A Rare Coexistence of Neuroblastoma with Spina Bifida

Shipra Singhal[*], *Sonam Sharma*[**], *Mukul Singh*[***]

Abstract

Coexistence of solid tumors with congenital abnormality is known to occur. Neuroblastoma is the most common solid tumor in childhood which has various associations, but seldom with spina bifida. The authors describe one such case which highlights and enlightens the readers with this rare association.

Keywords: Neuroblastoma, Spina bifida, Rare, Coexistence.

Introduction

Neuroblastoma is a tumor derived from primitive cells of the sympathetic nervous system and is the most common solid tumor in childhood.[1] As is typical of embryonal tumors, they arise early in childhood with 90% of all cases diagnosed before the age of 5 years. They are responsible for up to 15% of childhood cancer-related deaths, with the majority of patients presenting with metastatic disease at the time of diagnosis. Neuroblastomas manifest marked heterogeneity in clinical outcomes. The prognosis of children less than 18 months old, even those with metastatic disease, is favorable, and the tumors in children with stage 4S disease frequently regress spontaneously. Unfortunately, children older than 18 months who are diagnosed with advanced-stage disease have a grave prognosis despite multimodal, dose-intensive chemoradiotherapy.[2]

Neuroblastoma usually occurs sporadically but familial cases are observed, with a subset of cases occurring in association with congenital malformations of the neural crest being linked to germline mutations of the PHOX2B gene.[3] Neuroblastoma harbors a variety of genetic changes, including a high frequency of MYCN amplification, loss of heterozygosity at 1p36 and 11q, and gain of genetic material from 17q, all of which have been implicated in the pathogenesis of neuroblastoma.[4]

Many reports of excessive incidence of congenital abnormalities in subjects with malignant disease have appeared in recent years but existence of neuroblastoma with congenital anomalies has been rarely reported in the literature.[5]

Case Report

A 9-year-old female child presented with a diffuse swelling in the lumbar region since two and a half months. On examination, the swelling was observed to be 4×4cm in size (Fig. 1). A history of trauma was present. Fine needle aspiration cytology (FNAC) was done.

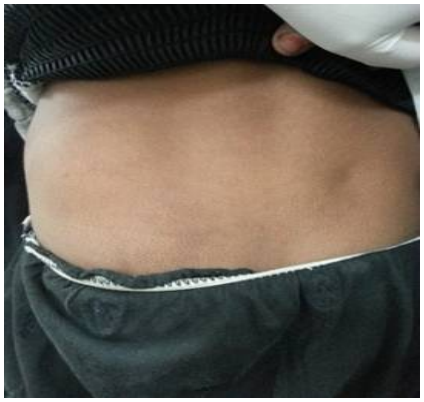

Figure 1.Diffuse Swelling in the Lumbar Region

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FNAC showed presence of small round cells in loose clusters. The cells had high N: C ratio, round to oval nuclei with granular chromatin and inconspicuous nucleoli. Rosette formation was also present with a neuropil-like material in the center (Figs. 2 and 3).

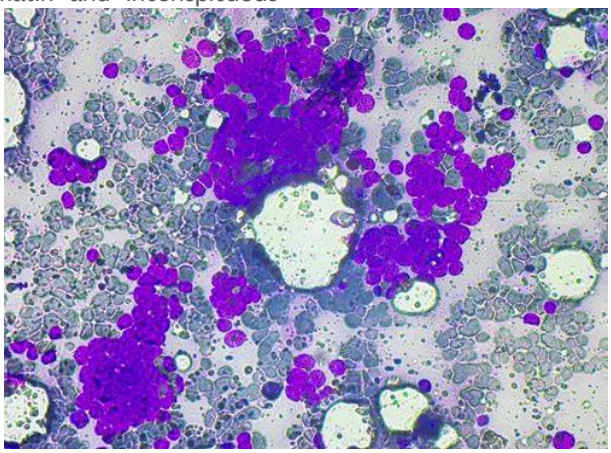


Figure 2.FNA Showed Presence of Small Round Cells in Loose Clusters, Having High N: C Ratio, Round to Oval Nuclei with Granular Chromatin and Inconspicuous Nucleoli

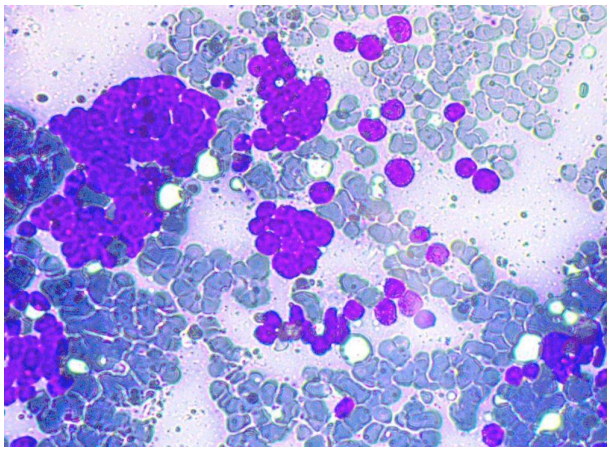
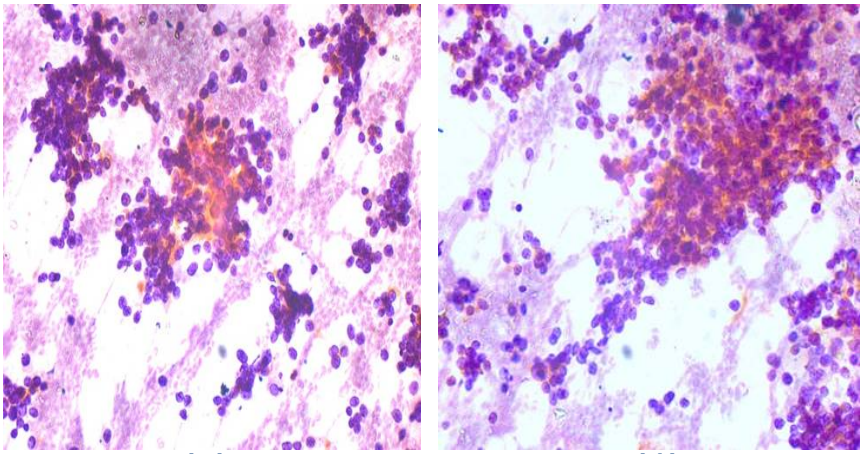


Figure 3.Rosette Formation with a Neuropil-Like Material in the Center

Immunocytochemistry showed that the tumor cells were positive for chromogranin, synaptophysin and negative for LCA, CD 99 and CK (Figs. 4a 4b).



(4a) **(4b)**

Figure 4.Immunocytochemistry Showed that the Tumor Cells Were Positive for Chromogranin (4a) and Synaptophysin (4b)

Based on cytomorphological and immunocytological features, a diagnosis of a small round cell tumor possibly neuroblastoma was suggested.

Radiological studies showed coexistence of spina bifida occulta (Fig. 5).

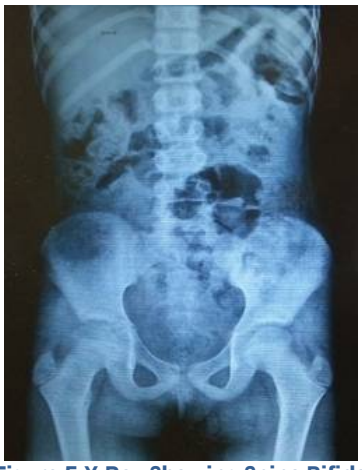


Figure 5.X-Ray Showing Spina Bifida

Discussion

The presence of cancer and a congenital anomaly in the same child may be explained in certain cases by an underlying genetic abnormality. The study of these associations may lead to the identification of genes that are important in both processes.

The frequency of anomalies is much higher among children with solid tumors (4.4%) than among those with leukemia or lymphoma (2.6%). The types of cancer with the highest rates of anomalies are Wilms tumor (8.1%), Ewing sarcoma (5.8%), hepatoblastoma (6.4%), and gonadal and germcell tumors (6.4%). Cases of spina bifida and abnormalities of the eye, ribs, and spine were more common in children with cancer than among population-based controls.[6]

Neuroblastoma has been found to be associated with ventricular septal defects, anomalous position of aortic arch, congenital dislocation of hip, bilateral pes cavus, pyloric stenosis, duplex left kidney and ureter but its coexistence with spina bifida has been rarely reported in world literature.[7]

Conclusion

Individual patients with both congenital anomalies and malignancy should be studied intensively to look for pathogenic clues such as unusual prenatal exposures, chromosomal microdeletions, or characteristic mutations of genes involved in embryogenesis, oncogenesis or both. FNAC is an important modality for the diagnosis of such rare cases. It yields adequate number of dissociated, viable cells making it ideally suitable for ancillary techniques like immunocytochemistry.

Source(s) of Support: None

Conflict of Interest: None

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 ISSN: 2454-8642