Elevated cerebrospinal fluid levels of placental alkaline phosphatase and β-human chorionic gonadotrophin in a case of intracranial germinoma with normal levels in blood

Sir,

The authors report a case of intracranial germinoma with raised levels of β-human chorionic gonadotrophin (HCG) and placental alkaline phosphatase (PLAP) in cerebrospinal fluid (CSF), with normal levels in the blood.

A 13-year-old female complained of intermittent headaches and diplopia for the past three months. An MRI of the brain revealed a space-occupying lesion (SOL) involving the hypothalamus and infundibulum with signals isointense to the cortex on all sequences and with strong post contrast enhancement, suspicious of germinoma. Tests for serum tumor markers were negative. Subsequently, the levels of these tumor markers in the CSF were evaluated which revealed raised levels of placental alkaline phosphatase [1.928 IU/L (n=0.11 IU/L)] and b-HCG [4.4 mIU/ml (n=2 mIU/ml)] with normal alfa fetoprotein (AFP) levels. The patient’s guardians refused to consent for a biopsy. A diagnosis of primary pure intracranial germinoma was made on the basis of imaging and CSF tumor markers, though a small focus of mixed component could not be ruled out as confirmatory biopsy was not done. She was treated with craniospinal irradiation. The symptoms of the patient responded favorably and the CSF values of PLAP and b-HCG returned to normal after four weeks of the treatment. A CT scan after six months of treatment did not show any residual tumor.

The peak incidence of primary intracranial germ cell tumors is at puberty. The clinical signs and symptoms include visual disturbances, delayed sexual maturity, diabetes insipidus and growth failure. The non-germinomatous tumors present with more severe neurological deficits and have a poorer prognosis as compared to pure germinomas.

As the radiological characteristics of different
tumors on imaging may not be specific enough and as intracranial germ cell tumors may arise in locations not amenable to easy diagnostic biopsy, specific and sensitive tumor markers may aid in diagnosis and timely detection of recurrences. In germ cell tumors the levels of markers in the CSF may be more sensitive than the corresponding levels in blood. The ratio of the blood levels to CSF levels may also be helpful, an increased value in CSF indicating the bulk of the tumor to be in the intracranial compartment. In enzymatic assays for PLAP, cross-reactivity with the intestinal isoform in the serum limits its clinical utility. False positivity may be avoided by measuring placental alkaline phosphatase levels in CSF, as it normally lacks the enzyme.

The HCG-producing germinomas are usually reserved for cases in which increased HCG is detected in the blood and are treated more aggressively, cases with increased levels only in the CSF as in our case, should be regarded as pure germinomas and treated accordingly.

The role of routine measurement of tumor markers in the CSF is yet to be established. We report this case to emphasize the importance of the measurement of tumor markers in the CSF, especially in tumors which are difficult to biopsy, as levels in the CSF may be a more sensitive indicator than the blood levels.

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References

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