

Brain metastasis originating from a lung cancer

Siyabonga Nkumanda 3rd year student radiographer, Groote Schuur Hospital, Observatory

Abstract: Most brain metastases are considered to be relatively superficial and situated at the well-vascularized interface of the grey and white matter. About 20% of metastatic lesions occur in the posterior fossa, primarily in the cerebellum and cerebrum. In approximately half of all cases multiple metastatic lesions are present. This case report describes a typical example of lung cancer that metastasized to the brain.

Keywords: Intracranial, hydrocephalus, basal cisterns.

Introduction

This case report discusses the significant role played by contrast-enhanced computed tomography of the head in diagnosing metastatic tumours of the brain and the prognosis of this disease. The case of an adult who was diagnosed with brain metastases and the consequences of the progression or development of this disease are discussed [1-6].

Contrast enhanced computed tomography is used to identify the majority of brain metastasis as ring-enhancing or diffusely enhancing lesions, typically surrounded by a zone of oedema which is out of proportion compared to the size of the lesion.

Clinical history

A 47-years old male patient was referred from a private hospital to an academic hospital as he had presented with back pain, leg pain, severe headaches and hematemesis. He had been diagnosed with lung cancer five years ago.

It is protocol to refer patients who present with any of the above symptoms for computed tomography imaging of the brain. In view of this the patient underwent spiral computed tomography scans a few days post-admission. Findings of the contrast enhanced computed tomography revealed multiple inhomogeneously enhancing lesions (Figures 1 to 3). Most of the lesions showed areas of central necrosis and varying degrees of surrounding oedema. There was also another small enhancing lesion in the left midbrain. The brain was generally swollen but the basal cisterns were still patent. No hydrocephalus or midline shift was visualised. The paranasal sinuses were clear and the mastoid air cells were also well aerated. No bony lesions were detected as shown in Figure 2.

Management

As this patient was diagnosed with lung cancer and brain metastases he was placed on steroids and chemotherapy. He received morphine 10mg, six hourly and augmentin 375mg eight hourly. Due to brain swelling which caused intracranial pressure the patient died a few days after the computer tomography examination.

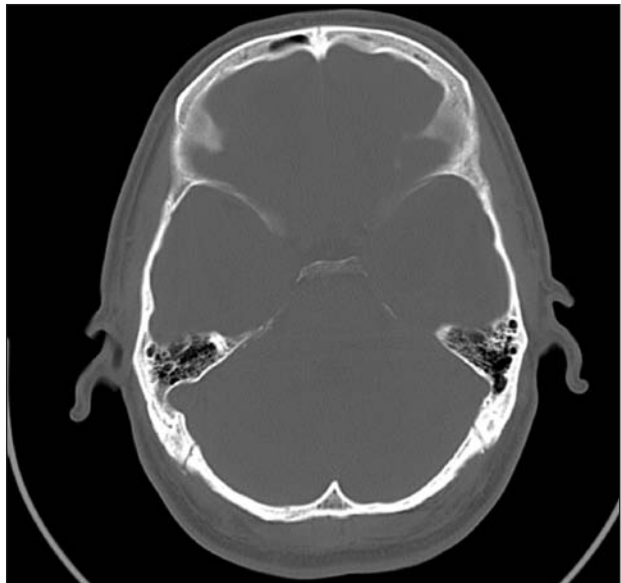


Figure 2: Shows the normal bony margins of the skull as no bony lesions were detected.

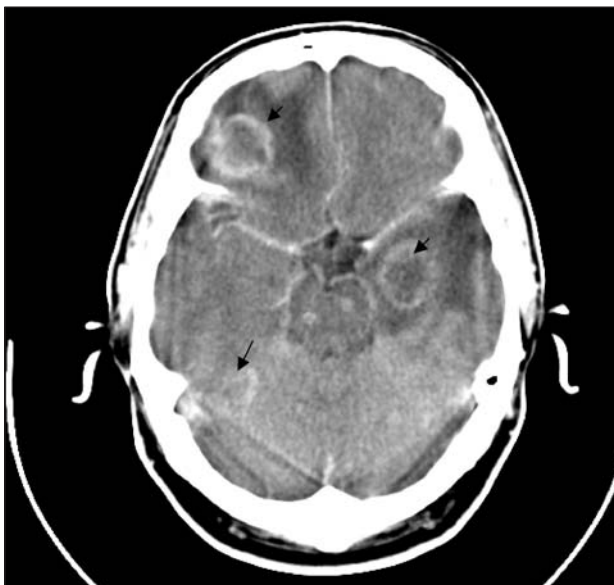


Figure 1: Shows multiple enhanced lesions as they were detected on computed tomography after contrast medium was introduced.

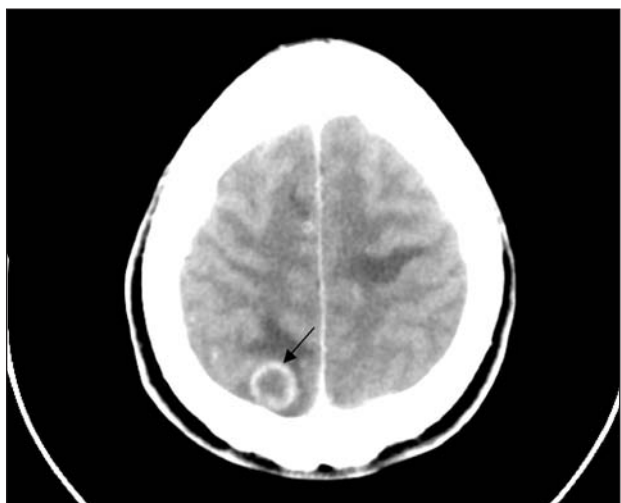


Figure 3: Shows another metastatic lesion arising from the superficial area of the posterior cerebrum.

Discussion

A brain metastasis is a tumour that develops from cancer cells that have spread from other cancerous sites in the body to the brain, usually through the blood stream [3]. Less commonly the cancer cells may travel by direct spread from surrounding structures such as the skull sinuses to the brain. The three common primary sites of the brain metastasis are the lung, breast and gastrointestinal tract [1-3]. These metastatic tumours present with the same clinical features common to any intracranial mass, but are distinguished by a much more rapid evolution of symptoms, often measurable in days to weeks. This accelerated clinical course is due to the tremendous accumulation of peri-tumoral brain swelling, which typically accompanies even the smallest of metastatic deposits [1].

Brain metastases occur in approximately 20-40 percent of patients with cancer. Up to 75 percent of afflicted patients have multiple lesions. Although the most common sources of brain metastasis in an adult include cancer of the lung, breast and skin, such as melanomas, the primary site or tissue of origin of the metastasis is unknown in up to 15 percent of patients. As a general rule almost any systemic cancer is capable of metastasizing or spreading to the brain [3,5].

Approximately two-thirds of brain metastasis are symptomatic at some point during the course of the disease. Symptoms are caused by increased intracranial pressure, and/or focal irritation or destruction of brain tissue, which causes malfunctioning of the brain tissue [3].

Increased intracranial pressure can be caused by tumour growth, swelling caused by oedema induced in the adjacent brain tissue, obstruction of the cerebral spinal fluid pathways resulting in hydrocephalus, or a combination of these effects.

Typically patients may experience non-specific symptoms, such as headache, nausea, vomiting, mental status change and lethargy [3]. The patient discussed in this report did present with some of the clinical symptoms mentioned in the literature, such as headaches, and hematemesis.

Focal irritation or destruction of brain tissue produce varied symptoms, such as seizures, paralysis, visual impairment, epileptic seizures, gait disturbances or other neurological deficits, depending on the specific location of the metastatic lesion [3]. These lesions are most frequent in the frontal and parietal lobes, usually rounded, well circumscribed and enhanced on computed tomography images or magnetic resonance images when intravenous contrast media are used. The lesions are often associated with cerebral oedema and may occasionally be thought to be a cerebral abscess. One-third to half of such individuals will die as a result of the cerebral component of their disease. Therefore attaining local control is a priority [3,4].

Conclusion

Brain metastasis is a fairly common disease in patients who have certain types of cancer. These lesions originate from various primary cancer sites. Up to 70 percent of patients who are diagnosed with brain metastasis the primary cancer is in their lungs. The next highest primary site is cancer of the breast followed by cancers of the gastrointestinal tract. The survival rate of patients who are diagnosed with brain metastasis is poor but can be improved if the lesions are detected early. Chemotherapy and surgery could be the best options to treat the lesion.

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