

## Oncology

## Cystic brain metastasis from prostate cancer: A case report and literature review

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## ABSTRACT

Parenchymal brain metastases from prostate cancer are rare and mostly appear in the terminal phase of the disease. Here, we report a case of cystic cerebral metastases in patient with prostate adenocarcinoma. This patient presented with one large parietal polycystic tumor and three other suspicious-looking nodular lesions as shown on magnetic resonance imaging. This is the twelfth reported case of prostatic brain metastasis occurring as a cystic intraparenchymal tumor in the literature.

## Introduction

Prostate carcinoma is the most common malignancy among men in Western countries. Although this cancer can metastasize to any organ, metastatic invasion of the central nervous system is very rare. Indeed, from 0.3 to 2.8% of patients with prostate cancer will be affected by such a condition.<sup>1,2</sup> There appears to be an increase in the incidence of brain metastases from prostate cancer over the past two decades that may reflect a gain in survival.<sup>1</sup> Though, cystic brain metastases are still very rare and only a few cases have been reported in the literature. Here we present an unusual case of a large polycystic brain metastasis from prostate cancer.

## Case

A 71-year-old male was diagnosed with high risk localized prostate adenocarcinoma given that Gleason score was 10 (5 + 5) on biopsy. Gonadorelin analogous decapeptide hormone therapy was started and he received prostatic radiotherapy of 8000 centigray (cGy) in 40 fractions combined with prophylactic irradiation of the pelvic lymph nodes of 5600 cGy in 23 fractions. Within a year, it relapsed in the form of lymph nodes involvement, lungs tumor and multiple bone lesions despite chemical castration. He underwent a first line docetaxel chemotherapy followed by a second line of cabazitaxel with spinal radiotherapy due to bone progression in the axial skeleton resulting in epidural compressions. Afterwards, he receives a third line of enzalutamide chemotherapy due to poor tolerance of cabazitaxel. At that time,

his overall tumor lesions and PSA levels remained stable. The patient was then admitted for repeated falls. His clinical examination revealed no neurological impairment. A magnetic resonance imaging (MRI) of his brain showed a 27 mm polycystic lesion in the left parietal region without peripheral edema (Fig. 1). MR spectroscopy with relative cerebral blood volume measurement was performed showing marked hyperperfusion and tumor-like biochemical profile within this cystic lesion and finding out three others suspicious-looking intraparenchymal lesions (left temporal, right occipital and left frontal areas) measuring 6 mm, 6 mm and 4 mm respectively (Fig. 2.). Metastatic nature of these brain lesions was therefore retained. As the patient began to develop symptoms such as hemiparesis and headache, he received whole brain radiation therapy at a dose of 3000 cGy in 10 fractions. He was still alive 4 months after RMI diagnosis of brain metastases.

## Discussion

Although cerebral metastases are a common neurological complication reported in 10–40% of adult patients with malignant neoplasms, prostate cancer rarely metastasizes to the brain.<sup>1</sup> In addition, brain metastasis from prostate cancer occurring as a cystic tumor is even rarer. To our knowledge, eleven cases of prostate cancer patients with cystic or partially cystic brain metastases have been reported in the literature. These studies are shown in Table 1.

Such a type of brain metastases are mostly described in patient with lung cancer, especially in ALK-rearranged non-small cell lung cancer patient and the role of crizotinib in the development of these cystic brain

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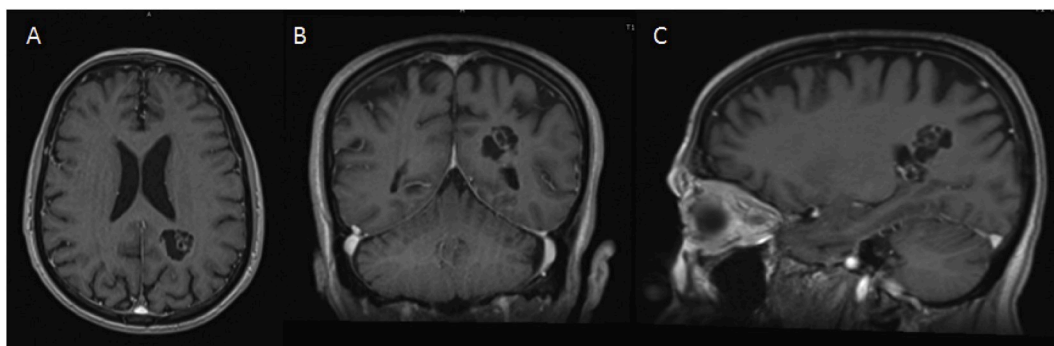


Fig. 1. Axial (A), coronal (B) and sagittal (C) T1-weighted gadolinium enhanced MRI (magnetic resonance imaging) showing a 27 mm polycystic left parietal mass.



Fig. 2. Sagittal T2-weighted gadolinium enhanced MRI (magnetic resonance imaging) showing three suspicious-looking nodular lesions localized in left temporal lobe (A), left frontal lobe (B) and right occipital lobe (C). Polycystic left parietal tumor is also evident in section B.

Table 1

Reported cases of cystic brain metastases from prostate cancer.

Authors (Year)	Number of cases	Histology	Gleason score	Brain location	Others organs involved	Survival (months)
Our case report (2020)	1	ADK <sup>1</sup>	10 (5 + 5)	Left parietal lobe	Yes (LN <sup>2</sup> , B <sup>3</sup> , Lu <sup>4</sup> )	Still alive (4-month follow-up)
Lam et al. (2017)	1	ADK	9 (5 + 4)	Left frontal lobe	Yes	N/M <sup>5</sup>
Hatzoglou et al. (2012)	4	N/M	N/M	N/M	N/M	N/M
Tsai et al. (2001)	2	ADK	N/M	Left cerebellum	Yes (B, S <sup>6</sup> )	N/M
		ADK	N/M	Left parietal lobe	Yes (B, Li <sup>7</sup> )	N/M
Behrens et al. (2001)	1	ADK	N/M	Right frontal lobe	No	N/M
Fervenza et al. (2000)	1	ADK	N/M	Right frontal lobe	Yes (B)	N/M
Zachariah et al. (1994)	1	SCC <sup>8</sup>	N/M	Right frontal lobe, left parietal lobe	Yes (LN, SK <sup>9</sup> )	Dead (2-months survival)
Bland et al. (1992)	1	ADK	N/M	Left temporal lobe	Yes (B)	N/M

<sup>1</sup>Adénocarcinoma, <sup>2</sup>Lymph nodes, <sup>3</sup>Bones, <sup>4</sup>Lungs, <sup>5</sup>Not mentioned, <sup>6</sup>Spine, <sup>7</sup>Liver, <sup>8</sup>Small cell carcinoma, <sup>9</sup>Skin.

lesions is questioned.<sup>3</sup> Cystic brain metastases may also occur in patients with breast or digestive tract cancer<sup>4</sup> and cases have been reported in patients with papillary thyroid cancer and with adenoid cystic carcinoma of the parotid gland. One study has shown that cystic brain metastasis was associated with poor prognosis in patients with advanced breast cancer.<sup>5</sup> However, most studies found that there was no significant difference in survival between patients with cystic and non-cystic brain metastases.<sup>2</sup> Radiation therapy appears to be the most appropriate management of cystic or non-cystic brain metastases from prostate cancer.<sup>2</sup> For eligible patients, hypofractionated stereotactic radiotherapy seems to give the best results with a 70% isodose surfaces normalized to 100% at the isocentre. In our case, the patient's ECOG-PS score was 2 and he had four brain metastases, thus stereotactic radiation therapy was not considered and he received a whole brain irradiation. Our patient was still alive after a 3-month follow-up after brain radiotherapy.

#### Declaration of competing interest

The authors declare that they have no competing interests.

#### Acknowledgements

Not applicable.

#### List of Abbreviations

cGy	centigray
PSA	Prostate specific antigen
MRI	magnetic resonance imaging
ALK	anaplastic lymphoma kinase
ECOG-PS	Eastern Cooperative Oncology Group Performance Status

#### Ethics approval and consent to participate

This study was approved by the Ethics Review Committee of "Jean

Godinot Institute in Reims<sup>™</sup> and informed consent was obtained from the subject prior to participation.

#### Consent for publication

Consent to publish was obtained from the subject of the case.

#### Availability of data and material

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

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#### Authors' contributions

CMC and LE wrote the manuscript. CMC performed the radiotherapy.

All authors read and approved the final manuscript.

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