

# Meningioma: a Clinicopathologic Study of 251 Cases and the Clinical Significance of P73 Expression

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**Abstract Objective** To investigate the clinicopathologic features of meningioma and the clinical significance of P73 expression. **Methods** A total of 251 patients with meningioma were studied by clinicopathological analysis and the expression of P73 was detected with immunohistochemical stain. **Results** This series consists of 101 men and 149 women and the sex ratio was 1:1.47, and the age of the patients were mostly more than 41 years old (64.93%). Majority of the lesions were located in the convex surface of the cerebrum and the majority of the cases (47.01%) were meningothelial (syncytial) type and the second was in transitional type of 29.48% histologically. The expression of the P73 protein in malignant meningioma was greater than that in benign meningioma. **Conclusion** In meningioma cases the female was more than male cases and the age was mostly beyond 41 years old. The lesions located mainly in the convex surface of the cerebrum and histologically majority were in meningothelial(syncytial) type, and P73 may be used as criteria for differential diagnosis.

**Key Words** meningioma; P73; immunohistochemistry

Meningioma is one of the benign intracranial tumors the clinicopathologic feature of meningioma had been few reports in China. In this study 251 cases of meningioma were analysed and the expression of P73 protein was detected in part of cases of malignant meningioma.

## MATERIALS AND METHODS

### General data

From January 1990 to January 2000, 251 patients with meningioma received surgical resection in the department of neurosurgery of union hospital, Fujian medical university. Among the 251 patients, 101 were male, 149 cases were female and 1 case unrecord, with the sex ratio of 1:1.47. Age at initial diagnosis as follows: 12 patients (4.78%) were under 20 years old, 25 patients (9.95%) were in 21~30 years old, 48 patients (19.12%) in 31~40 years old, 71 patients(28%) in 41~50 years old, 36 patients (14.34%) over 61 years old, and 3 patients (1.19%) were unrecord. So the most of patients were in the age of 41 to 61 years old (64.93%).

### Immunohistochemical staining

In this study, we selected 16 cases of benign and malignant meningiomas respectively for the detection of P73 expression with immunohistochemi-

cal S-P techniques. All the section were in 4 um thickness and deparaffinized, repaired the antigen with microwave, then immersed 3% H<sub>2</sub>O<sub>2</sub> to block the endogenous enzymes, and rest operations were performed according to the introduction of the reagent kit. P73 is polyclonal antibody (manufacture by Santa cruz Biotechnology).

**Evaluation of results** P73 protein was mainly expressed in the nuclei of tumor cells, and under microscopy it was recorded as follows according to the nuclei stained degree: A, 0 point (-), nuclei stain-less; B, 1 point (+) nuclei stained in slight yellow cloudy; C, 2 point (++) nuclei stained in yellow granular form; D, 3 point (+++) nuclei stained in deep yellow color. According to the percentage various degree staining of P73 protein, P73 protein tumor cells were recorded as a.b.c and d. Then  $A \times a + B \times b + C \times c + D \times d$ . So the results are categorized into four groups: 0 point (-), 1 point (+), 2 point (++) , 3 point (+++). The (-) and (+) are signed negative, and 2 point (++) is signed low expression and 3 point (+++) is signed height expression (Table 1).

## RESULTS

**The position of meningioma** According to wan jing hai's classification, specific distribution was

as follows: 137 patients (54.58%) were in convex surface of the cerebrum, 34 patients (13.5%) were in sagittal sinus, 7 patients (2.78%) were in ventricle system, 4 patients (1.59%) were located between skull and cervical vertebral and 3 patients (1.19%) were in vertebral canal.

### Gross pathology

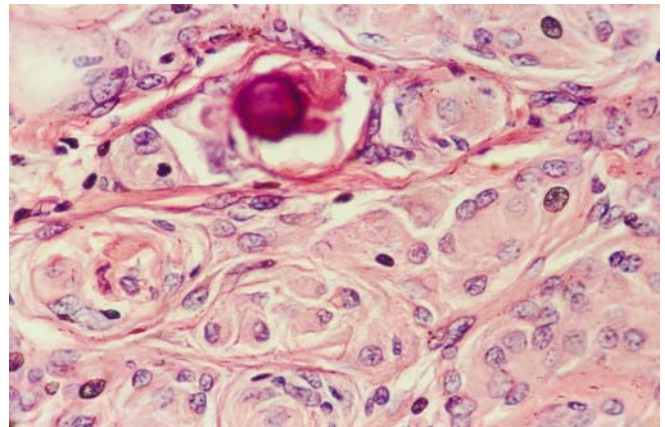
The tumors measuring 1 cm in diameter were 2 cases (0.79%), 2 cm were 17 cases (6.79%), 3 cm were 46 cases (18.32%), 4 cm were 44 cases (17.52%), 5 cm were 48 cases (19.12%), 6 cm were 39 cases (15.5%), 7 cm were 26 cases (10.35%), 8 cm were 21 cases (8.36%), 9 cm were 6 cases (2.39%), and 10 cm were 2 cases (0.7%).

### Histopathology

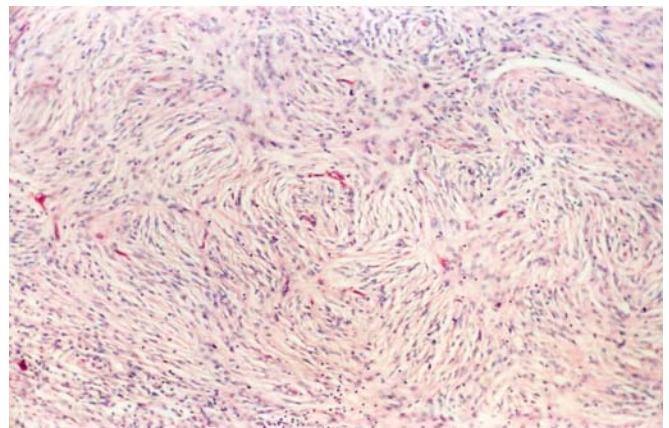
According to the proposed new histological classification of brain tumors of WHO translated by Feng Jing-yang and Xu Qing-zhong [1], the criteria of classification of meningioma are as follows: (1) meningothelial (syncytial) type was 118 cases (47.01%) (Fig.1), the tumors are well defined and the tumor consists of sheets of tumor cells that have indistinct cell borders, with round or oval nuclei, and chromatin aggregate around the margin of nuclei as vacuolated and also bizarre nuclei of monocyte or giant nuclei cells may be seen, and contain variant of stroma. (2) fibrous (fibroblastic) type was 32 cases (12.74%) (Fig.2) this kind of tumors were composed of spindle shaped cells predominately, which resemble fibroblasts and arranged in whorls palisading or fascicles and psammoma may be seen. (3) transitional /mixed type, the tumor cells of 74 cases (29.48%) (Fig.3) consist of two type components of meningo-thelial and fibrous in intersetic, and the tumor cells arranged perivascular formed whorls. (4) psammomatous type, the main component of this type of 3 cases (1.91%) were psammomas. (5) angiomatous type was 18 cases (7.17%), which are abundant capillaries in variform of caliber vascular, and not much meningothelial cells penetrated in it, so in this type abundant capillaries of tumor are resemblance as angioblastoma. (6) chordoid type were 5 cases (1.99%) that the histological feature bear resemblance to chordoma. (7) lymphoplasmacyte-rich type was 1 case (0.3%) only. In this series, the microcytic type, secretory type and metaplastic variants type were not seen. Among 251 cases of meningioma, there were 19 cases (7.56%) malignant changed (Fig.4).

### Express of P73

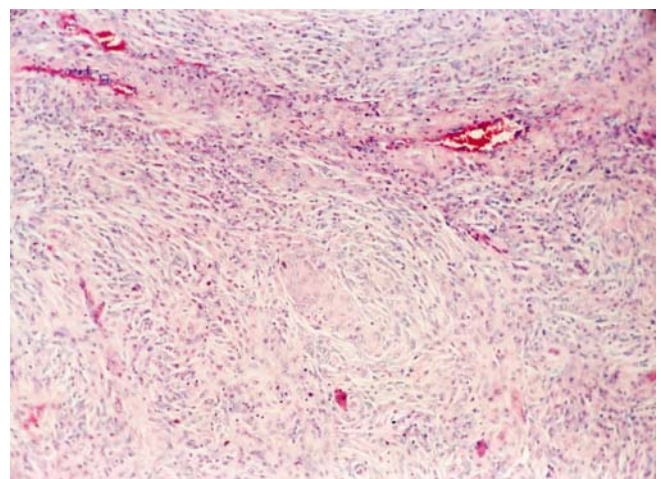
The expression of P73 see table 1.



**Fig.1** Tumor cells show polygonal cells with abundant eosinophilic cytoplasm and nuclei of round or oval in shape with small nucleolus and a psammoma in the centre.



**Fig. 2** Tumor show spindle cells that abundant cytoplasm with indistinct cells border, arranged in fascicles or whorled architecture.



**Fig. 3** In center of tumor cells showed varied sheets of polygonal syncytial cells with peripheral mixture of loose fibrous type.

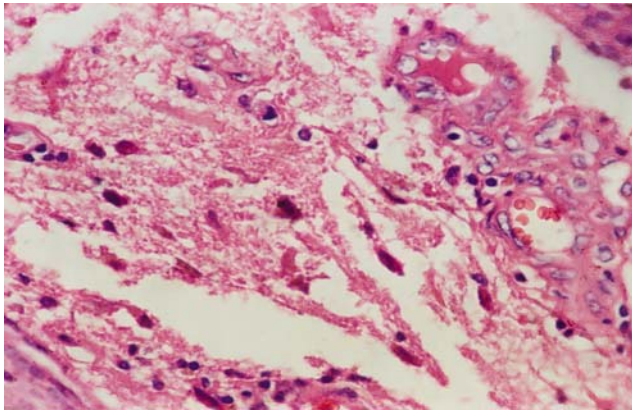


Fig. 4 Tumor cells invade into the brain parenchyma.

Table 1 The results of the expression of P73

-	0-1	1-2	2-3
Benign meningioma	7	9	0
Malignant meningioma	1	4	11

$P < 0.05$

## DISCUSSION

Meningioma is one of the most common intracranial tumors. Huang Wenqing<sup>[2]</sup> reviewed 50 series of meningiomas in China and it was 10.7% of intracranial tumors. In this study, the meningioma take up 20.9% in 1198 cases of different kinds intracranial tumors in the same period, which close to American's 20.61%. In this series, ages of the patients were mainly in 41~61 years old (64.9%) that was slightly more than that in 10368 cases (49.2%) in our country. Among our 251 cases, 101 were male and 149 were female with the ratio of 1:1.47 that is agree with Huang Wenqing's opinion, appeared male less than female<sup>[2]</sup>. About the location of meningioma, 137 cases (54.58%) were located in the convex surface of the cerebrum, 66 cases (26.29%) were in cranial basal and 34 cases (13.5%) were in sagittal sinus, and the others were less than 10 cases in this series.

### Pathology

Concerning the classification of benign meningioma, many employed the classification of WHO (1990) recently in our country, and the 11 types are described previously, and these are meningothelial (syncytial) type, fibrous (fibroblastic) type,

transitional/mixed type, angiomatous type, chordoid type, lymphoplasma-rich type, metaplastic variants (xanthomatous, myxoid, osseous, cartilagenous etc) type. After being available for use the grade and classification of WHO and learning for 4 years period, Zhang Yulin<sup>[3]</sup> according to the analysis of the pathology in 4373 cases, and 929 cases of meningiomas was divided into 15 types, beside the above 11 types the atypical, anaplastic, papillary meningioma and rhabdomyosarcomatous of 4 types were added about the criteria of diagnosis of malignant meningioma, Wei Shaopo<sup>[4]</sup>, according to local necrosis, mitosis, infiltrated into the brain, hemorrhage, coarse chromatin of the tumors, make the diagnosis of malignant, he suggested that if the case contain 4 items the diagnosis of malignant meningioma may be established, if less than 4 may diagnose as benign or border line cases. In this study 19 cases of malignant changed on the histopathology, there were variety in degree of necrosis, infiltrated into the brain, hemorrhage, mitosis and core chromatin of the tumors.

The application of immunohistochemistry method for differential diagnosis between benign and malignant of meningioma have not been reported. A novel gene, P53,<sup>[5-8]</sup> has been recently identified, which is predicted to encode a protein with significant amino-acid sequence similar to P53. Of Kaghad's study, they state the SK-NN-AS cell line expresses no detectable P73 protein and negligible levels of P73 transcript and therefore represented an ideal model for testing the effect of reintroducing P73. and significantly, cells expressing wild-type P73 showed elevated levels of P21 protein, comparable to those seen in wild -type P53 transfectants, whereas mutant P73 and mutant P53-expressing cells both failed to show a similar P21waf induction. These results suggest that P73 can, at least when overproduced, activate P53-responsive genes and act as a growth suppressor. Qu Guang et al. reported the expression of P73 in 63 cases of gliocytomas, the result showed 17 cases of gliocytomas were in positive expression of P73. In this study, most high expression of P73 were in malignant meningiomas cases ( $P < 0.05$ ). the result was closed to Qu Guang's series. So we think the detecting the expression of P73 may be a criteria to differential diagnosis between benign and malignant of meningiomas.

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