longer than for patients with subtotal removal. In our experience, there was a 30% recurrence rate after incomplete removal, after a mean interval period of 8.1 years. The statistical analysis demonstrated an increasing time-dependent recurrence rate in patients with subtotal removal, up to 35% at 13 years. Our results are consistent with the literature on the timing and incidence of symptomatic recurrences (26, 58, 69). Zhou (71) reported only four recurrences in 68 patients during a period ranging from 5 to 20 years.

Altschuler et al. (3) emphasized the poor prognosis of patients suffering from fixed deficits, which persist through multiple operations, for recurrences. Extensive lesions, incomplete initial resection, and limited initial exposure were considered to be the primary causes of recurrences (3). However, some authors have reported excellent results in series of patients undergoing second or multiple operations (58, 66, 69). Notwithstanding these reported positive results, the higher the rate of subsequent operations, the less satisfactory is the outcome for reversal of neurological symptoms. Initial incomplete excision is unlikely to achieve definitive tumor cure.

The timing of subsequent surgery is controversial. Surgeons still debate whether second surgery should be performed at the first radiological evidence of recurrence, at the time the tumor presumably extends beyond the original operative field, or after the onset of symptoms. Because of radiological uncertainties, the general attitude is to wait either for clear radiological evidence of recurrence or for the renewal of symptoms (3, 9, 43, 70).

CONCLUSION

In contrast with other posterior fossa benign tumors, in which the cure is obtained by overcoming surgical technical difficulties, the main problems in the management of epidermoids remain misdiagnosis, incomplete removal at the first operation, and delayed detection of recurrences, which occur in nearly half of the patients. On MRI, PD-weighted images are superior to T1- and T2-weighted images in differentiating the cyst content from CSF. A classification system helps in patient assessment, in choosing the surgical strategies, and in determining prognosis. Among CPA epidermoids, a higher rate of preoperative neurological disturbances and a higher postoperative morbidity rate are demonstrated in mesencephalic extended tumors. Fourth-ventricle tumors carry higher risks of surgical complications, whereas few clinical signs and a good outcome are demonstrated in posterior fossa basal epidermoids. Because tumor extension plays a major role in limiting the extent of surgical removal, it should be considered in choosing the surgical approach and in following-up the patient. Our recommendation for the management of recurrent posterior fossa epidermoids is to conduct serial MRI studies, beginning 2 years after the initial operation and repeating at 2-year intervals. This strategy allows better assessment for subsequent surgery, before the tumor extends beyond the original location.

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REFERENCES