Atypical cystic calcified brain metastases (ECR 2019 Case of the Day)
Published on 31.07.2019

ISSN: 1563-4086
Section: Neuroradiology
Area of Interest: Neuroradiology brain
Imaging Technique: MR
Case Type: Clinical Cases
Authors: Aleksandra Aracki-Trenkic1, Milan Simic1, Dragan Stojanov1,2, Zoran Radovanovic1,2
Patient: 43 years, female

Clinical History:
A 43-year-old female patient was admitted to the Emergency Department due to a sudden generalised epileptic seizure and a short-term loss of conscience. She had undergone breast cancer surgery a few years earlier. Elisa test detected Toxocara Canis IgG antibodies. Emergency CT examination showed multiple, calcified, atypical intracerebral lesions.

Imaging Findings:
Figure 1. Brain MRI: axial T2W image shows multiple supratentorial hyperintense lesions without perifocal oedema
Figure 2. Brain MRI: axial FLAIR image also shows multiple supratentorial hyperintense lesions without oedema in subcortical and deep white matter locations, in centrum semiovale
Figure 3. Brain MRI: (a-c) axial DWI shows a narrow, thin, peripheral ring restriction of diffusion of certain lesions, while the right frontal and temporal lesions show an asymmetric smaller solid part that also shows a hyperintensity; d) which is accompanied with low signal on the ADC map
Figure 4. Brain MRI: (a-d) axial SWAN images show diffuse multiple calcifications in the lesions
Figure 5. Brain MRI: axial 3D ASL images show (a) clear hyperperfusion of the wall thickening and solid components of the right frontal lesion (white arrow); (b) unlike other parts of the lesion that show hypoperfusion; (c) one of the multiple lesions that are located in right temporal lobus show ring hyperperfusion (black arrow); (d) other cystic lesions are clearly hypoperfused
Figure 6. Brain MRI: (a-c) axial T1W FLAIR precontrast images show multiple oval hyposignal lesions; (d-f) On T1W FLAIR postcontrast images, some of the lesions show poorly marginal enhancement. The right frontal and temporal lesions also show asymmetric wall thickening and a smaller solid part uptaking contrast medium. Some other do not enhance.

Discussion:
There is a wide range of differential diagnosis for the presence of multiple cystic calcified brain lesions and the knowledge of imaging patterns is important for an accurate diagnosis [1]. Brain metastasis are a common cancer complication and differentiating these lesions in case of atypical imaging patterns may be challenging [2]. Magnetic
resonance imaging (MRI) with advanced neuroimaging sequences such as non-contrast perfusion, arterial spin labelling (ASL) is the imaging procedure of choice to diagnose and characterise brain metastases. Many diseases, primarily infectious, can mimic brain metastases on neuroimaging, including brain abscess, neurocysticercosis, toxoplasmosis, tuberculoma and primary brain tumours. By applying MRI sequences such as T1W, T2W, FLAIR, DWI, and postcontrast T1W, and advanced techniques, SWAN and ASL, we can establish a diagnosis with certainty even in atypical cases.

Clinical presentation ranges from general symptoms such as a headache, epileptic seizures, as in the case of our patient; and focal neurologic deficits, depending on the affected brain region [3,4].

Following a CT brain scan revealing multiple, calcified intracerebral lesions, MR brain examination was performed to precisely evaluate the described diffuse supratentorial lesions. MR detected multiple cystic supratentorial lesions, presenting as hyperintense on T2 weighted images and hypointense on T1W. Certain lesions showed a narrow, thin, peripheral area of diffusion restriction. Most lesions showed marginal postcontrast enhancement, while the right frontal and temporal lesions showed asymmetric wall thickening and a small solid part, also uptakeing contrast. ASL sequences showed the described wall thickening and solid components were hyperperfused, unlike other cystic lesions that were clearly hypoperfused. SWAN sequence revealed diffuse multiple calcifications in the lesions. Due to intracerebral calcifications, we also considered neurocysticercosis as a possible diagnosis. A misdiagnosis may cause patients to undergo unnecessary neurosurgery, or to be exposed either to toxic chemotherapy or cranial irritation. Therefore, differentiation between non-neoplastic causes and neoplastic lesions is of critical importance. Following the diagnosis, a biopsy of a lesion was performed and atypical metastatic cells were identified. Radiation therapy was applied, and a month later the patient presented with no major deficits.

Intracerebral cystic calcified lesions are usually associated with low-grade primary brain tumours, and with infectious diseases; however, the possibility of atypical brain metastases in patients with breast cancer should be considered despite being rare, since prompt diagnosis allows early therapy and better treatment outcomes.

**Differential Diagnosis List:** Brain metastases - atypical cystic calcified brain metastases, Primary brain tumour, Toxocariasis, Neurocysticercosis, Brain abscesses

**Final Diagnosis:** Brain metastases - atypical cystic calcified brain metastases

**References:**


**Figure 1**

Description: Brain MRI: axial T2W image shows multiple supratentorial hyperintense lesions without perifocal oedema. 

**Origin:** Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: axial FLAIR image also shows multiple supratentorial hyperintense lesions without oedema in subcortical and deep white matter locations, in centrum semiovale. Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-c) axial DWI shows a narrow, thin, peripheral ring restriction of diffusion of certain lesions, while the right frontal and temporal lesions show an asymmetric smaller solid part that also shows a hyperintensity; d) which is accompanied with low signal on the ADC map.

Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-c) axial DWI shows a narrow, thin, peripheral ring restriction of diffusion of certain lesions, while the right frontal and temporal lesions show an asymmetric smaller solid part that also shows a hyperintensity; d) which is accompanied with low signal on the ADC map.

Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-c) axial DWI shows a narrow, thin, peripheral ring restriction of diffusion of certain lesions, while the right frontal and temporal lesions show an asymmetric smaller solid part that also shows a hyperintensity; d) which is accompanied with low signal on the ADC map. Origin: Department of radiology, Clinical Center Nis, Serbia 2018
**Description:** Brain MRI: (a-c) axial DWI shows a narrow, thin, peripheral ring restriction of diffusion of certain lesions, while the right frontal and temporal lesions show an asymmetric smaller solid part that also shows a hyperintensity; d) which is accompanied with low signal on the ADC map.

**Origin:**
Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-d) axial SWAN images show diffuse multiple calcifications in the lesions

Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-d) axial SWAN images show diffuse multiple calcifications in the lesions
Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-d) axial SWAN images show diffuse multiple calcifications in the lesions
Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-d) axial SWAN images show diffuse multiple calcifications in the lesions
Origin: Department of radiology, Clinical Center Nis, Serbia 2018
**Figure 5 a**

**Description:** Brain MRI: axial 3D ASL images show (a) clear hyperperfusion of the wall thickening and solid components of the right frontal lesion (white arrow); (b) unlike other parts of the lesion that show hypoperfusion; (c) one of the multiple lesions that are located in right temporal lobe show ring hyperperfusion (black arrow); (d) other cystic lesions are clearly hypoperfused.

**Origin:** Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: axial 3D ASL images show (a) clear hyperperfusion of the wall thickening and solid components of the right frontal lesion (white arrow); (b) unlike other parts of the lesion that show hypoperfusion; (c) one of the multiple lesions that are located in right temporal lobe show ring hyperperfusion (black arrow); (d) other cystic lesions are clearly hypoperfused. Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: axial 3D ASL images show (a) clear hyperperfusion of the wall thickening and solid components of the right frontal lesion (white arrow); (b) unlike other parts of the lesion that show hypoperfusion; (c) one of the multiple lesions that are located in right temporal lobus show ring hyperperfusion (black arrow); (d) other cystic lesions are clearly hypoperfused. Origin: Department of radiology, Clinical Center Nis, Serbia 2018
**Description:** Brain MRI: axial 3D ASL images show (a) clear hyperperfusion of the wall thickening and solid components of the right frontal lesion (white arrow); (b) unlike other parts of the lesion that show hypoperfusion; (c) one of the multiple lesions that are located in right temporal lobe show ring hyperperfusion (black arrow); (d) other cystic lesions are clearly hypoperfused.

**Origin:** Department of radiology, Clinical Center Nis, Serbia 2018
**Description:** Brain MRI: (a-c) axial T1W FLAIR precontrast images show multiple oval hyposignal lesions; (d-f) On T1W FLAIR postcontrast images, some of the lesions show poorly marginal enhancement. The right frontal and temporal lesions also show asymmetric wall thickening and a smaller solid part uptaking contrast medium. Some other do not enhance. **Origin:** Department of radiology, Clinical Center Nis, Serbia 2018
**Description:** Brain MRI: (a-c) axial T1W FLAIR precontrast images show multiple oval hyposignal lesions; (d-f) On T1W FLAIR postcontrast images, some of the lesions show poorly marginal enhancement. The right frontal and temporal lesions also show asymmetric wall thickening and a smaller solid part uptaking contrast medium. Some other do not enhance. **Origin:** Department of radiology, Clinical Center Nis, Serbia 2018
**Description:** Brain MRI: (a-c) axial T1W FLAIR precontrast images show multiple oval hyposignal lesions; (d-f) On T1W FLAIR postcontrast images, some of the lesions show poorly marginal enhancement. The right frontal and temporal lesions also show asymmetric wall thickening and a smaller solid part uptaking contrast medium. Some other do not enhance. **Origin:** Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-c) axial T1W FLAIR precontrast images show multiple oval hyposignal lesions; (d-f) On T1W FLAIR postcontrast images, some of the lesions show poorly marginal enhancement. The right frontal and temporal lesions also show asymmetric wall thickening and a smaller solid part uptaking contrast medium. Some other do not enhance. Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-c) axial T1W FLAIR precontrast images show multiple oval hyposignal lesions; (d-f) On T1W FLAIR postcontrast images, some of the lesions show poorly marginal enhancement. The right frontal and temporal lesions also show asymmetric wall thickening and a smaller solid part uptaking contrast medium. Some other do not enhance. Origin: Department of radiology, Clinical Center Nis, Serbia 2018
Description: Brain MRI: (a-c) axial T1W FLAIR precontrast images show multiple oval hyposignal lesions; (d-f) On T1W FLAIR postcontrast images, some of the lesions show poorly marginal enhancement. The right frontal and temporal lesions also show asymmetric wall thickening and a smaller solid part uptaking contrast medium. Some other do not enhance. Origin: Department of radiology, Clinical Center Nis, Serbia 2018