Table SI. Clinical information of 57 patients with PA associated with meningioma.

No.	Sex	Order of onset	Age at PA Dx	Age at meningioma Dx	MEN1 c.1523G>A; p.G508D	Attributable symptoms	Invasion	Pituitary adenoid volume, mm^3	Endocrine function	Meningioma location	Meningioma volume, mm^3	Pathology	Associated pathologies	Next generation sequencing
1	F	Men	50	44	N	Decline of vision	N	3,264	NFPA	Left frontal	48,000	Transitional	NA	Y
2	F	S	66	59	N	Decline of vision	Y	112,500	NFPA	Tentorium cerebelli	NA	Fibrous	NA	Y
3	M	S	37	37	NA	Visual field defects	N	26,250	NFPA	Obital apex	1,300	NA	NA	N
4	F	S	50	50	NA	Decline of vision	N	9,234	NFPA	Left frontal	280	NA	NA	N
5	F	Men	71	65	N	Decline of vision	N	1,650	NFPA	Tentorium cerebelli	15,625	Transitional	NA	Y
6	F	S	44	42	N	Menstrual disorder	NA	NA	GH	Left temporal	16,500	Transitional	NA	Y
7	F	Men	62	54	N	Decline of vision	N	2,160	PRL	Right petroclival	NA	NA	Adrenal tumors	Y
8	F	S	46	46	NA	Amenorrhea	Y	50,568	PRL	Left temporal occipital	6,000	NA	NA	N
9	F	S	20	20	NA	Menstrual disorder	Y	15,400	PRL	Right parasagittal	46,332	Endothelial	NA	N
10	F	S	58	58	N	Decline of vision	N	11,025	NFPA	Left CPA	2,160	NA	NA	Y
11	F	S	48	48	NA	Acromegaly	N	6,358	GH	Right frontal	90	NA	NA	N
12	F	S	45	45	Y	Amenorrhea	Y	62,640	PRL	Left temporal	1,980	NA	NA	Y
13	M	S	36	36	NA	Decline of vision	N	5,054	PRL	Parafalcine	1,000	NA	NA	N
14	F	S	39	39	NA	Amenorrhea, Lactation	N	2,688	NFPA	Parafalcine	2,016	NA	NA	N
15	F	S	55	55	N	Decline of vision	Y	39,168	NFPA	Parafalcine	8,500	NA	Thyroid tumors	Y
16	F	S	60	60	N	Decline of vision	N	18,848	NFPA	Parafalcine	280	NA	NA	Y
17	M	S	62	62	NA	Decline of vision	Y	17,226	NFPA	Parafalcine	1,320	NA	NA	N
18	F	S	54	54	N	Amenorrhea	Y	10,120	PRL	Tentorium cerebelli	7,524	NA	NA	Y
19	F	S	71	71	NA	Decline of vision	N	16,720	NFPA	Parafalcine	4,352	NA	NA	N
20	F	P	66	72	N	Decline of vision	Y	47,250	NFPA	T9-10	2,880	Transitional	NA	Y
21	F	S	70	70	NA	Decline of vision	N	14,175	NFPA	Left frontal	1,134	NA	NA	N
22	F	S	50	50	Y	Physical findings	N	5,148	NFPA	Left CPA	60,000	Fibrous	NA	Y
23	F	Men	66	53	NA	Decline of vision	N	4,704	NFPA	Left temporal	NA	Transitional	Intraductal papilloma of breast	N
24	M	S	61	61	NA	Physical findings	N	2,925	NFPA	Parafalcine	1,080	NA	NA	N
25	F	P	22	26	NA	Amenorrhea	Y	40,500	NFPA	Right frontal	20,000	NA	NA	N
26	F	S	52	52	N	Physical findings	N	2,704	PRL	Parafalcine	10,080	Transitional	NA	Y

Table SI. Continued.

No.	Sex	Order of onset	Age at PA Dx	Age at meningioma Dx	MEN1 c.1523G>A; p.G508D	Attributable symptoms	Invasion	Pituitary adenoid volume, mm^3	Endocrine function	Meningioma location	Meningioma volume, mm^3	Pathology	Associated pathologies	Next generation sequencing
27	M	S	59	59	N	Decline of vision	Y	28,152	NFPA	Parafalcine	150	NA	NA	Y
28	F	S	51	51	N	Headache	N	1,200	NFPA	Left frontal	125	NA	NA	Y
29	F	S	53	53	NA	Physical findings	N	11,475	NFPA	Right frontal	3,744	NA	NA	N
30	M	S	49	49	Y	Physical findings	N	210	GH	Left sphenoid ridge	5,280	Transitional	NA	Y
31	M	S	57	57	N	Acromegaly	N	800	GH	Tentorium cerebelli	280	NA	NA	Y
32	F	S	65	65	NA	Headache	N	2,600	NFPA	Left frontal	1,960	NA	NA	N
33	F	S	54	54	Y	Decline of vision	N	15,708	NFPA	Parafalcine	3,780	NA	NA	Y
34	F	S	57	57	Y	PA recurrence	Y	20,000	NFPA	Parafalcine	2,160	NA	NA	Y
35	F	S	57	57	NA	Physical findings	N	2,856	NFPA	Left CPA	29,512	Fibrous	NA	N
36	F	S	67	67	N	Decline of vision	N	19,320	NFPA	Right sphenoid ridge	2,448	NA	NA	Y
37	F	S	57	57	N	Acromegaly	N	210	GH	Parafalcine	1,200	NA	NA	Y
38	M	S	65	65	N	Physical findings	N	5,814	NFPA	Left temporal	500	NA	NA	Y
39	F	S	58	58	N	Decline of vision	N	20,592	NFPA	Torcular	1,560	NA	NA	Y
40	F	S	56	56	NA	Decline of vision	Y	4,860	NFPA	Parafalcine	448	NA	NA	N
41	M	S	50	50	NA	Acromegaly	Y	58,695	GH+PRL	Tentorium cerebelli	15,428	NA	NA	N
42	F	S	56	56	NA	Decline of vision	N	12,000	NFPA	Right frontal	2,160	Transitional	NA	N
43	F	S	56	56	NA	Decline of vision	N	6,912	NFPA	Right frontal	1,859	Fibrous	NA	N
44	M	S	61	61	NA	Headache	N	11,960	NFPA	Right frontal	4,056	Endothelial	NA	N
45	F	S	64	64	NA	Fatigue	Y	70,448	NFPA	Left frontal, Parafalcine	62,197	Transitional	Adrenal cortical adenoma	N
46	F	S	56	56	NA	Decline of vision	N	18,000	NFPA	Right frontal	6,000	Fibrous	NA	N
47	F	S	57	57	NA	Decline of vision	NA	NA	NFPA	Right frontal	NA	Transitional	NA	N
48	F	S	55	55	NA	PA recurrence	Y	81,120	NFPA	Left CPA	8,073	NA	NA	N
49	F	S	61	61	NA	Decline of vision	N	2,431	NFPA	Left frontal	3,640	NA	NA	N
50	M	S	59	59	NA	Acromegaly	Y	13,662	GH	Anterior cranial base	24,4818	Transitional	NA	N
51	M	S	53	53	NA	Headache	N	510	NFPA	Right CPA	3,295.08	NA	NA	N
52	F	S	53	53	NA	Acromegaly	NA	NA	GH	Left parasagittal	512	NA	NA	N
53	M	S	54	54	NA	PA recurrence	Y	8,892	NFPA	Left tentorium cerebelli	648	NA	NA	N

Table SI. Continued.

No.	Sex	Order of onset	Age at PA Dx	Age at meningioma Dx	MEN1 c.1523G>A; p.G508D	Attributable symptoms	Invasion	Pituitary adenoid volume, mm^3	Endocrine function	Meningioma location	Meningioma volume, mm^3	Pathology	Associated pathologies	Next generation sequencing
54	F	S	49	49	NA	Decline of vision	Y	30,056	NFPA	Right ventricle; Parafalcine	19,683	NA	NA	N
55	F	S	68	68	NA	Headache	N	2,496	NFPA	Left CPA	29,700	NA	NA	N
56	F	S	57	57	NA	Decline of vision	Y	10,450	NFPA	Right frontal	840	NA	NA	N
57	F	S	57	57	NA	Visual field defects	Y	3,876	NFPA	Right orbital	2,940	NA	NA	N

CPA, cerebellopontine angle; F, female; GH, growth hormone; M, male; Men, meningioma; NFPA, non-functional pituitary adenoma; N, no; NA, not available; PA, pituitary adenoma; PRL, prolactin; S, simultaneous; Y, yes.

Table SII. Comparison of characteristics between PAM and MEN-1 syndrome.

Characteristic	MEN-1 syndrome	PAM
Related diseases	Multifocal neoplastic endocrine lesions of parathyroid glands, endocrine pancreas, duodenum, anterior pituitary and less commonly also of the stomach, adrenal, cortex, thymus and lungs	Pituitary adenoma and meningioma
Age of onset	Earlier, tumor penetrance rate <40 years was 94%	Later, tumor penetrance rate <40 years was 25%
Sex	Both sexes are equally affected	Most were female (male:female=10:38)
Mutation features of *MEN1*	Missense, nonsense, insertion, frame shift, etc	MEN1 (c.1523G>A; p.G508D)
Pedigree	First degree relatives may possess MEN-1-related tumors or *MEN1* mutations	No first degree relatives possessed MEN-1-related tumors or other *MEN1* mutations, expect for *MEN1* (c.1523G>A; p.G508D)

MEN-1, multiple endocrine neoplasia type 1; PAM, pituitary adenoma associated with meningioma.