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Case Report

Primitive neuroectodermal tumor in a child with Currarino syndrome

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ABSTRACT

Background. Curarino syndrome is a rare and complex anomaly with the triad of anorectal malformation, presacral mass and sacral bone deformation. The most common cause of the presacral mass is meningioma, but teratoma is the diagnosis in about one-third of the cases. Malignant transformation of teratoma in the form of carcinoma, rhabdomyosarcoma and leukemia have previously been reported on rare occasions.

Case. A 19 month-old-girl was referred with a presacral mass of 29mm x 23mm x 24mm. She was diagnosed as Currarino syndrome. The presacral mass was surgically resected and pathological examination revealed a foci of primitive neurectodermal tumor.

Conclusions. This is the first case of Currarino syndrome with a primitive neuroectodermal tumor (PNET) foci in the presacral mass. Considering the risk of malignant transformation, the accurate pathological examination is important for complete systemic evaluation and treatment plan in these children.

Key words: currarino syndrome, presacral teratoma, malignant transformation, PNET.

Currarino is a rare syndrome consisting of anorectal malformation, presacral mass and sacral bone deformation and may have different presentations. The type of the presacral mass, which is one of the components of the triad, is frequently meningocele, but may be teratoma in 20-40% of cases.[1] Malignant transformation of teratoma was reported in 6 children with Currarino syndrome in the literature as far as we know.[2] This transformation was in the form of carcinoma, rhabdomyosarcoma and leukemia. However, development of a primitive neuroectodermal tumor (PNET) has been observed in only two cases in the literature.[3,4] Here we report a girl with Currarino syndrome and a sacrococcygeal teratoma with a PNET foci inside.

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Case Report

Our case is a 19 month-old-girl born with ceasarian section weighing 2980gr at 37 weeks of gestation from consanguineous parents. It was learned that there were no similar cases in the family history of the patient. Informed consent was received from the family for this case report. Colostomy was performed on the second postnatal day due to vomiting and delayed stool discharge. In the lumbosacral MRI, a presacral mass lesion of 29mm x 23mm x 24mm with lobulated contours consisting of fat, dense content and cystic areas was detected, and interpreted as teratoma. In the preoperative examinations of the patient serum AFP level was 57 ng/ml (reference range for 6-12 months is 0-80 ng/ml) and serum NSE level was 21.7 ng/ml (reference range is <18 ng/ml). On examination under general anesthesia, it was observed that the rectum opened into the perineum in the form of a fistula, and presacral mass excision and anorectoplasty were

performed with a posterior sagittal incision due to anorectal malformation with perineal fistula. During the operation, dysmorphic coccyx and sacrum were observed and the coccyx was excised. The patient, in whom all 3 components of the syndrome observed, was diagnosed with Currarino syndrome. Pathological examination was revealed such that grade 2 ependymal components constituted approximately 30% of the tumor in a nodular infiltrative pattern. In addition, the primitive neuroectodermal tumor (PNET) area was seen in a focal area of approximately 1x1mm as a part of ependymal component. (Fig. 1)

The surgical margins were negative with a 0.1 mm to normal tissue. Given the presence of a PNET foci inside the tumor, the thorax CT and PET-MRI were performed, and no metastatic lesion was observed. Genetic testing was not done at this stage. The patient was discussed at the local tumor board. Considering the PNET foci is small and excised totally with no metastatic lesion, adjuvant therapy was not scheduled. She is under close follow-up with monthly AFP and MRI every three months, and 6 months since the diagnosis, with no evidence of disease.[3,4]

Discussion

Currarino syndrome is a rare syndrome that includes one or more of the components of anorectal malformation, presacral mass and sacral bone deformation. While no pathology has been found in the cytogenetic examination of most cases, an autosomal dominant inherited mutation in the HLXB9 (MNX1) gene on chromosome 7q36 was observed in some cases.[5,6] There may be asymptomatic cases, as well as cases with compression symptoms such as intestinal obstruction or chronic constipation as observed in our case, and malignant transformation.

Sacrococcygeal teratoma, which may accompany the syndrome, is generally observed more frequently in sporadic cases and in females. It also carries a 1% risk of malignant transformation.[3] In a comparative study by Dirix

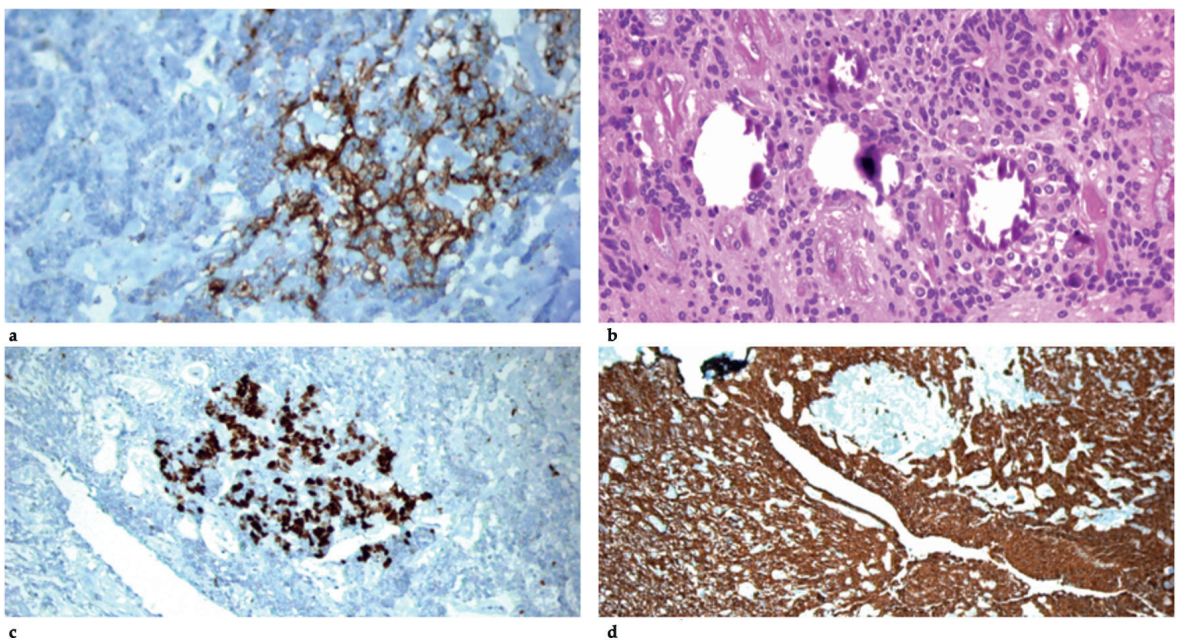

Fig. 1. a. Synaptophysin immunopositivity in PNET areas (Synaptophysin X200), **b.** Focal primitive neuroectodermal component in ependymal areas (H&EX200), **c.** High Ki-67 proliferative index in PNET areas (Ki-67X100), **d.** GFAP immunopositivity in ependymal component and immunonegative PNET areas (GFAPX100).

et al, the risk of malignant transformation was found to be higher in sporadic sacrococcygeal teratomas than components of Currarino syndrome. Also, malignant transformation of teratomas occurred at an older age in patients with the syndrome.[7,8] The authors proposed that the teratomas in Currarino syndrome might have a different biology and have a higher chance for complete resection. It was suggested that the treatment should be personalized for those patients.

As far as we know, malignant transformation of teratoma has been detected in 6 pediatric cases with Currarino syndrome in the literature.[2] This transformation is often in the form of carcinoma, rhabdomyosarcoma and leukemia. Peripheral PNET is an aggressive tumor with a high metastatic potential and systemic treatment is usually indicated irrespective of the size. Despite local and systemic treatment, the 5-year estimated survival rates are 75% in nonmetastatic cases and worse outcomes are reported in the presence of metastasis.[8] There are only two other cases of Currarino syndrome with malignant transformation of teratoma to PNET in the literature. A 3-year-old patient with Currarino syndrome having sacral teratoma component of PNET presenting with long-term constipation was mentioned in the case report of Sen et al.[4].The patient was treated according to the Euro Ewing 99 protocol, followed by local radiotherapy after resection. She remained in complete remission after 8 months from end of treatment. The second case with Currarino syndrome having malignant transformation to PNET within a sacral mass component had presented with a painless abdominal swelling at the age of 19.[9] After surgical excision of the tumor, considering that the pelvic washings were negative with no evidence of lymphovascular invasion, it was decided to closely monitor the patient without any additional intervention. The patient was monitored with abdomen and pelvis ultrasound and tumor markers (Carcinoma antigen 125, lactate dehydrogenase, beta human chorionic gonadotropin and a-fetoprotein) every 6 months. She remained in complete remission after 8 months of surgery. Our case is the third and the youngest one reported with a PNET foci inside the teratoma component of the Currarino syndrome.

The prognosis of Currarino Syndrome parallels the diversity in clinical involvement and death has been reported due to malignancy and sepsis in approximately 30% of cases.[10] As the malignant transformation to PNET was diagnosed in the first years of two cases, we think timely and margin-safe resection of the teratoma should be performed as soon as detected in these patients.

Since the clinical presentation of Currarino syndrome varies, it should be kept in mind that there may be asymptomatic cases that do not include all components of the triad, and Currarino syndrome should be included in the differential diagnosis in patients with at least one of the components of the syndrome. Considering the risk of malignant transformation, evaluation should be made in terms of systemic involvement and the treatment plan should be shaped specifically for sacrococcygeal teratoma in these patients.

Author contribution

The authors confirm contribution to the paper as follows: study conception and design: MC, GC, SO; data collection: MC, GC, SO; analysis and interpretation of results: GC, SO, RO; draft manuscript preparation: MC, GC, SO, RO, NC, TTJ. All authors reviewed the results and approved the final version of the manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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