

Meningioma - The Sarawak General Hospital Experience

S H Wong, FRACS, S H Chan, MBBS

Hospital Umum Sarawak, Jalan Tun Ahmad Zaidi Adruce, Kuching, 93586 Sarawak

Summary

The aim of this study was to determine the factors for the large size of intracranial meningiomas at the time of presentation to the Sarawak General Hospital. The data was collected prospectively from 1/3/2000 to 28/2/2001. During this period a total of 57 cases of intracranial tumours were operated upon. Twenty of these cases (35%) were meningioma, making meningioma the most common intracranial tumour operated in the Neurosurgery service here with one to two cases operated per month. Headache was the most common symptom. The average duration of symptoms before the diagnosis was made was twenty-five months, the longest being fifteen years. The patients needed an average of seven visits prior to the diagnosis.

Key Words: Meningioma, Diagnosis

Introduction

Meningioma is one of the few benign tumours in Neurosurgery. Factors determining outcome after an operation for meningiomas include, the duration of symptom, size of the tumour at presentation, the site and the histological type. Symon et al¹ reported that the overall outcome was better in patients with tumour size of 3cm or less and a duration of symptoms of two years or less among patients operated for suprasellar meningioma.

The aim of this study was to determine the demographics of the patients and the factors for the large size of the meningiomas presenting to the Sarawak General Hospital.

Materials and Methods

The data was collected prospectively from twenty consecutive cases of meningioma operated in the Sarawak General Hospital between 1/3/2000 and 28/2/2001. The protocol used is shown in appendix 1. There were three cases that were not operated. The demographics of the patients for age and sex were collected. The size of tumour and the location of the tumour were obtained from the scan. The symptoms, duration of the symptoms and the number of medical visits were directly obtained from the patients or their relatives. Medical visits included visits to doctors or medical assistants. The medical assistants staff some of the polyclinics and the "klinik desa" (or village clinics) in Sarawak.

This article was accepted: 16 June 2002

Corresponding Author: Wong Sii Hieng, Neurosurgeon, Hospital Umum Sarawak, Jalan Tun Ahmad Zaidi Adruce, Kuching, 93586 Sarawak

Patient's conscious level at the time of presentation was graded according to the Glasgow Coma Scale (GCS)². This is shown in Table I.

The size and location of the tumours were obtained from either the MRI scan or the CT scan. The largest diameter of the tumour was used to indicate the size. The extent of tumour excision was based on the Simpson's grading³. (Table II)

The outcome was measured using the Glasgow Outcome Scale (GOS)⁴ upon discharge or at the last follow-up in the clinic. This is shown in Table III.

Results

Twenty out of a total of 57 cases of operated intracranial tumours during the study period were meningiomas. The female to male ratio was 10:1. The average age was forty-seven years. The most common locations of the tumour were at the sphenoid ridge and falx with 5 patients each. The location of the tumours is shown in Figure 1.

The tumour sizes ranged from 1cm to 10cm. They were grouped into four categories namely; less than 3cm, 3 to 6cm, 6 to 9cm and greater than 9cm. The average diameter was 5cm and median diameter was also 5cm. Figure 2 indicates the number of tumours in each size category.

Twelve patients (57%) presented with headache. Five patients (24%) presented with blindness and 2 patients (10%) with epilepsy. The remaining patient presented with a behavioral change.

The duration of symptoms ranged from one week to fifteen years. They were categorised into those with less than one year, one to two years and more than two years. The number of patients in the various categories is shown in Figure 3.

The number of medical visits prior to diagnosis were divided into those who visited one time, two to five times, six to nine times and those more than nine times. On average seven visits were needed before the diagnosis was made. The frequency distribution of the number of visits before diagnosis is shown in Figure 4.

The excision was graded according to the Simpson's grading. Eight patients had grade I excision, 5 had grade II, 3 had grade III and 4 had grade IV excision. The degree of outcome was obviously related to the clinical status of the patient at presentation. The majority of patients improved after operation with eighteen patients achieving good recovery i.e. GOS of 5. Out of the fifteen patients with GCS of 15 at admission, one who was conscious postoperatively deteriorated on the second day due to cerebral edema. Her pupils were reactive throughout. She was immediately intubated and was taken to theatre for a bifrontal craniectomy to relieve the raised intracranial pressure. Unfortunately she remained bedridden at the time of discharge. Another patient who was comatose with a GCS of 5 at admission died one month later due to an intracerebral bleed away from the operated site. The degree of outcome is summarised in Figure 5.

Discussion

Sarawak General Hospital is the only general hospital in this state with a neurosurgical service and serves a population of about 2.1 million people⁵. This study shows that meningioma is not an uncommon disease in this hospital. On average about two cases were done per month. Thirty-five percent of our operated cases were meningiomas. This proportion is even higher than the 19.5% reported by Glasauer⁶ of surgically verified intracranial tumours in Malaysia.

The most common presentation for intracranial meningioma is headache, which accounted for

fifty four percent of the presenting symptom. The mean duration from onset of symptom to diagnosis was approximately two years. They needed an average of seven medical visits prior to the diagnosis.

Headache is a very frequent complaint for which a careful history needs to be taken. Headache caused by tumour is usually gradual in onset and likely to be persistent and progressive in nature. This may be associated with vomiting or focal neurological signs. A CT scan of the brain will be mandatory in these cases.

However some of these patients had decreased conscious level by the time they presented. One was comatose with GCS of 5 and three had GCS of 14. It was found by Chan et al⁷ that the preclinical condition of the patient was an important determining factor of postoperative survival. Eighteen percent of their patients with poor preoperative clinical condition never achieved independent living postoperatively versus two percent in the group who were socially independent prior to surgery.

An important feature to note is the large sizes of the meningiomas when they presented, the average size being 5cm in diameter. This was also noted by Arumugasamy et al⁸ earlier, where meningiomas frequently occupied up to half or three quarters of a hemisphere. There is an association between the size of the tumour and the outcome of the patients. Symon et al⁹ reported that the overall outcome was better in patients with suprasellar meningioma of 3cm or less. The operative mortality was 7.1 percent for tumour which were more than 3cm compared to 4.4 percent for those with tumour sizes which were equal or less than 3cm. Similarly Raco et al¹⁰ found a 2.2% mortality for tumour less than 4cm while in tumours of more than 4cm the mortality rate was 16% in their series of tuberculum sellae meningiomas.

The duration of symptoms also has an effect on the outcome. Symon et al⁹ found that patients who had symptoms for greater than 2 years had a mortality of 8.1% compared to 4.8% for those with less than 2 years' duration. The mortality rate of 4.7 percent, in our series is comparable to these figures.

Complete tumour removal is more easily achieved with smaller tumour. Raco et al¹¹ reported that radical removal was possible for all cases of tuberculum sellae meningiomas of diameter less than 4cm. Hence the earlier the diagnosis and the smaller the tumour at presentation the better is the surgical result and outcome. In order to achieve this, early diagnosis is needed.

The duration of symptoms prior to treatment might be shorter if the meningioma was detected during an earlier visit rather than an average of seven visits. In Sarawak, health care is provided by a combination of medical and paramedical staff. The patient who presents for example with headache in the village clinic will usually need to be seen a few times by a few people before they can have a definitive scan done. He has to be considered as having a serious problem first before being referred to a district hospital. At the district hospital he will then need to be referred to a specialist in a general hospital. If that hospital does not have a CT scan then the patient will require further referral to the nearest general hospital that have a CT scan. We have only 2 CT scanners in the public sector covering a very wide area of 124,449 sq km. This has made accessibility for scanning even more difficult. Moreover, many patients are not able to afford care or scanning outside the general hospital system, resulting in late diagnosis.

The neurosurgical service here have embarked on state-wide courses aimed particularly at the frontline medical personnel who include medical officers, nurses and medical assistants. Hopefully this will help to improve the diagnosis of brain

tumour and particularly benign brain tumour like meningiomas. We have held 2 courses, one in June 2001 with 83 participants and another one in April 2002 with 105 participants.

This problem of delayed diagnosis of tumours in Malaysia is not peculiar to the diagnosis of meningioma as it is also seen in other tumour conditions such as nasopharyngeal carcinoma¹².

Table I: The Glasgow Coma Scale (GCS)

Parameter	Response	Numerical value
Eye Opening	Spontaneous	4
	To Speech	3
	To Pain	2
	None	1
Best Verbal Response	Orientated	5
	Confused	4
	Inappropriate	3
	Incomprehensible	2
	None	1
Best Motor Response	Obeys Commands	6
	Localises to pain	5
	Flexion to pain-withdrawal	4
	Flexion to pain- abnormal	3
	Extension to pain	2
	None	1
Total		15

Table II: The Glasgow Outcome Scale (GOS)

Score	Meaning
5	Good recovery-resumption of normal life despite minor deficits
4	Moderate disability-disabled but independent
3	Severe disability-dependent for daily support
2	Persistent vegetative state
1	Death

Table III: Simpson Grading System for Removal of Meningiomas

Grade	Degree of removal
I	Macroscopically complete removal with excision of dural attachment and abnormal bone
II	Macroscopically complete removal with endothermy coagulation of dural attachment
III	Macroscopically complete removal without resection or coagulation of dural attachment or its extradural extensions
IV	Partial removal leaving tumour in situ
V	Simple decompression/biopsy

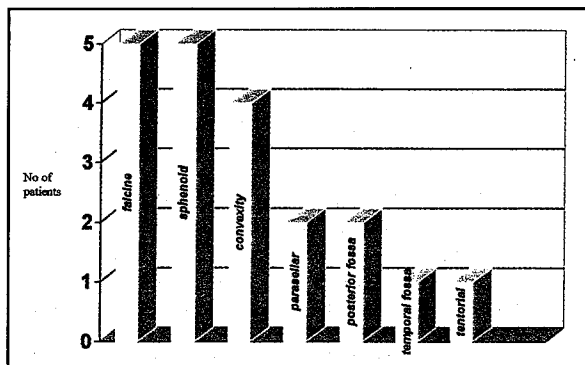


Fig. 1: Location of the Meningiomas

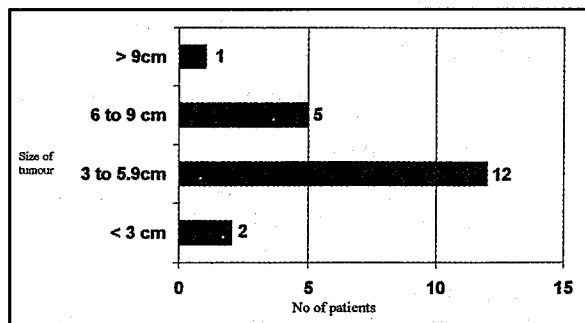


Fig. 2 : The Size of the Meningiomas

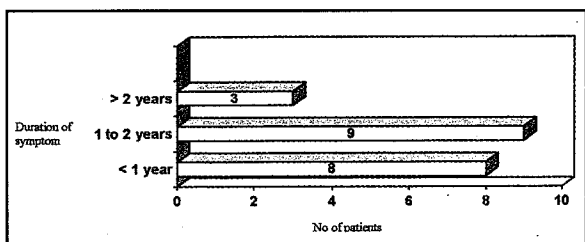


Fig. 3 : Duration of Symptoms

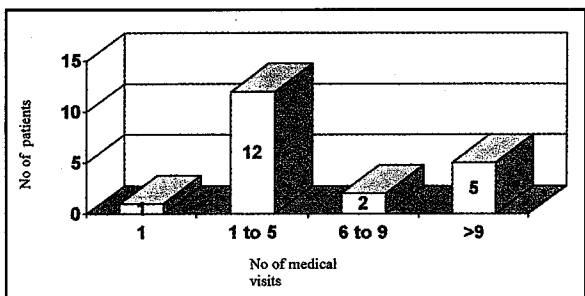


Fig. 4 : Number of Medical Visits made prior to Diagnosis

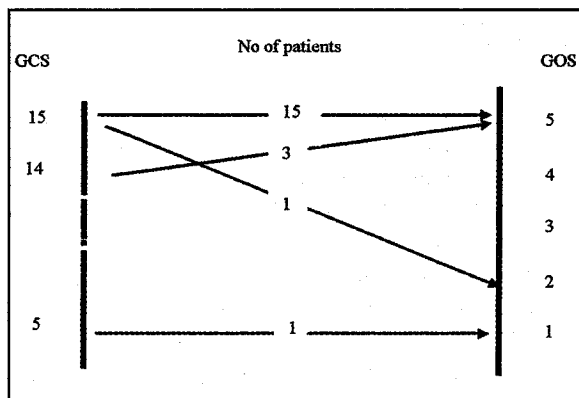


Fig. 5 : The Admission Glasgow Coma Scale (GCS) and Glasgow Outcome Scale (GOS) scores

Conclusion

This study shows that patients who presented to the neurosurgery service here with meningiomas had symptoms for an average of twenty-five months. They needed an average of seven visits prior to the correct diagnosis and treatment. Hopefully an increased awareness of this condition among medical personnel and patients will result in earlier diagnosis. This will lead to earlier diagnosis and hopefully easier treatment. More importantly this gives rise to better outcome with not only longer survival but also a better quality of survival.

Acknowledgements

The authors would like to thank Dr Lee Khoo Siew and Dr Flora Ong of the Sarawak State Health Department, the Surgical Department of Sarawak General Hospital, the Medical Officers who have looked after these patients and the first author's wife Dr Ng Siew Eng for all their support during this time.

References

1. Symon L, Rosentein J. Surgical management of suprasellar meningiomas. The influence of tumour size, duration of symptoms and microsurgery on surgical outcome in 101 consecutive cases. *J Neurosurg* 1984; 61: 633-41.
2. Teesdale G, Jennett B. Assessment of coma and impaired consciousness: A practical Scale. *Lancet* 1974; 2: 81-4.
3. Simpson D. The recurrence of intracranial meningioma after surgical treatment. *J Neurol Neurosurg Psychiatry* 1957; 20: 22-39.
4. Jennett B, Bond M. Assessment of outcome after severe brain damage. A practical scale. *Lancet* 1975; 1: 480-4.
5. Buku Harian Rasmi 2002. Percetakan Nasional Malaysia Berhad, Cawangan Kuching, Sarawak. 11.
6. Glasauer F. Intracranial tumours in Southeast Asia. A review. *Surg Neurol* 1976; 6: 258-60.
7. Chan RC, Thompson GB. Morbidity, mortality and quality of life following surgery for intracranial meningiomas. A retrospective study in 257 cases. *J Neurosurg* 1984; 60: 54-60.
8. Arumugasamy N, Mohandas A. Intracranial space occupying lesions. Incidence and management in Malaysia. Presented at the Symposium on Neurological Sciences in Developing Countries. March 29-April 1, 1975, Kuala Lumpur, Malaysia.
9. Symon L, Rosentein J. Surgical management of suprasellar meningiomas. The influence of tumour size, duration of symptoms and microsurgery on surgical outcome in 101 consecutive cases. *J Neurosurg* 1984; 61: 638-41.
10. Raco A, Bristot R, Domenicucci M, Cantore G. Meningiomas of the tuberculum sellae. *J of Neurosurg Sci* 1999; 43(4): 258-62.
11. Raco A, Bristot R, Domenicucci M, Cantore G. Meningiomas of the tuberculum sellae. *J of Neurosurg Sci* 1999; 43(4): 259-62.
12. Prasad U, Pua KC. Nasopharyngeal carcinoma: A delay in diagnosis. *Med J Malaysia* 2000; 55(2): 230-5.

Appendix I: Protocol for data collection on all new cases of meningioma that were operated on

Name

IC

Sex

Age

Date of admission and discharge

Glasgow Coma Scale at admission

Symptom

Duration of symptom

Neurological deficit

Number of medical visits prior to coming to Sarawak General Hospital

Location of tumour

Size of tumour-the largest diameter in cm measured from CT/MRI scan

Date of operation

Grade of excision

Confirmation via histology that it is meningioma

Glasgow Outcome Scale (at discharge or last follow-up)