Follicular thyroid cancer causing intra and extra-cranial masses

Aasiyah Schroeder 3rd year diagnostic radiography student 2007, Cape Peninsula University of Technology, Health and Wellness Science Faculty, Department of Radiography and Nursing, Cape Town, South Africa

Abstract: The most common causes of skull metastases include lung, breast and prostrate cancer. Skull metastases caused by thyroid cancer are very rare and not many are reported in literature but metastases caused by follicular thyroid carcinoma is the most common cause [1]. This case report is of a patient who presented with follicular thyroid carcinoma which resulted in a mass in the intracranial compartment. Primary intracranial tumors derive from locally present tissue but occasionally ectopic tissue, while second degree tumors have either metastasized from extracranial cancer or direct extensions from head and neck malignancies [1-5]. The clinical history and management of the patient are discussed.
Keywords: intracranial tumours, thyroid gland, skull metastases.

Case report

A 49 year old female presented with metastatic follicular carcinoma of the thyroid. She developed a mass in the left temporal area one year ago. She eventually consulted her general medical practitioner who diagnosed an enlarged thyroid gland. She later on underwent a right thyroid lobectomy for a 60mm x 45mm x 40mm follicular carcinoma. She had a total thyroidectomy and histology results showed no evidence of local malignancy. A trucut biopsy of the left temporal area of the skull was performed to determine the type of carcinoma. Biopsy of the temporal area showed positive signs of metastatic follicular carcinoma (Figure 1). A computed tomography scan of the brain showed large lytic lesions in the occipital bone and in the right and left temporal bones. A bone scan showed multiple osteoblastic areas in the skull, the left humerus, left scapula, several ribs and the pelvis. A chest radiograph and ultrasound scan of the abdomen were performed. These examinations showed metastatic disease. A magnetic resonance venography scan was performed to determine involvement of the

Figure 1: A small right sided mass (a) measuring 3.80cm by 4.81cm and a larger left sided mass (b) measuring 7.06cm by 3.49cm and a small occipital mass (c) measuring 3.26am by 3.37cm is observed on this T1 axial MR image.

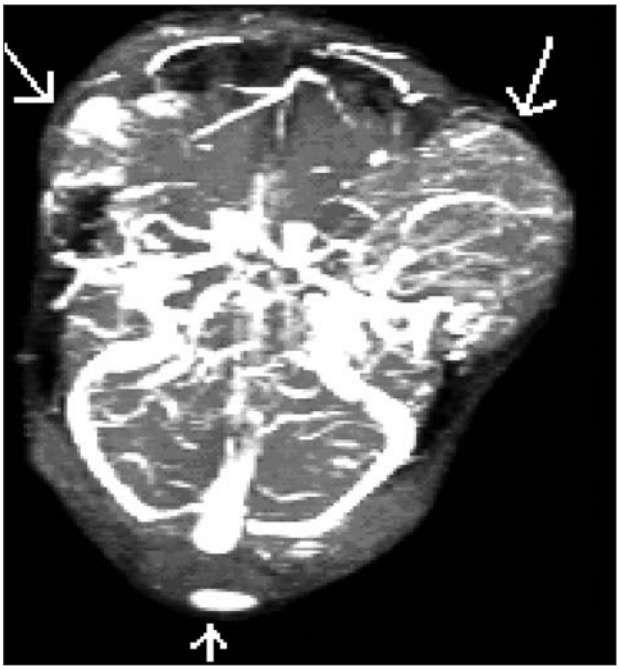

Figure 2: This MRV image shows the venous blood flow to the masses outlined by the contrast media (see arrows) which was introduced intravenously.

vascular system (Figure 2). The radiologist also wanted to establish involvement of the mass relative to the eye (Figure 3).

The patient was referred to a neurosurgeon for debulking of her skull metastases. This was however contra-indicated due to the vascular nature of the metastases. The patient was then referred to an orthopedic surgeon for possible intervention for the metastases in her left humerus. External beam radiation therapy was considered as a possible treatment but was ruled out due to it not being effective in this type of disease.

The patient is now on a medication for pain management. She attends the thyroid clinic for regular checkups. She did not receive any form of chemo or radiotherapy due to it being unsuccessful to treat this type of cancer spread.

Discussion

Thyroid cancer, particularly papillary thyroid cancer, has increased in

Figure 3: This T1 coronal post contrast MR image shows both masses relative to the eyes, left (a) and right (b).

western countries over the last few years but factors to explain the increase have not yet been clearly established [2].

Follicular thyroid cancers are uncommon lesions. Distant metastases caused by follicular thyroid cancer are more common than papillary thyroid cancer. An estimate 50 - 60% of patients with follicular thyroid cancer develop distant metastases. The mortality rate of patients with follicular thyroid cancer ranges from 10% to 40% [3]. Metastatic lesions in the skull usually present as a soft single mass. The mass rarely causes intracranial pressure on the brain. Occasionally the mass causes an extension into the brain with neurological symptoms (Figure 4) resulting in uncontrollable seizures [1]. If the condition is handled appropriately patients may have a 43% survival rate [4].

Follicular carcinoma accounts for about 25% of thyroid malignancies and the incidence is 2-3 times higher in females than in males and is found in patients between the ages of 50-60 years old [1-4]. Papillary and follicular carcinomas begin in the epithelial cells of the thyroid, growing slowly and forming nodules in the gland.

Papillary tumors are non-encapsulated and extend to adjacent tissue beyond the thyroid. They metastasize to local cervical lymph nodes. Distant metastases is rare. Follicular tumors are large, invasive lesions which are encapsulated. These tumors extend to surrounding tissue and cervical lymph nodes and metastasize through the bloodstream to distant sites. Fibrosis, hemorrhage, necrosis and cyst formation are relatively common [1-4]. Follicular metastases cause expansile osteolytic bone lesions and can be very vascular hence trucut biopsy of the lesion can bleed a great deal. The metastases disseminate haematogenously to lungs and bones and the secondary deposits are thryroid stimulating hormone dependent and are treatable with iodine 131 with some success.

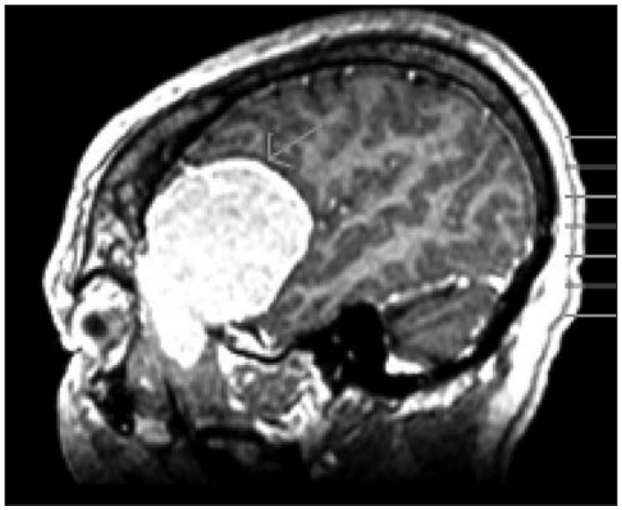

Figure 4: A T1 sagital MR image showing intracranial mass (arrow) causing a mass effect on the brain.

Raised intracranial pressure is due to intracranial mass lesions. Impairment of the conscious level of a patient is related to the level, size and growth rate of the mass. If the growth is slow, various compensatory mechanisms may occur including alterations in volume in the cerebral spinal fluid space and venous sinus thereby allowing the tumor to reach a considerable size. More rapid growth does not allow the compensatory mechanisms to take place and raised intracranial pressure develops at an early stage, especially if cerebral spinal fluid circulation is also obstructed [5]

A raise in intracranial pressure from a mass may cause alterations within the skull and may lead to displacement of the brain between various compartments. The downward displacement of the temporal bone through the tentorium due to large mass lesions may cause temporal coning causing pressure on the contra lateral cerebral peduncle. Downward displacement of the cerebral tonsils through the foramen magnum may compress the medulla oblongata resulting in brainstem hemorrhage. As coning progresses the patient may become decerebrate and if this condition is not treated immediately death occurs [5].

Conclusion

The patient referred to in this case report had a complete thyriodectomy and is now on a long-term treatment of thyroxine. No radiation therapy or chemotherapy was given due to it being unsuccessful in previous cases. Surgery for follicular thyroid metastesis in the brain is not recommended as it may cause neurological damage.

Reference

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