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INTRAOPERATIVE SQUASH SMEAR CYTOLOGY: A CURTAIN RAISER IN OCCULT PRIMARY.

Pathology

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ABSTRACT

Overall incidence of thyroid carcinoma is 1%.Out of which only 1% cases give intracranial metastasis by haematogenous route indicating the rarity of intracranial metastasis of thyroid follicular carcinoma. Intraoperative squash smear cytological diagnosis of metastatic thyroid carcinoma to brain as initial presentation has not been reported previously and hence this case report.

CASE REPORT: 69 years old female presented with painless, progressive proptosis of left eye. Mass was diagnosed as meningioma on MRI. Intraoperative squash cytology smears showed micro-follicular arrangement of monotonous tumour cells showing crowding and hyper chromasia. Colloid was lacking in the smears studied. These characteristic cytological features not only made an easy catch for the morphologist's eye as metastasis from thyroid malignancy but also guided the clinician to look for primary in the thyroid gland. Follicular carcinoma was confirmed by fine needle aspiration cytology of thyroid nodule followed by histopathological examination of the excised thyroid gland .Thus intraoperative squash smear cytology acted as curtain raiser in our case.

KEYWORDS

Metastatic follicular carcinoma, occult primary, unilateral proptosis, squash cytology, micro-follicular pattern

INTRODUCTION:

Haematogenous spread of tumours is a frequent route of metastasis to CNS (central nervous system) than direct invasion of CNS from adjacent structures. Incidence of leptomeningeal metastasis is 4-5% in patients with solid tumours, while 8-9% patients with advanced cancer show dural metastasis. Most common primary malignancies metastazing to CNS in descending order of frequency are lung (20%), renal cell carcinoma (6.8%), melanoma (6.5%), breast (5%), and colorectal carcinoma (1.8%).[1]Thyroid malignancies metastazing to brain are rare accounting for 0.15% to 1.3% cases. Prevalence of brain metastasis from differentiated thyroid carcinoma is 1.2%. [2]

Metastatic follicular carcinoma of thyroid clinically presenting as painless, progressive proptosis of left eye is rare .Presenting as first manifestation of the disease is further exceptional. [3]

On imaging, solitary space occupying lesion in brain is strongly suggestive of primary CNS tumour .When present as isolated meningo-dural space occupying lesion,they mimic meningioma [4]Anita et al had diagnosed four cases of metastatic follicular carcinoma presented as spinal space occupying lesion with known primary on squash cytology. [5]However with the best of literature search, we could not found any reference for intraoperative squash smear diagnosis of metastatic thyroid follicular carcinoma in brain and hence this case report.

Here we present a case of metastasis of follicular carcinoma of thyroid clinically causing proptosisof left eye. Lesion was diagnosed as meningioma on MRI. This clinic-radiological dido was unfolded by intra operative squash smear cytology, a reliable and rapid diagnostic technique for CNS lesions.

CASE REPORT:

69-Years - female presented with painless, progressive proptosis of left eye. There was no significant past history. Magnetic resonance imaging (MRI) showed an extra-axial polypoidal soft tissue space occupying lesion (4x3x3 cm) arising from left side sphenoid wing .The mass was bulging into left orbit causing effacement of the optic canal. These radiological features were suggestive of meningioma with differential diagnosis of neurofibroma. [Fig.1]

Patient was referred to neurosurgery department for surgical intervention. Exploratory craniotomy was performed. Two-three tumour tissue bits were sent in isotonic saline to pathology department for intra-operative squash cytology examination while remaining tissue was processed for routine histopathology. The tissue spread easily on slides and were stained with rapid hematoxylin and eosin stain. Slides were ready for morphological examination within 5 minutes.

Squash cytology smears showed uniform cells arranged predominantly as micro follicular pattern along with sheets of monotonous cells with traversing capillaries and also scattered singly. Colloid was absent in the background. [Fig. 2]Findings were suggestive of metastatic deposits of adenocarcinoma probably from thyroid malignancy. Thus characteristic cytological features were not only significant enough to attract the attention of the morphologist but also directed the clinician to evaluate thyroid gland for primary lesion.
USG (Ultra sonography) of the thyroid gland showed 3x2cm heterogeneous nodule in left lobe, features pointing towards neoplastic lesion.USG guided fine needle aspiration from the thyroid lesion was done.Smears were stained with H and E, PAP and MGG stain showed moderate cellularity against haemorrhagic background. Repetitive micro-follicles were seen scattered throughout the smear along with syncytial cell aggregates. At places clusters showed nuclear crowding and overlapping. Nuclei were enlarged monomorphic, hyper chromatic with coarse chromatin. Colloid was classically absent in smears studied. [Fig.3]We reported as follicular neoplasm category (IV) according to the Bethesda System for reporting Thyroid Cytopathology (TBSRTC).

A 3cm diameter encapsulated greyish white nodule seen in the left lobe of thyroid with 0.5 cm satellite nodule in the right lobe on gross examination of thyroidectomy specimen. Follicular carcinoma of thyroid showing capsular invasion was confirmed on histopathology. Satellite nodule in the right thyroid lobe also showed similar morphological features. Tissue for histopathology from cranial lesion also showed morphology similar to primary thyroid malignancy. [Fig.4] Thus according to WHO classification (2017) for endocrine tumours, our case was from the category of follicular thyroid carcinoma, widely invasive group.

DISCUSSION:

Thyroid carcinoma is the most common endocrine carcinoma with overall incidence of thyroid malignancy is 1%.Out of which only 1% cases give rise to intracranial metastasis by haematogenous route. This indicates the rarities of intracranial metastasis of thyroid follicular carcinoma.[6]

Amongst the overall incidence of CNS metastatic lesion, about 16% cases come into limelight as a first manifestation of the disease requiring detailed clinic-radiological and pathological work up is required to identify the primary culprit.[7]

Metastatic follicular thyroid carcinoma presenting as painless, progressive proptosis of left eye as the primary presentation with occult primary is exceptional. [8]The 'Dural tail' sign is highly suggestive but not pathgnomic of meningioma. It can also be seen in dural metastasis, gliomas, and nerve sheath tumours. There are case reports of isolated dural mass reported as meningioma on imaging which turned out to be metastatic carcinoma on histopathology.[9]The isolated space occupying lesion in our case also acted as clinico-radiological camouflage for metastatic dural lesion.

Intraoperative squash smear cytology is an established and reliable technique for the diagnosis of CNS lesion due to its proven high degree of sensitivity and specificity. It not only gives rapid information about the nature of the lesion but also guides the surgeon to optimise the surgical approach. [10] High index of suspicion regarding thyroid follicular carcinoma should always be kept in mind when CNS squash cytology smears are showing characteristic repetitive follicular arrangement of alien cells against colloid deficient background.

Clinicians were guided to search of primary in the thyroid which revealed a nodule in left lobe of thyroid on imaging. USG guided fine needle aspiration cytology smears showed cytological features consistent with category (IV) - follicular neoplasm or suspicious for a follicular neoplasm according to Bethesda System for reporting Thyroid Cytopathology (TBSRTC). [11]The recommended management of a patient with diagnosis of follicular neoplasm / suspicious of follicular neoplasm is surgical excision of the lesion, most often a hemi- thyroidectomy or lobectoctomy. Our patient was subsequently subjected to total thyroidectomy for confirmation of thyroid follicular carcinoma as against other cytological mimickers.

For final attestation in advance resources poor institute like ours and to complete diagnostic –therapeutic protocol ,patient was subjected to total thyroidectomy .Histopathology confirm the diagnosis of follicular carcinoma of thyroid by showing capsular invasion. Gupta A et al found clinico-pathological findings as simple and effective tool to identify unknown primary in metastatic CNS tumours in centres with various constraints. They also found thyroid follicular carcinoma the second most common metastatic lesion to CNS with unknown primary after lung malignancy.[12]Our patient on thyroidectomy was diagnosed as thyroid follicular carcinoma with widely invasive group according to WHO 2017 classification of endocrine tumours.[13]

Figure Legends:

Fig 1: MRI - extra-axial polypoidal soft tissue space occupying lesion (4x3x3 cm) arising from left side sphenoid wing causing proptosis of left eye

Fig 2 H and E stained squash smears (10X) - micro-follicular pattern and sheets of cells with traversing capillaries.

Fig 3: MGG stained FNAC smears from thyroid mass (40X) - repetitive follicular pattern with uniform, enlarged hyper chromatic nuclei

Fig 4: H and E stained section (40X): From CNS metastatic deposit.

CONCLUSION:

Intra-operative squash cytology has proved, not only an accurate diagnostic method for metastatic follicular carcinoma by morphologist eye also guided the clinician to clinch the primary for further management. Intra-operative squash cytology thus acted as curtain raiser in our case.

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