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Case Report

Utilizing squash cytology and histodiagnosis to detect lipomatous metaplasia in meningiomas: A diagnostic approach

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ABSTRACT

Squash smears provide with preliminary cytological diagnosis in central nervous lesions. Reporting features of uncommon lesions is important for correct identification of them. We herewith present a case of meningioma with lipomatous metaplasia.

A 37-year-old male presented with weakness in lower limbs for 4 months, loss of sensation in lower limbs for 3 months. Radiology revealed a space occupying lesion at C7 to the T3 with altered signal intensity. Laminectomy was performed. The squash cytology displayed mature adipocytic tissue along with a small cluster of round cells with homogenous chromatin. Cytology was reported as benign, and the possibility of teratoma to be considered.

On histology, the tumor was composed of predominantly adipocytes and interspersed whorls and nests of meningothelial cells showing uniform bland nuclei and abundant cytoplasm with foci of psammomatous and dystrophic calcification were seen. Hence, reported as lipomatous meningioma.

On review, it was found that the cytology was consistent with lipomatous meningioma; the lack of morphological description and no clinical suggestion led to a possible opinion of teratoma.

1. Introduction

First reported by Bailey and Bucy in 1931 lipomatous meningiomas are fairly uncommon type of meningiomas.[1] Recently they have been clubbed with myxoid, cartilaginous, osseous and xanthomatous meningiomas as single category of metaplastic meningiomas.[2] Though they have been since beginning referred to as adipocytic metaplasia in meningiomas authors have found that the adipocytes present in these tumors retain the ultrastructural and immunophenotype of the cells of the meninges. Which makes them not true to the term of being a true metaplastic event.[3,4] Progressive xanthomatous alteration, characterized by nonspecific cytoplasmic lipidization, appears to be the underlying mechanism in what are commonly referred to as lipomatous meningiomas, rather than genuine metaplastic transformation.

In multiple case reports and even in a large series, the squash cytological features of this entity are not described.[3,5–8] With this in mind we herewith report this present case of lipomatous meningioma with an intend to describe the squash cytology features. Though benign, but they are important to know so that the differential may be considered.

2. Materials and Methods

A 37-year-old male presented with complaints of weakness in lower limbs for 4 months, loss of sensation in lower limbs for 3 months. On MRI there was an

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intradural extramedullary lesion of altered signal intensity (hyperintense in T1 / STIR, isointense in T2) showing intense contrast enhancement seen extending from the vertebral level of C7 to the T3 measuring 4×3.2×5.8 mm producing extradural indentation over the thecal sac and compressing the spinal cord. The patient underwent laminectomy C7-T1 and T2-T3 and intraoperatively the lesion was pinkish grey, firm, moderately vascular and non-suck able.

3. Result

3.1. Intraoperative squash cytology

A small not easily squashable tissue was received in normal saline measuring 0.8x0.4x0.5 centimetres, entire tissue was subjected to cytological smear preparation. The haematoxylin and eosin stained smear revealed two major component of cells. Firstly, small clusters of monomorphic cells were seen in a non-fibrillary background as seen in (Figure 1 A, B). These cells had homogenous chromatin indistinct cytoplasm and present in clusters. No spindling was identified and no whorling pattern was seen. Apart from this mature fibro adipocytic clusters (Figure 1 A) (inset) were also seen composed of mature fat cells intermixed with bland spindle cells. There was no evidence of atypia or necrosis or fibrillary material. The Squash cytology displayed a benign neoplasm with two component, in view of midline location, young age of patient and thinking that these cells which were likely epithelial and fibro adipocytic of two dermal layer the cytology was reported as benign, and the possibility of teratoma may be considered.

3.2. Definitive histology

On basis of squash report complete excision of the tumor was carried out and Gray white multiple soft tissue pieces of tissue were received collective measuring 3x4x2.5 centimetres. Entire tissue was processed for histological examination. On Histological Examination, a benign neoplasm was seen consisting of predominantly adipocytes and interspersed whorls and nests of meningothelial cells showing uniform bland nuclei and abundant cytoplasm. Foci of psammomatous and dystrophic calcification were also identified. Morphologically it was diagnosed as: lipomatous meningioma.

On review, it was found that the cytology was consistent with lipomatous meningioma; the lack of morphological description and no clinical suggestion led to a possible opinion of teratoma.

4. Discussion

Meningiomas that too metaplastic meningiomas are very uncommon with multiple case reports describing them. Lipomatous meningiomas are usually WHO grade 1 disease

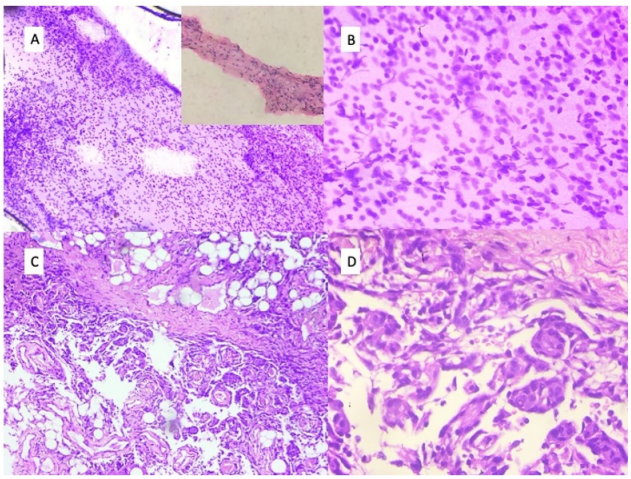

Figure 1: Microphotograph of squash cytology shows cluster of monomorphic cells; **A)**; H&Ex 100) with a small fibrofatty fragment in inset. On high power these cells are monomorphic with fine chromatin (**B**; H&Ex400), No whorling could be seen. In section from definitive histology mature adipocytic like cells intermixed with cells disposed in whorl like pattern are seen (**C**; H&Ex40). Individual cells are monomorphic as seen in cytology image with homogenous chromatin (**D**; H&Ex200)

with few reports describing atypical features in them.[3] Associated myxoid changes have also been reported. Surgical excision is usually the treatment of choice and few reoccurrences have also been reported.[5]

The present was intraoperatively reported as likely to be mature teratoma on squash cytology, in retrospect it is easy to corelate the entire cytology which composed of sheets of monomorphic cells of meningothelial cells and fat component being lipomatous differentiation. However, mainly as there were two component of cells which were seen. One was a small clusters of monomorphic cells in sheets without any fibrillary background which resembled epithelial cells and other was cluster of mature adipocytic tissue. Both the cells were benign in morphology and derived from two different types of dermal layers, to support this the lesion was present in young adult in midline. Prospectively the rarity of the lesion, no radiological or intraoperative opinion of meningioma led to this diagnosis . However the histology was quite classical as described.[4] Reported specificity and sensitivity of squash cytology in different studies is approximately 95-98%. Discrepancy in meningothelial lesions have been seen and the radiology is an important parameter while interpreting the intraoperatively cytology.[9,10] In the present case no indication of meningioma was provided both in radiology or preoperatively.

The slides of the intraoperative squash were reviewed in view of histology and we found that those round cell groups seen in the smear beyond the small fibro

adipocytic fragment may be consistent with small round meningothelial cells with homogenous chromatin.

5. Conclusion

Though no psammomatous calcification or cellular whorling was seen in the squash smears which misled to morphological muddle of these cells. Lipomatous meningioma is a rare occurrence and rarity of this lesion was also a contributing factor along with lack of radiological opinion. Presence of mitosis and necrosis in these lesions are corelated with reoccurrence in these lesions.[7,11] Both on cytology and histology no such features were seen in the present case. The patient is under follow-up and is doing well after one year of surgery.

6. Sources of Funding

None.

7. Conflict of Interest

None.

8. Abbreviations

STIR- Short tau or short TI inversion recovery

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