ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 02 | February - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

NEUROSURGICAL MANAGEMENT OF VON HIPPEL LINDAU SYNDROME RELATED HEMANGIOBLASTOMA: CASE REPORT AND LITERATURE REVIEW.

Neurosurgery

Hamza Al-khawaldeh	Neurosurgery Department, King Hussein Medical Center - Royal Medical Services, Amman-jordan
Raed Mohammad Al-jbour	Neurosurgery Department, King Hussein Medical Center - Royal Medical Services, Amman-jordan
Assem Al-njeiden	Neurosurgery Department, King Hussein Medical Center - Royal Medical Services, Amman-jordan
Ali Kbelat	Neurosurgery Department, King Hussein Medical Center - Royal Medical Services, Amman-jordan
Raed Sami Abu-kheit	Neurosurgery Department, King Hussein Medical Center - Royal Medical Services, Amman-jordan

ABSTRACT

Study Design: A case report of the neurosurgical management of hemangioblastoma in patients with Von Hippel Lindau (VHL). **Objective:** to report our case of this rare condition of VHL related intracranial hemangioblastomas. **Summary and background:** hemangioblastoma (HGB) compose around 4% of the intracranial masses , and compromise 10% of the primary posterior fossa tumors. They have found that almost 15-25% of the cerebellar HGB and 80% of the spinal HGB are associated with VHL. **Methods:** a 32-year-old male patient who was complaining of headache and vertigo for months, brain and spinal images showed right sided cerebellar HGB, and right cerebellopontine angle (CPA) lesion and multiple spinal HGB. Abdominal images showed also a large left kidney renal cell carcinoma and a large liver metastatic lesion. **Results:** the patient was treated surgically with left sided nephrectomy by the urological team, liver metastaectomy by the general surgical team, right sided cereblellar HGB resection by the neurosurgical team.

KEYWORDS

Von Hippel Lindau syndrome; Hemangioblastoma; renal cell carcinoma; Endolymphatic sac tumor.

INTRODUCTION:

Von Hippel Lindau (VHL) is a rare familial neoplastic syndrome with autosomal dominant transmission. This syndrome is seen in approximately one in 39,000 live births. characterized by an abnormal angiogenesis with multiple malignant and nonmalignant lesions which affect various tissues and organs [1,2]. Inherited as a mutation in one allele of the VHL suppressor gene. This syndrome has a 95 % penetrance at the age of 60 years but almost 4% of the patients of VHL syndrome are a symptomatic carrier [3].

Patients with VHL syndrome are predisposed to the development of disease specific central nervous system (CNS) lesions like intracranial hemangioblastoma (HGB), spinal HGB and endolymphatic sac tumors, retinal angiomas [4-7].

Regarding the HGB in VHL syndrome they tend to present earlier in comparison to the sporadic cases (peak age is the third decade in the VHL related HGB and the 4th decade in the sporadic cases). HGB may be found in the cerebellum, medulla oblongata, spinal cord, cerebrum [8].

Patients with VHL also may develop many visceral lesions including renal cysts, renal cell carcinoma, pancreatic cysts, adnexal organ cystadenoma (broad ligament and epididymis) [9]. The primary cause of VHL related death is usually the renal cell carcinoma and the CNS hemangioblastomas (Table.1). The suggested diagnostic criteria for VHL syndrome are mentioned in (Table.2). There are 2 subtypes of VHL syndrome (Table.3).

Table.1: The Incidence Of Different Organs Involvement.

Organ	Lesion	Incidence
Eye	Benign retinal angioma	50-60%
Cns	Hemangioblastoma	40-70%
Kidney	Renal cell carcinoma	30-70%
Kidney	Renal cysts	20-60 %
Adrenal	pheochromocytoma	20%
Pancreas	Islet cell tumors	12%
Epididymis	cystdenoma	10-25%
Ear	Endolymphatic sac tumors	10%

Table 2: The Suggested Diagnostic Criteria For Vhl Syndrome

1-	multigenerational family history and only one CNS or visceral lesion is necessary to establish the diagnosis ..80% of VHL patient are diagnosed with this criterion.
2-	if there is no family history then we need 2 manifestations including one CNS or retinal manifestation to make the diagnosis of VHL syndrome.
3-	Genetic testing is needed in uncertain cases

Table.3: Classification And Subtypes.

Type 1	May have any manifestation except for pheochromocytoma
Type 2 A	Ther is a low risk for RCC and neuroendocrine pancreatic tumors
Type 2 B	There is a high risk for RCC and pancreatic endocrine tumors
Type 2 C	Risk for pheochromocytoma without hemangioblastoma

Radiologic Feature Of The HGB in the CNS

In the radiological evaluation of the HGB we can use different radiological methods like Bain CT, usually low-density cystic lesion with enhancing mural nodule. MRI: preferable to CT due to tumor predilection for the posterior fossa. The image may show signal voids especially in the periphery of the lesion, usually hyperintense cystic lesion with enhancing mural nodule. Angiography may be used also as a diagnostic method [10].

Microscopic examination of the HGB

The lesion usually consists of numerous capillary-sized thin-walled vessels that are separated by intervening stromal cells with lightly PAS-positive, lipid rich cytoplasm, these stromal cells express a membrane of TGF-b family which serves as useful diagnostic marker [12].

Genetic Counseling

In the patient at high-risk pregnancy in which at least one parent has known VHL genetic testing should be done.

Case Report:

A 32-year-old male patient, previously healthy with no chronic illnesses. The patient was doing well until 4 years ago when he started to complain from headache and vertigo, the images were done then showed a Rt sided CPA lesion (vascular in nature) according to the

radiological report, as a result this lesion was embolized through an interventional method. 3 years later the patient represented to our department with decreased level of consciousness. He was admitted and the brain CT showed a new single lesion in the Rt cerebellar hemisphere with acute HCP. Ventriculoperitoneal shunt was inserted at that time.

The brain MRI which was done 2 days later showed a cystic mass lesion with an enhancing mural nodule in the right cerebellar hemisphere reported by the radiologist as a hemangioblastoma. As result of that further investigations were done to establish the diagnosis of the are disease of VHL syndrome as follow: contrasted Abdominal CT showed large left sided renal mass lesion and large liver mass lesion with heterogenous enhancement reported by our colleague readilogists as a renal cell carcinoma with liver metastasis. While whole spine magnetic resonance imaging revealed multiple vascular spinal cord lesions reported as hemangioblastomas. Ophthalmologic examination showed multiple peripheral vascular retinal lesions reported as vascular angiomas.

Interventions

Left sided nephrectomy by the urological team and liver metastatectomy by the general surgical team. The histopathologic report revealed renal cell carcinoma and liver metastasis. Right sided suboccipital approach to remove the right cerebellar hemisphere lesion, which showed hemangioblastoma.

CONCLUSION

VHL syndrome is a multisystem neoplastic syndrome with common manifestations affecting the CNS and other several organs. Hemangioblastomas are benign neoplasms of the CNS that occur sporadically or as part Of the VHL syndrome. Because of their location these lesions usually underlie significant morbidity. Although the surgery is the treatment of choice for most hemangioblastomas, the indications for the treatment are different depending on the clinical circumstances.

REFERENCES

1- Varshney, N., Kebede, A. A., Owusu-Dapaah, H., Lather, J., Kaushik, M., & Bhullar, J. S. (2017). A Review of Von Hippel-Lindau Syndrome. Journal of kidney cancer and VHL, 4(3), 20–29.
2- Tsang SH, Sharma T. Von Hippel-Lindau Disease. Adv Exp Med Biol. 2018; 1085:201-203.
3- Chappell JC, Payne LB, Rathmell WK. Hypoxia, angiogenesis, and metabolism in hereditary kidney cancers. J Clin Invest. 2019 Feb 01;129(2):442-451.
4- Signoretti S, Flaifel A, Chen YB, Reuter VE. Renal Cell Carcinoma in the Era of Precision Medicine: From Molecular Pathology to Tissue-Based Biomarkers. J Clin Oncol. 2018 Oct 29;36(36): JCO2018792259.
5- Koch CA, Petersenn S. Black swans - neuroendocrine tumors of rare locations. Rev Endocr Metab Disord. 2018 Jun;19(2):111-121.
6- Yilmaz U. [CNS manifestations of neurocutaneous syndromes]. Radiologe. 2018 Jul;58(7):664-667.
7- Das JM, Kesavapisharady K, Sadasivam S, Nair SN. Microsurgical Treatment of Sporadic and von Hippel-Lindau Disease Associated Spinal Hemangioblastomas: A Single-Institution Experience. Asian Spine J. 2017 Aug;11(4):548-555.
8- Ganeshan D, Menias CO, Pickhardt PJ, Sandrasegaran K, Lubner MG, Ramalingam P, Bhalla S. Tumors in von Hippel-Lindau Syndrome: From Head to Toe-Comprehensive State-of-the-Art Review. Radiographics. 2018 May-Jun;38(3):982.
9- Maher ER. Hereditary renal cell carcinoma syndromes: diagnosis, surveillance and management. World J Urol. 2018 Dec;36(12):1891-1898.
10- Bonneville F, Sarrazin JL, Marsot-Dupuch K, Iffenecker C, Cordoliani YS, Doyon D, Bonneville JF. Unusual lesions of the cerebellopontine angle: a segmental approach. Radiographics. 2001 Mar-Apr;21(2):419-38.
11- Yoda, R. A., & Cimino, P. J. (2022). Neuropathologic features of central nervous system hemangioblastoma. Journal of pathology and translational medicine, 56(3), 115–125.