Department of Neurosurgery
The University of Tokyo

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Comparative analysis of spinal hemangioblastomas in sporadic disease and von Hipple-Lindau syndrome

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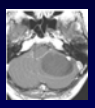
Background/Purpose

Sporadic disease VS VHL syndrome

How different?



Cerebellar hemangioblastomas

→ Many clinical studies

Spinal hemangioblastomas

→ A few studies

→ We investigated in this study

Diagnosis of VHL syndrome

Clinical diagnosis (Lanser RR et al:*Lancet* 2003)

- With a family history of VHL syndrome

One or more
- CNS hemangioblastomas
  Pheochromocytoma
  Clear cell renal carcinoma

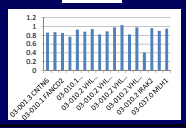
- Without a family history

One or more CNS hemangioblastoma and visceral tumor

Genetic diagnosis

Direct sequence

MLPA



Distribution of CNS hemangioblastomas

in our hospital's cases(1988-2011)

Location	Sporadic disease	VHL syndrome	p Value
Supratentorial	1(2.6%)	2(11.8%)	0.22
Pons	1(2.6%)	0(0%)	1.00
Cerebellum	26(66.7%)	14(82.4%)	0.34
Cerebellopontine angle	3(7.7%)	0(0%)	0.55
Medulla	3(7.7%)	1(5.9%)	1.00
Spinal cord	8(20.5%)	15(88.2%)	<0.001*
Total	**39**	**17**	

* Statistically significant difference (Fisher's exact test)

Spinal hemangioblastomas
at our hospital and affiliated institutions

Total:35 patients
Sporadic disease: 17
VHL syndrome : 18

treated between 1998 and 2011
at our hospital and 3 affiliated institutions

investigate
- Age at diagnosis
- Symptoms and signs at diagnosis
- Tumor number, size, and distribution
- Surgical outcome

McCormick classification

To evaluate clinical functions in patients with intramedullary spinal cord tumor

normal

severe

Grade	Definition
I	Neurologically normal; mild focal deficit not significantly affecting function of involved limb; mild spasticity or reflex abnormality; normal gait
II	Presence of sensorimotor deficit affecting function of involved limb; mild-to-moderate gait difficulty; severe pain or dysesthetic syndrome impairing patient's quality of life; still functions and ambulates independently
III	More severe neurological deficit; requires cane/brace for ambulation or significant bilateral upper extremity impairment; may or may not function independently
IV	Severe deficit; requires wheelchair or cane/brace with bilateral upper extremity impairment; usually not independent

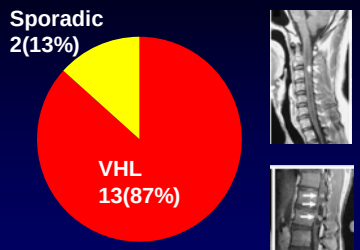
(McCormick PC et al: *J Neurosurg*,1990)

Clinical and radiological presentations

	Sporadic disease	VHL syndrome	p Value
Total no. of patients	17	18	
Males:females	11:6	14:4	0.53
Mean age at diagnosis(yrs)	45.5±12.0	32.8±13.8	0.007*
Neurological status at diagnosis (McCormick classification)			0.004*
Ⅰ	2(11.8%)	12(66.7%)	
Ⅱ	12(70.6%)	5(27.8%)	
Ⅲ	0(0%)	0(0%)	
Ⅳ	3(17.6%)	1(5.6%)	
No.patients with multiple spinal lesions	2(11.8%)	13(72.2%)	<0.001*

* Statistically significant difference

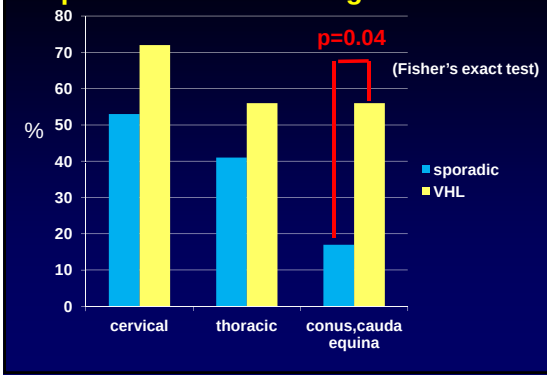
Multiple lesions and VHL syndrome



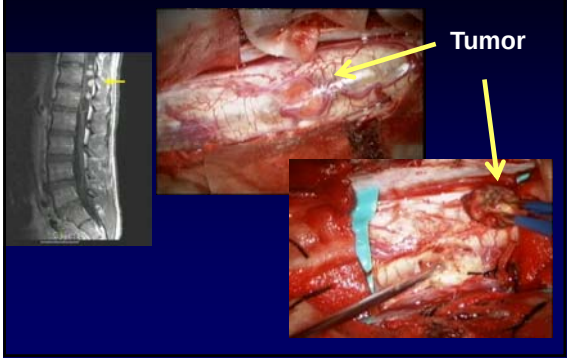
Sporadic
Simple lesion

VHL
Multiple lesion

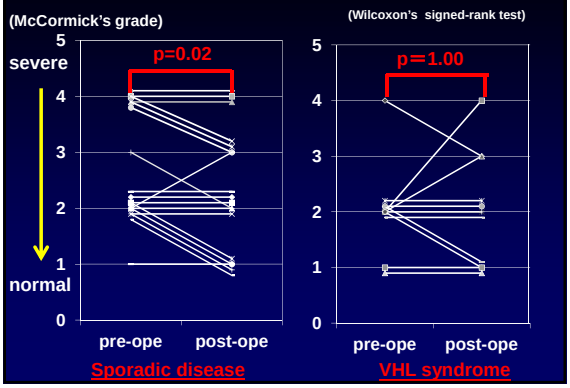
Spinal levels of hemangioblastomas



Surgery



Changes of clinical function after surgery



Clinical differences

	Sporadic disease	VHL syndrome
Prevalence of spinal lesions	20%	88%
Age at diagnosis	4th decade of life	3rd decade of life
Neurological status at diagnosis	mild to moderate deficits	no symptoms to mild deficits
Surgical outcome	significant improvement	no significant improvement

Discussion

- Multiple spinal lesions tends to indicate VHL syndrome.
  (Baker KB, et al: *Am J Roentgenol*.2000)
- Lower spinal cord lesions were more frequently observed in patients with VHL syndrome.
  (Biondi A, et al: *Am J Neuroradial*.2003)

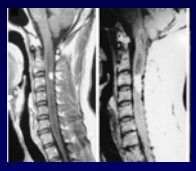
Patients with multiple spinal lesions including the lower spinal cord are more likely to have VHL syndrome.

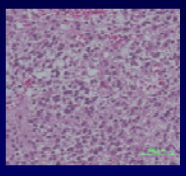
Conclusions

- As predicted, the clinical characteristics differed in many respects between patients with spinal hemangioblastomas in sporadic disease and those in VHL syndrome.
- The findings of this study suggest that patients with multiple spinal lesions including the lower spinal cord are more likely to have VHL syndrome.

Diagnosis of spinal hemangioblastomas

Pathological diagnosis
- 24 cases based on spinal lesions
- 10 cases based on other CNS lesions





Factors affecting deterioration

Factor	p Value
Von Hipple-Lindau syndrome	1.00
Age at surgery	0.07
McCormick classification at surgery	0.91
No. of lesions removed at one time	0.03*
Size of lesion	0.56
Spinal level of lesion	
cervical	0.17
thoracic	0.71
Conus/cauda equina	0.05*
Partial removal of lesions	0.08

* Statistically significant difference

Factors affecting recurrence

Factor	p Value
Von Hipple-Lindau syndrome	0.16
Age at surgery	0.68
No. of lesions removed at one time	0.44
Partial removal of lesions	0.05*

* Statistically significant difference

Prevalence of spinal lesions

	Sporadic disease	VHL syndrome
Neumann HP, et al *J Neurosurg*,1989	15%	7%
Conway JE, et al *Neurosurgery*,2001	12%	47%
Wanabo JE, et al *J Neurosurg*,2003	------	76%
Present study	20%	88%