

## Case Report

# Hemangioblastoma of pelvic cavity: report of a case and review of literature

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Received August 4, 2014; Accepted September 1, 2014; Epub September 15, 2014; Published October 1, 2014

**Abstract:** Hemangioblastoma of soft tissue is a very rare tumor of uncertain histological type. Herein, we reported a 51-year-old woman was found to have a solid and cystic mass measuring 31×30 mm in the right adnexa area on a computed tomography scan. The tumor showed the typical histology of hemangioblastoma. Tumor was composed of numerous capillaries and stromal cells with cytoplasmic vacuolization. Immunohistochemical study revealed that the tumor stromal cells were positive for CD56, S-100 protein, NSE, Syn, CgA, and inhibin- $\alpha$ . Focal EMA positivity was present. Ki-67 expression was found in approximately 1% of tumor cells. The tumor cells were negative for CK, HMB-45, Melan-A, SMA, and CD68. The differential diagnosis of Hemangioblastoma arising in pelvic cavity includes hemangioma, hemangioendothelioma, liposarcoma, renal cell carcinoma, fat-forming solitary fibrous tumor, paraganglioma, and perivascular epithelioid cell tumor (PEComa).

**Keywords:** Hemangioblastoma, pelvic cavity, immunohistochemistry staining

## Introduction

Hemangioblastoma is a rare tumor and occurs most commonly in the cerebellum and less commonly at other sites in the central neuraxis [1]. In addition, hemangioblastoma rarely occurs in kidney, liver, lung, skin, adrenals, bladder, and pancreas [2-7]. Hemangioblastoma arising in soft tissues is extremely rare. Herein, we reported one case of hemangioblastoma in pelvic cavity and analyzed its clinicopathological features and reviewed the literature.

## Materials and methods

Tumor specimens were fixed in 10% neutral buffered formalin and embedded in paraffin. Tissues were cut into 4- $\mu$ m thick sections and stained with hematoxylin-eosin staining. Immunohistochemistry staining was carried out on formalin-fixed, paraffin-embedded tissue using an EnVision kit (Dako, Carpinteria, CA). The following primary antibodies purchased from Dako Corporation were used: vimentin, CK, EMA, S-100 protein, HMB45, Melan-A, SMA, CD31, CD34, CD68, CD56, synaptophysin (Syn), chromogranin-A (CgA), neuron-specific enolase

(NSE), Inhibin- $\alpha$ , and Ki-67. Positive and negative control slides were employed.

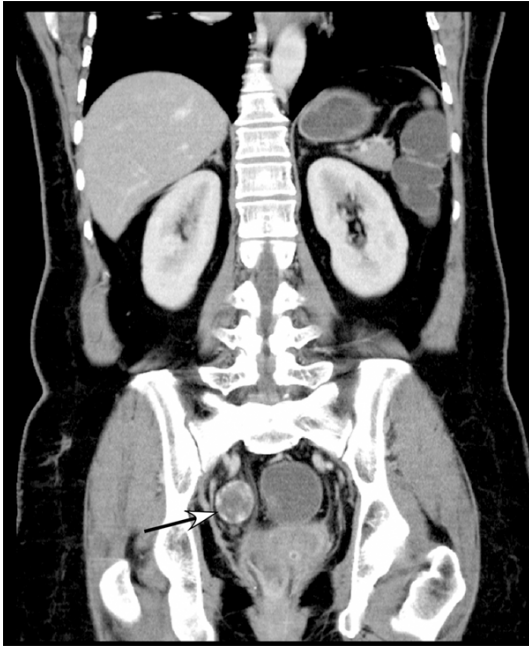
## Results

### Clinical findings

The patient was a 51-year-old woman and found a mass in the pelvic cavity during a physical examination. Ultrasound examination showed a round mass measuring 33×26 mm located on the right side of the uterus, the mass had a clear boundary and abundant color flow signals. Computed tomography (CT) scan demonstrated a solid and cystic mass measuring 31×30 mm in the right adnexa area. There was an inhomogeneous contrast enhancement in the mass (**Figure 1**). The patient was a hepatitis B virus carrier and had a history of chronic gastritis. No Von Hippel-Lindau (VHL) syndrome was found in the patient or her family. The patient underwent tumor resection.

### Pathological features

Grossly, the tumor was gray-red and 3×3×2 cm in size. On cut surface, the tumor presented solid and cystic containing dark-brown liquid.



**Figure 1.** Computed tomography showed an enhanced well-circumscribed mass measuring 31 mm×30 mm in the right adnexa area.

Microscopically, the tumor appeared as a well-circumscribed nodule and had a fibrous capsule. The tumor was characterized by an alternation of cellular and hypocellular areas. Numerous blood vessels which had variably size from small capillaries to medium-sized vessels and thin-walled or thick-walled vessels intervening epithelioid stromal cells were observed in the cellular areas. The hypocellular areas were mainly composed of edematous and hyalined fibrous stroma. The stromal tumor cells were oval to polygonal cells with a pale eosinophilic or clear or multi-vacuolated cytoplasm and irregularly contoured nuclei and small nucleoli. Some plump spindle tumor cell nuclei were hyperchromatic or vesicular with inconspicuous nucleoli. No mitotic figures and necrosis were observed in the tumor. However, there were numerous mast cells within the stromal of the tumor (**Figure 2**). The stromal tumor cells were positive for vimentin, CD56, S-100 protein, NSE, Syn, CgA, and inhibin- $\alpha$ . Focal EMA positivity was present. Ki-67 expression was found in approximately 1% of tumor cells. The tumor cells were negative for CK, HMB-45, Melan-A, SMA, and CD68 by immunohistochemistry staining. CD31 and CD34 stains highlighted the capillary network of the tumor vasculature (**Figure 3**).

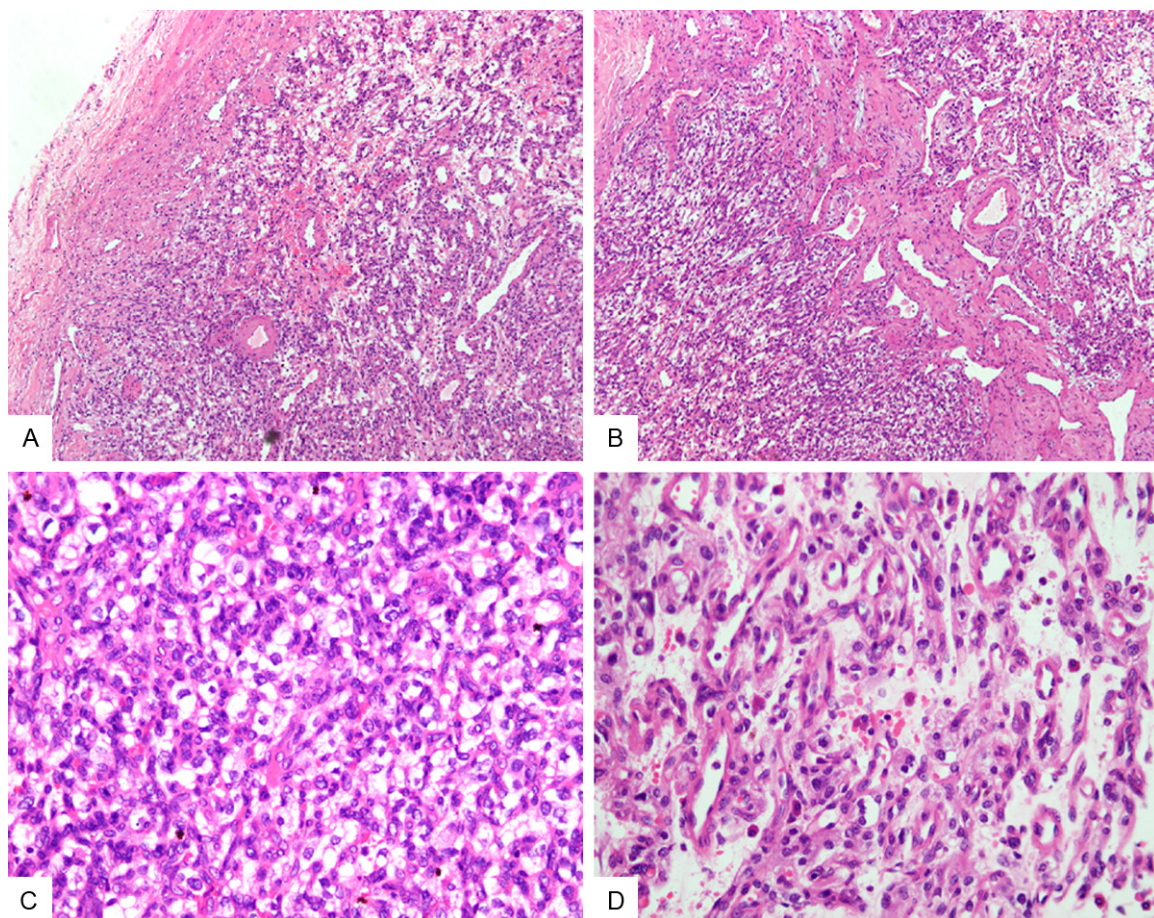
Base on the above histological features and immunophenotype, we made a diagnosis of hemangioblastoma of the pelvic cavity. Following up three months after tumor excision, the patient was alive and well without any evidence of recurrence or metastatic disease.

## Discussion

Hemangioblastoma is a rare tumor of uncertain histological type that typically arises in the cerebellum, quite often in the setting of VHL, an autosomal dominant disorder associated with germline mutations in the VHL tumor-suppressor gene located on the short arm of chromosome 3 (3p25-26) [1]. Exceptional cases of hemangioblastoma arising outside the central nervous system including peripheral nerve roots, liver, gastrointestinal tract, retroperitoneum, kidney and adrenal gland, and extremities have been reported, most often as single-case reports. Up to now, less than 15 cases of soft tissue hemangioblastoma have been reported in the English literature [2-7].

The literature review delineated the typical characteristics of soft-tissue hemangioblastoma were a solid tumor mainly seen in older females and commonly involving the retroperitoneum, extremities, and trunk. The median tumor size was 4 cm (range, 1.3 to 15 cm). Most tumors were well circumscribed. Tumors were composed of an admixed population of plump spindle cells and microvacuolated cells with pale eosinophilic or clear cytoplasm. In some cases, tumor cells presented marked nuclear pleomorphism. Mitotic activity was low (range, 0 to 2/10 HPF). Tumors had a complex capillary network, with admixed larger thin-walled or thick-walled vessels in a solid and often lobular growth pattern, similar to central nervous system hemangioblastoma. In some cases, the larger vessels showed a branching hemangiopericytoma-like pattern. No necrosis or lymphovascular invasion was identified. In addition, our present case showed that numerous mast cells were distributed within the stromal of the tumor. Merrill et al. have reported that hemangioblastoma-associated mast cells in VHL disease are tumor derived. The Kit signaling pathway may contribute to the ability of some of the VHL-deficient pluripotent neoplastic cells to develop into more differentiated progeny, including mast cells and erythrocytes

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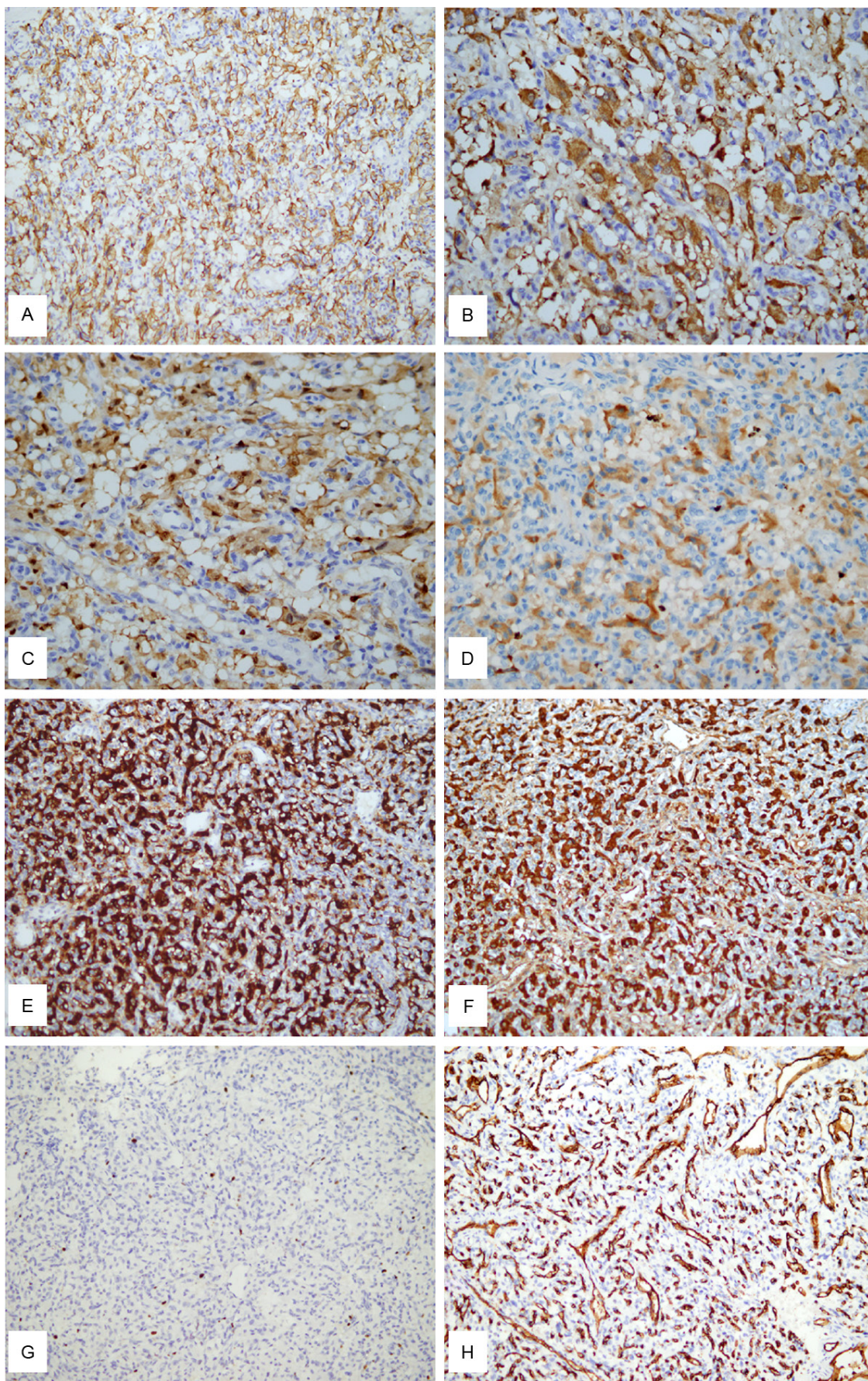
**Figure 2.** Histological features of hemangioblastoma in the pelvic cavity. A. The tumor appeared as a well-circumscribed nodule and had a fibrous capsule, HE×100; B. The tumor was composed of numerous blood vessels which had variably size from small capillaries to medium-sized vessels and thin-walled or thick-walled vessels intervening epithelioid stromal cells, HE×100; C. The stromal tumor cells were oval to polygonal cells with a palely eosinophilic or clear or multi-vacuolated cytoplasm and irregularly contoured nuclei and small nucleoli, HE×200; D. There were numerous mast cells within the stroma of the tumor, HE×200.

[8]. Tumor cells were positive for inhibin- $\alpha$ , NSE, and S-100 protein, focal SMA and EMA expression. However, the tumor cells were negative for CK, HMB-45, Melan-A, GFAP, CD31, and CD34 by immunohistochemistry staining.

The histological differential diagnosis of hemangioblastoma arising at pelvic cavity includes hemangioma, hemangioendothelioma, liposarcoma, renal cell carcinoma, fat-forming solitary fibrous tumor, paraganglioma, and perivascular epithelioid cell tumor (PEComa). Hemangioblastoma is composed of numerous capillary blood vessels and easily confused with hemangioma and hemangioendothelioma. However, hemangioma and hemangioendothelioma lack stromal cells with clear or microvacuolated

cytoplasm and immunohistochemistry staining may be helpful to aid the diagnosis. The microvacuolated cells of hemangioblastoma may resemble lipoblasts and mimic liposarcoma. However, the tumor cells of hemangioblastoma were absence of atypia and the nuclei of the “pseudolipoblasts” are not scalloped in appearance and these cells tend to have more numerous cytoplasmic vacuoles than true lipoblasts. Renal cell carcinoma is composed of carcinoma cells with clear or palely eosinophilic cytoplasm, which is very difficult to differentiate from hemangioblastoma. However, carcinoma cells of renal cell carcinoma are usually nested and positive for EMA and negative for S-100 protein and inhibin- $\alpha$ , unlike hemangioblastoma. Fat-forming solitary fibrous tumor is com-

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**Figure 3.** Tumor cells were positive for CD56 (A×100), NSE (B×200), S-100 protein (C×200), inhibin- $\alpha$  (D×200), Syn (E×100), and CgA (F×100). Ki-67 expression was approximately 1% of tumors (G×100). CD34 staining highlighted the capillary network of the tumor vasculature (H×100) by immunohistochemistry staining.

posed of true mature fat cells and spindle tumor cells are positive for CD34 but negative for S-100 protein and inhibin- $\alpha$  is different from hemangioblastoma. Paraganglioma has the prominent vascular network and the tumor cells are arranged with trabeculae and may present with clear cytoplasm, which resemble hemangioblastoma. However, the cells of paraganglioma are usually epithelioid or round or oval and show diffuse expression of Syn and CgA, whereas S-100 stains only sustentacular cells within fibrous septa and negative for inhibin- $\alpha$ . Tumor cells of PEComa are usually arranged in a nested architecture and have clear or eosinophilic cytoplasm and show variable expression of SMA, HMB-45, and Melan-A, which are different from hemangioblastoma.

As for the prognosis of the patients with hemangioblastoma, Doyle and Fletcher have reported 22 cases of peripheral hemangioblastoma. Follow-up information was available for 17 patients (range, 5 to 117 months; median 36 months). Three patients had locally persistent disease after incomplete resection. True local recurrence or distant metastasis has not been identified in any patient [7]. As our case, the patient was alive and well without any evidence of recurrence or metastasis after tumor complete resection.

### Disclosure of conflict of interest

None.

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