Congenital Hemangiopericytoma in a Neonate

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Hemangiopericytoma is a rare malignant vascular tumor that usually occurs in adults. The occurrence of these tumors in infants, known as congenital or infantile hemangiopericytoma, is even rarer and their behavior may be more benign than the adult type. We describe a 1-day-old female neonate with congenital hemangiopericytoma, presenting with a right inguinal mass at birth. At the time of surgery, lymphangioma was suspected because of its appearance, fluid-filled multicystic content, and the high incidence of this disease in pediatric patients. Tumor excision was performed and hemangiopericytoma was diagnosed by histology. There was no tumor recurrence during 12 months of follow-up. [J Formos Med Assoc 2006;105(3):247–251]

Key Words: hemangiopericytoma, infant, neonate

Hemangiopericytoma is an uncommon vascular tumor that was first described by Stout and Murray in 1942. Only 10% of cases occur in children under the age of 15 years. Kauffman and Stout differentiated the congenital or infantile form of hemangiopericytoma from the adult form based on the more benign character of the tumor in children who are < 1 year old. It comprises one-third of cases in children. The incidence is higher in boys than in girls. Most cases of infantile hemangiopericytoma have been reported in Western countries. Only two patients younger than 1 month have been reported in Eastern countries, with one in Japan and the other in India. This is the first case of congenital hemangiopericytoma reported in Taiwan.

Case Report

A 1-day-old female neonate, weighing 3300 g, was born to a 32-year-old, gravida 1, para 0, mother at 39 weeks’ gestation. There was no consanguinity or hereditary disease found in the family. The pregnancy and delivery were normal. The neonate was admitted to the neonatal ward because of a right-sided inguinal mass noted at birth.

On admission, physical examination revealed generally normal findings except for a 4 × 3 cm elastic and firm mass with purplish discoloration over the right inguinal area (Figure 1). Ultrasonographic examination of the tumor revealed a fluid-filled multicystic mass. Magnetic resonance imaging (MRI) of the pelvis showed a 4 × 4.2 × 4.7 cm mass with discoloration in the right inguinal area noted just after birth in a neonate.
cm multiloculated, multicystic lesion at the right lower anterior abdominal wall and right inguinal subcutaneous area without remarkable intra-abdominal extension. Moderate septal enhancement after contrast medium injection and previous hemorrhage were also noted. Laboratory data were normal, including complete blood cell count, coagulopathy profile, and serum levels of β-human chorionic gonadotropin and α-fetoprotein. Because lymphangioma is one of the most common vascular tumors in pediatric patients, this disease was highly suspected before surgical exploration. After considering that rapid enlargement of lymphangioma can occur with infection or hemorrhage, surgery was performed at 10 days of age, which revealed a 4 × 3 cm reddish-yellow encapsulated mass with central hemorrhage. The tumor was not totally removed due to its encapsulation with femoral vessels. Frozen section during the operation revealed round-to-oval hyperchromatic nuclei in the tumor cells.

Pathology showed an ill-defined infiltrating hypercellular tumor. The tumor cells were round-to-oval pleomorphic neoplastic cells with indistinct cellular border and nucleoli, arranged in solid sheets without any particular growth pattern such as storiform or fascicular arrangements (Figure 2A). Many large vessels and capillaries were noted within the tumor. Focal necrosis, fragmentation, and old and fresh hemorrhage were also seen within the tumor. Section margins were not identified because of tumor fragmentation. Mitosis was extremely rare. Serial special stains were performed for further diagnosis. Silver stain showed a delicate reticulum network around individual neoplastic cells (Figure 2B). Vimentin stain was strongly positive, and neuron-specific enolase stain was weakly positive. Smooth muscle actin and CD34 stain were strong in the cytoplasm in perivascular neoplastic cells, but showed tapering reactivity in neoplastic cells further from the vessels. Cytokeratin, S-100 protein, desmin, myogenin, CD31, and CD117 were negative. Morphologic and immunohistochemical results confirmed the diagnosis of infantile hemangiopericytoma. Because residual tumor was found after incomplete resection, the stage of the tumor in this patient was classified as Group III according to the Intergroup Rhabdomyosarcoma Study (IRS). Chemotherapy was considered but withheld after discussion with the family and the pediatric oncologist regarding the risk of chemotherapy in neonates. The postoperative course was smooth and the patient was discharged at 18 days of age.

Over 12-months of follow-up at our outpatient clinic, physical examinations revealed no sign of local progression of the residual tumor. MRI performed at 2 months of age showed residual nodular lesions with abnormal enhancement. Small

Figure 2. (A) Hematoxylin and eosin stain (× 600) of the resected tumor shows round-to-oval pleomorphic neoplastic cells with indistinct cellular border and nucleoli arranged in solid sheets without any particular growth pattern. Many large vessels and capillaries were noted within the tumor. Mitosis is extremely rare, but local tumor necrosis is found. (B) Reticulum stain (original magnification × 60) shows a delicate reticulum network around individual neoplastic cells.
focal areas of abnormal high signal intensity were found in both the right inguinal subcutaneous region and the right femoral canal. No definite focal destructive bone lesion was noted.

Discussion

This is the first case of congenital hemangiopericytoma reported in Taiwan. Hemangiopericytoma has a wide variation of presentation, including tumor size and growth, clinical manifestations, and malignant potential.9 The majority of these tumors in adults tend to be highly malignant. Congenital hemangiopericytoma has been considered to be a distinct entity from the adult form of the disease. Most infantile hemangiopericytomas are benign. Good response to chemotherapy, spontaneous regression, and no recurrence even with residual tumor have been reported in the infantile type.9-12 However, children > 1 year old have a similar malignant disease course to adults. Increased age is a risk factor associated with a more malignant clinical course.2,8 The mechanism responsible for this difference with age is not well understood.12 One possibility for the distinctive benign course of infantile hemangiopericytoma may relate to its maturation ability.8,12

The diagnostic mainstay of infantile hemangiopericytoma is biopsy and histologic confirmation, while imaging studies and laboratory examinations are seldom helpful.13 Plain radiographs, angiograms, computed tomography and MRI are all nonspecific for infantile hemangiopericytoma, but the information obtained from these examinations may be useful in preoperative planning. Lymphangioma is the second most common benign vascular tumor in children.6 As in our patient, the similarity of clinical manifestations and the imaging studies of infantile hemangiopericytoma may lead to a misdiagnosis as lymphangioma, which is a much more common disease in neonates. Pathologic and immunohistochemical examinations are crucial for a definite diagnosis of hemangiopericytoma. Hemangiopericytoma is usually a firm, rubbery and painless tumor.13 It is composed mainly of a kind of perivascular cell called a pericyte. Pericyte tumor cells can be oval or round, and are arranged homogeneously around thin-walled endothelium-lined vascular channels.13,14 The pericytes can interact with endothelial cells by many long cytoplasmic processes to form interdigitating contacts. They may influence the maturation, remodeling, maintenance and permeability of the vascular system.13,14 They can also be contractile like smooth muscle.15 Since the tumor originates from perivascular cells, it may occur anywhere in the body where capillaries exist. Approximately 30–50% of infantile hemangiopericytomas occur in the extremities, especially the lower extremities.12,13,16 Microscopically, infantile hemangiopericytoma is similar to the adult type, but the lesion in infants is usually located in subcutaneous tissues, while the adult type is often located in deeper structures.2,12-14 It is multilobulated, often with distinct intravascular and perivascular satellite nodules outside the main tumor mass, and endovascular growth is frequent.14 Silver stain is usually positive, and stain for α-smooth muscle actin is positive in varying degrees.13 The tumor cells also stain positive to vimentin, which indicates the mesenchymal origin of the lesion.13,16

It is extremely difficult to predict the malignant potential of such tumors in infants. Although factors such as hypercellularity, increased mitotic activity, anaplasia, necrosis, and hemorrhage have been reported to be associated with malignant behavior in adult hemangiopericytoma, no such associations have been found in the infantile type.14,17 Infantile hemangiopericytoma may have more mitotic figures and focal necrosis than the adult type, but is generally benign in its clinical course.13 Since there are no specific histologic criteria to differentiate whether these tumors are benign or malignant, classification has often been based on clinical behavior.12,18,19 Patients may be classified according to the criteria of the IRS as follows: Group I includes completely excised tumors; Group II includes those patients whose tumors are grossly resected with either microscopic evidence of residual disease at the primary site (Group IIa), regional lymph node involvement that is complete-
ly resected (Group IIb), or regional lymph node involvement that is grossly removed with evidence of microscopic residual tumor (Group IIc); Group III includes patients with gross residual disease after incomplete resection or biopsy; and Group IV comprises patients with metastases at onset. The clinical behavior of the tumor in our patient appeared to fit IRS Group III, since residual tumor was noted after incomplete resection.

The ideal therapy for infantile hemangiopericytoma is to enhance long-term survival without injury to other growing organs. The most common management is wide surgical excision when the tumor is resectable. Preoperative vascular embolization or ligation has been used for large hemangiopericytoma with life-threatening hemorrhage. Where total excision is not possible or, in cases with recurrence after surgery, chemotherapy before or after further operation is usually preferred. Chemotherapy agents including vincristine, doxorubicin, actinomycin, and cyclophosphamide are commonly used singly or in combination in various regimens. del Rosario and Saleh reported a 2-month-old boy with unresectable nuchal hemangiopericytoma with lung metastasis. The tumor regressed and was resected after combination chemotherapy with vincristine, doxorubicin and cyclophosphamide. This treatment also resulted in resolution of the metastatic lesion. Most reported cases who received chemotherapy were diagnosed after the neonatal period. In our patient, total excision of the tumor was impossible due to its encapsulation with femoral vessels. Due to the residual tumor and lack of definite histologic criteria to predict malignant behavior, chemotherapy was considered but withheld after discussion with the family and the pediatric oncologist because of concerns regarding chemotherapy-associated complications in neonates. There have been few case reports of a malignant course such as metastasis or recurrence in infantile hemangiopericytoma, while the metastatic rate of the adult type was as high as 56%. We regularly followed up this patient at the outpatient clinic for 1 year after the surgery, and no recurrence or metastasis was found. However, given the potential for recurrence and metastasis, long-term follow-up is essential for congenital hemangiopericytoma presenting in the neonatal period with incomplete excision of the tumor. The role of radiation therapy in infantile hemangiopericytoma is controversial.

In conclusion, infantile hemangiopericytoma is a rare vascular tumor that should be considered in the differential diagnosis of vascular malformations in pediatric patients. Diagnosis of hemangiopericytoma requires biopsy and histologic confirmation. Wide surgical excision followed by close observation should be the treatment of choice. Chemotherapy may be considered for unresectable lesions or cases with recurrence and metastasis after the neonatal period. Long-term follow-up is mandatory to monitor the clinical behavior of the tumor after resection.

References


