

## Ring Artefacts in CT Scan: A Red Herring

Rudrajit Paul\*, Dipanjan Bandyopadhyay\*\*

### Abstract

The computed tomography (CT) scan is an indispensable part of modern medical practice. However, the images are sometimes prone to artefacts, which may confuse the clinician. One such artefact is described here in details along with the diagnostic pitfalls of misinterpretation.

**Key words:** Neurocysticercosis; ring artefact; detector; radiologist.

### Introduction

Computed Tomographic (CT) scan is a very common diagnostic imaging procedure advised by physicians in modern times. This imaging modality is extremely helpful in the detection of a number of pathologies in various organs. Its usefulness has been further demonstrated during the recent Covid-19 pandemic. However, like any other imaging technique, CT scan is also prone to a lot of artefacts<sup>1</sup>. While appearance of such artefacts is fairly common for the radiologists, it is often a source of bafflement for the clinician. But clinicians should also be aware of the radiological appearance of the common artefacts in order to avoid a diagnostic dilemma. We present here one such rare CT scan artefact, which may be a source of considerable confusion for the physician.

### The case

A 79-year-old female was admitted with sudden onset

unconsciousness following fever. There was no history of convulsion. A non-contrast CT scan done at admission showed multiple ring-like lesions in different parts of the cerebral cortex (Fig. 1). The treating clinician was thinking of neurocysticercosis and a decision was taken to start the patient on anti-helminthic drugs. However, consultation with the radiologist revealed these "lesions" to be nothing more than ring artefacts which were due to some problem with the detector of the CT machine. Meanwhile, the patient's serum sodium levels were found to be 116 mEq/l and correction of that level led to regaining of consciousness. Thus, unnecessary treatment was avoided.

### Discussion

There are many different types of artefacts in CT scan imaging, either hardware related or patient related. Common artefacts include motion artefact, noise, pseudo-enhancement, beam hardening and ring artefact<sup>2</sup>. Although



Fig. 1: CT brain of the patient showing ring artefact (Red arrows) in different axial cuts of the brain, simulating neurocysticercosis.

\*Consultant Physician, Department of Medicine, Ruby General Hospital, Anandapur, Kolkata - 700 107, West Bengal,

\*\*Professor and HOD, Department of Medicine, North Bengal Medical College, Darjeeling - 734 012, West Bengal.

Corresponding Author: Dr Rudrajit Paul, Consultant Physician, Department of Medicine, Ruby General Hospital, Anandapur, Kolkata - 700 107, West Bengal. Phone: 9433824341, E-mail: r.paul.medicalcollege@gmail.com.

these vagaries are of interest to the radiologist only, the physician should also have a basic knowledge of their appearances, in order to avoid misinterpretations.

Ring artefact is caused by a miscalibrated or defective detector which creates a bright or dark ring around the centre of rotation<sup>2</sup>. Such artefact can be easily recognised and ignored in imaging of other parts of the body. But in brain CT scan, if of small size, it often simulates pathology like neurocysticercosis or toxoplasmosis. The artefact can be seen either as a full circle or as an arc. *The main clue in detecting this artefact is its presence in the same geometrical location in multiple sequential images*<sup>3</sup>. As seen in our case, the "lesions" were present in multiple sections of the brain, but if observed closely, they were all in the same relative position (Fig. 1). Normal brain pathology would not have this symmetrical appearance.

To eliminate this artefact, the detector needs to be

recalibrated or replaced. Sometimes, software-based correction is also possible.

This case is presented with the aim to sensitize clinicians to this rare artefact in a CT scan of the brain. Unless the artefact is recognised, there would be unnecessary prolonged treatment. Another caveat to be learnt from this case is that although clinicians are expected to have a sound skill for the interpretation of CT scan images, it is always a good idea to consult a radiologist for additional inputs.

### References

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