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Multiple Congenital Plaquelike Glomuvenous Malformations With Type 2 Segmental Involvement

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Multiple congenital glomuvenous malformations (GVMs) are rare. Almost all reported cases describe the multiple congenital plaquelike GVM variant. We report a case of multiple congenital plaquelike GVMs suggestive of type 2 segmental involvement following Blaschko lines.

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Case Report

A 1-month-old infant with an unremarkable prenatal history was referred to our clinic for evaluation of large, scattered, vascular anomalies on her chest, back, scalp, right lower extremity, and periocular region. The lesions were reported to have been present since birth.

On physical examination, there were multiple bluish red, poorly demarcated, flat patches with central depression on the right lower extremity, chest, and back (Figure 1). The lesions also were notable for central prominent ectatic venous structures. On the anterior chest wall, the lesions were segmentally distributed and appeared to follow Blaschko lines (Figure 2). Additional findings included a well-demarcated, atrophic, alopecic patch with a violaceous border to the left of the midline vertex of the scalp (Figure 3) as well as periocular telangiectasia at the bilateral lateral canthi. The lesions were not noticeably tender on palpation. The family history, including 2 older siblings, was not remarkable for similar lesions.

Magnetic resonance imaging of the brain and complete abdominal ultrasonography were unremarkable for the patient's age. Ophthalmologic examination was unremarkable. Two-dimensional and color Doppler echocardiography imaging studies were normal, with the exception of a hemodynamically insignificant shunt across the middle of the atrial septum consistent with a patent foramen ovale.

Histologic examination revealed several dilated vascular lumina in the dermis, which were lined by a single layer of flattened endothelial cells. Peripheral to the endothelial cells were a few rows of cuboidal epithelia with pale nuclei and eosinophilic cytoplasm embedded in a fibrous stroma (Figure 4). Immunohistochemical analysis with smooth muscle actin antibodies showed staining of these rows of cuboidal epithelia (Figure 5).

During the 9-month follow-up period, the lesions showed gradual enlargement with body growth. Otherwise, the child had met developmental milestones and maintained a typical growth pattern.

Comment

Glomuvenous malformations (GVMs), also referred to as glomus tumors or glomangiomas, encompass a group of hamartomas that originate from the glomus body, which serves as an arteriovenous temperature-regulating shunt in the dermis.¹ Glomuvenous malformations can be divided into solitary and multiple lesions. Solitary GVMs are the most common form and tend to present in adults as a tender violaceous nodule in an acral location. Multiple GVMs can be subdivided further into disseminated, regional, and congenital plaquelike subtypes. In contrast to solitary GVMs, multiple GVMs tend to present at an earlier

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Figure 1. Multiple bluish red, poorly demarcated, flat patches with central depression on the back.



Figure 2. Segmentally distributed lesions on the anterior chest wall with central prominent ectatic venous structures. The lesions appear to follow Blaschko lines.

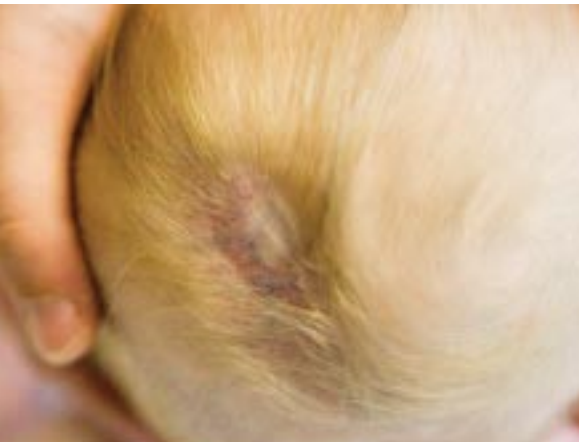


Figure 3. Well-demarcated, atrophic, alopecic patch with a violaceous border to the left of the midline vertex of the scalp.

age as asymptomatic, red to blue papulonodules or plaques located on the trunk or extremities.²

Glomuvenous malformations can present as inherited or sporadic cases. The incidence of GVMs has not been reported in the literature. Solitary GVMs are more common than multiple GVMs, which comprise less than 10% of all reported cases.² Mallory et al³ reported an equal sex distribution for GVMs overall; however, many reports state a male predilection for multiple GVMs.^{2,4,5} No specific racial predilection has been reported.

The pathogenesis of GVMs is thought to involve the aberrant differentiation of vascular smooth muscle cells. Multiple GVMs show a positive family history in more than 60% of reported cases and have been linked to a glomulin gene, *GLMN*, mutation at band 1p22-21.⁶ The abnormal *GLMN* gene is thought to be inherited via an autosomal dominant pattern with incomplete penetrance and variable expressivity.³

Segmental variants reflecting gene mosaicism have been reported in various autosomal dominant skin disorders.⁷ Two different types of mosaicism manifestations have been delineated in the literature. Type 1, which reflects heterozygosity for the underlying mutation, shows a degree of severity similar to the corresponding nonmosaic phenotype. Clinically, characteristic lesions present in a segmental area, and the rest of the skin is unaffected. Type 2, which represents a loss of heterozygosity, shows more extensive involvement with segmental lesions in addition to disseminated lesions of the ordinary trait.⁷

The majority of multiple congenital GVMs are present at birth with features of the plaque-like variant, manifesting as violaceous indurated plaques on the trunk or extremities and overlying red to blue papules.¹ As the child grows, these plaques tend to enlarge and thicken.³ In some cases, satellite lesions develop at distant sites.^{4,8} Multiple trichilemmal cysts,⁹ autism, von Willebrand factor deficiency, hexadactyly on both feet, ventricular septal defect, and keloid formation have been reported in patients with multiple congenital GVMs³; however, it has not yet been determined if they are true associations or chance findings.

Histopathologically, GVMs are characterized by numerous vascular lumina lined by a single layer of flattened endothelial cells. Peripheral to the endothelial cells are a few rows of cuboidal epithelia in the multiple type of GVM and many layers of cuboidal epithelia in the solitary type of GVM.¹⁰ Both solitary and multiple GVMs are thought to be derived from the modified smooth muscle cells

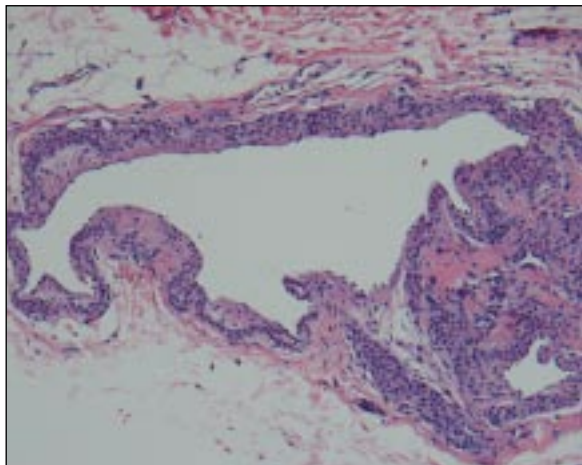


Figure 4. A biopsy specimen from the left upper back shows a dilated vascular lumina lined by a single layer of endothelial cells. A few rows of cuboidal epithelia with pale nuclei and eosinophilic cytoplasm lie peripheral to the endothelial cells (H&E, original magnification $\times 40$).

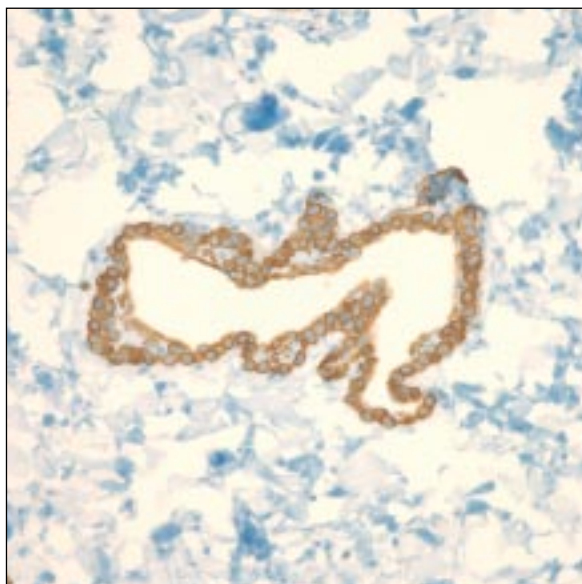


Figure 5. Immunohistochemical analysis with smooth muscle actin antibodies shows staining of the rows of cuboidal epithelia surrounding the dilated vascular lumina (original magnification $\times 40$).

of the arterial segment of the glomus body. On immunohistochemical examination, GVMs stain for

smooth muscle actin, h-caldesmon, muscle-specific actin, and myosin.¹¹

Conclusion

We report a case of a rare dermatologic condition, multiple congenital plaque-like GVMs. This case provides further support that multiple congenital plaque-like GVMs may be added to the group of autosomal dominant skin disorders that may manifest with type 2 segmental involvement.

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