid collection, brain edema
Bucci/1985 [18]	63	2/yes	Confusion	Left frontal	CT/subdural hematoma. No mass was depicted	Subdural fluid collection, brain edema
Barolat-Romana/1984 [19]	62	NA/no	Headache, confusion, left hemiparesis, left homonymous hemianopsia	Right temporo-parietal region	CT/intracranial hemorrhage. No mass was depicted	Intracerebral hematoma, acute subudural hematoma and brain edema.
Penley/1981 [20]	69	NA/yes	None	Disseminated	CT/multiple focal lesions	Brain edema

CN = cranial nerve; CT = computed tomography; MRI = magnetic resonance imaging; NA = not applicable; NS = not specified.