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ABSTRACT

Objective: **To report on the incidence of brain tumours in Jos Plateau of Nigeria and to highlight areas of interest regarding diagnosis, management and outcome.**
Design: **A retrospective study.**
Setting: **Jos University Teaching Hospital (JUTH), Jos, Nigeria.**
Subjects: **Thirty patients with brain tumours.**
Interventions: **Specific management of primary lesions was carried out in cases of metastatic brain tumours. Steroids were administered in one case of cerebellar oligodendroma. Craniotomy and excision was achieved in two cases of meningioma and two of sarcoma. Palliative excision was employed in another two cases of meningioma. Two cases each of pituitary adenomas were managed by craniotomy and excision and trans-nasal trans-sphenoidal excision.**
Results: **Brain tumours ranked third in frequency relative to other tumours. The relative frequency of different histological types in percentages were: metastatic (30%), anterior pituitary (21%), meningeal (18%), neuroepithelial (15%) and nerve-sheath (6%). The mean age of presentation was 33 years. The three commonest clinical features in percentages included headaches (43%), cranial masses (39%) and visual defects (26%). Eighty three per cent of the total number of patients died within three weeks to one year irrespective of management modality employed. Two patients who had transnasal excision of pituitary tumours abroad are, however, well and alive at one and two years post-operation respectively.**
Conclusion: **In this study, roentgenograms of the skull had a diagnostic value of 76% for tumours of meningeal origin and pituitary adenomas. CT scan is the mainstay for diagnosis of brain tumours. The outcome was poor with a mortality of 83%.**

INTRODUCTION

Brain tumours are said to be rare in Africa(1). In Britain, primary brain tumours are also relatively uncommon with an incidence of 6 per 100,000 population per year(2). The rarity of brain tumour has raised the problem of missed diagnosis for the patients who are symptomatic with common complaints like headache, but who nevertheless are afflicted with ominous primary brain tumours. Such hapless patients are normally managed symptomatically until the brain tumours progress to the nearly-always fatal stage of conning before the diagnosis of advanced brain tumour is made. Of interest is the fact that many attending physicians are encouraged to relegate the diagnosis of brain tumours to the background because of the absence of computed tomography scan (CT scan) in many areas of the tropics.

Increasingly, patients with primary brain tumours are being found in psychiatric clinics and hospitals where they are being managed for various non-organic brain syndromes without being adequately investigated employing these modern imaging techniques. The problems concerning the diagnosis and treatment of brain tumours are stressed in this study with the objective of reporting the incidence of brain tumours in our own locality and to highlight areas of interest in diagnosis, management and outcome of brain tumours. It is hoped that this study will engender a higher index of suspicion in the diagnosis of brain tumours with resultant appropriate referral to neuro-surgical centres at home and abroad where adequate facilities for proper management are available.

MATERIALS AND METHODS

This was a retrospective study of thirty new cases of brain tumours carried out at the Jos University Teaching Hospital (JUTH) between January 1989 and November 1998. Data were collected from case notes supplemented by information obtained from the JUTH cancer register, autopsy reports and those from neurosurgical centres to which some of the patients were referred abroad. Analysis of cases was made to determine the type of brain tumour, demographic data, clinical features, management and outcome of all the patients with brain tumours who were seen in the hospital during the ten-year period. Patients had been followed up for an average period of three years.

RESULTS

Incidence: The classification and number of new cases of brain tumours seen during the period stated are

shown in Table 1. There was a total of thirty cases of brain tumours with the following histological subtypes recorded as percentages: metastatic (30%), anterior pituitary (21%), meningeal (18%), neuroepithelial (15%) and nerve-sheath (6%). The relative incidence of brain tumours compared to other types of malignant tumours of body organs is indicated in Table 2. Brain tumours along with malignant melanoma ranked third in frequency after thyroid cancers, soft tissue sarcomas and gastrointestinal cancers with a hospital incidence of three versus four and five new cases per year respectively. The mean age at presentation was 33 years with a range of five to 68 years. Male/female sex ratio was 1:1.

Table 1

Classification and incidence of brain tumours: JUTH: 1989 - 1998

Tumour	Histological type	No. of patients (N=30)
Metastatic (30)	Primary adenocarcinoma of the breast	5 (15)
	Follicular carcinoma of the thyroid	3 (9)
	Malignant uterine trophoblastic disease	1 (3)
	Indeterminate	1 (3)
Neuroepithelial tumours (15)	Astrocytomas	4 (12)
	Oligodendromas	1 (3)
Nerve sheaths (6)	Neurofibroma (acoustic)	2 (6)
Meningeal and related tissues (18)	Meningiomas	4 (12)
	Meningeal sarcoma	2 (6)
Anterior pituitary (21)	Chromophobe	5 (15)
	Acidophil	2 (6)

Percentages in brackets

Table 2

Hospital incidence of various tumours in JUTH: 1989 - 1998

Site	Incidence (No/Year)
Breast	2.1
Lungs	0.2
Gastrointestinal	5
Genito-urinary	2.3
Thyroid	4
Soft tissue sarcoma	4
Malignant melanoma	3
Brain	3

Table 3

Clinical presentation of brain tumours; JUTH: 1989 - 1998

Presentation	No. of patients (N=30)
Headache	13 (43)
Mental changes	2 (4)
Seizures	2 (4)
Visual defects	8 (26)
Amenorrhoea	1 (3)
Acromegaly	2 (4)
Facial palsy	2 (4)
Deafness	2 (4)
Ataxia	1 (3)
Skull masses	12 (39)
Pulsating exopthalmos	1 (3)
Increased intracranial pressure features	4 (13)

Some patients presented with more than one symptom

Table 4

Management and outcome of patients with brain tumours; JUTH: 1989-1998

Tumour	Stage	Management	Remarks and outcome
Metastatic (n=10)	IV in 10 cases primary lesion	Specific management of	All died within three to six months
Neuro-epithelial (n=5)	Massive intracranial extension in four cases	No specific treatment	All died within three -12 months
Oligodendroma (cerebellar)	Chronic effect of increased ICP in one case	Steroids	Died within three months
Nerve sheath (n=2)			
Acoustic neurofibroma	Chronic effect of increased ICP in one case	No specific treatment	Died within three years
	Mass effect in one case	No specific treatment	Alive, one year following diagnosis
Meningeal (n=6)	Localised tumour in two	Craniotomy plus excision	One intraoperative death
Meningiomas	Meningioma en plaques with chronic effects increased ICP in two	Palliative decompression	Died within 3 weeks
Sarcoma	Localized in two cases	Craniotomy plus excision	All died within one month post-operation
Anterior pituitary (n=7)			
Chromophobe	Intesellar in two cases	Frontal osteoplastic craniotomy plus excision in one case	Intra-operative death.
		Transnasal excision in one case that was referred abroad	Alive and well at two years after operation
	Estrasellar extension in one case	No specific treatment after diagnosis	Still alive and well 6 months
	Massive intracranial extension in two cases	No specific treatment	All died within one year of diagnosis
Acidophil (n=2)	Intrasellar in two cases	Frontal osteoplastic Craniotomy plus excision	One intra-operative death
		Transnasal excision on referral abroad	Alive and well in the United States one year following operation

Clinical presentation: Headache was the commonest presenting complaint accounting for 43% of the total number of patients with brain tumours (Table 3). Mental changes in the form of dementia and personality changes, were recorded in four per cent of the cases. Seizures of various types were recorded in another four per cent. Visual defects in the form of monocular blindness and hemianopia (26%), amenorrhoea (3%) and acromegaly (4%) included the triad of presentations confined to those patients with anterior pituitary tumours. Lower motor neurone palsy of the VII nerve and sensori-neural deafness were recorded in the two patients with acoustic neuromas. Cerebellar ataxia was recorded in one patient suspected of having had a cerebellar astrocytoma. Metastatic lesions to the brain and skull manifested as multiple cranial masses in 39% while one other patient with metastatic breast cancer presented with right unilateral pulsating exopthalmos. Thirteen per cent of the patients presented with the chronic effects of increased intra-cranial pressure (ICP) including headache, vomiting, bilateral papilloedema and the Foster-Kennedy syndrome in two cases.

Management and outcome: Roentgenograms of the skull were performed in all thirty cases and were of diagnostic value in the ten cases of metastatic brain tumours, six cases of tumours of meningeal origin and seven cases of pituitary tumours; with an overall diagnostic value of 76%. Computed tomography sonograms were obtained in only two cases of acoustic neuroma and frontal lobe diffuse astrocytoma; they yielded information of positive diagnostic and localising value. Specific management of the primary lesions was carried out in cases of metastatic brain tumours (Table 4). Steroids were administered in one case of cerebellar oligodendroma. Craniotomy and excision was achieved in two cases of meningioma and two of meningeal sarcoma. Palliative decompression was employed in another two cases of meningioma. Two cases each of pituitary adenomas were managed by craniotomy and trans-nasal trans-sphenoidal excision. Twenty five of 30 patients (83%) eventually died of brain four tumours within three weeks to one year (Table 4) irrespective of the therapeutic modality employed. The two patients referred abroad with pituitary tumours that were excised transnasally are, however, still alive and well. There were two cases of intra-operative deaths following craniotomy and excision of intrasellar pituitary tumour at our centre and another from a meningioma.

DISCUSSION

Brain tumours are not uncommon in the Jos Plateau as can be seen from the thirty cases that were recorded during a ten-year period. When this is viewed against the background of the incidence of other common malignancies of body organs recorded at our centre, brain tumours, as a whole ranked third in hospital incidence after gastrointestinal cancer, thyroid cancer and soft tissue sarcomas(3,4). The commonest type of cerebral tumour was metastatic which constituted thirty per cent of the total number of cases which compares favourably with figures from other centres(2). Primary brain tumours on the other hand included in decreasing order of frequency anterior pituitary tumours, meningioma and neuro-epithelial tumours. The mean age of presentation for all types of tumours in this series was 33 years with a male to female sex ratio of 1:1.

The clinical presentation of these tumours is more meaningful when viewed in non-specific and topographical backgrounds. A non-specific symptom like a headache was the commonest presenting complaint which aptly reflects the preponderance of pituitary adenomas especially in the stage of intrasellar development. Headache as a symptom of primary brain tumours occurs in 33% of supra-tentorial tumours and in 50% of tumours situated in the posterior fossa(5). Psychiatric manifestations were next in frequency and these included mental and personality changes, apathy and delirium in the patients afflicted. These clinical manifestations are attributable to the chronic effects of increased ICP. Symptomatic seizures in this study were recorded with the same frequency as psychiatric symptoms. Such seizures in the case of slow-growing neuro-epithelial tumours and meningiomas usually occur during the lag phase of tumour growth, although, fast growing gliomas and metastatic tumours usually present with fits as a terminal event.

Topographical considerations dictate that the clinical presentation of brain tumours is determined not only by the rate of growth but also by the site of the tumour. The triad of visual defects like hemianopia and mono-ocular blindness; acromegaly and secondary amenorrhoea was recorded exclusively in patients with pituitary adenomas which are the prototype of mid-line supra-tentorial tumours. Facial palsy of the lower motor neuron type, sensori-neural deafness and cerebellar ataxia were recorded exclusively in extra-axial posterior fossa tumours as exemplified by the two cases of acoustic neuroma. Cerebellar ataxia also results from cerebellar astrocytomas, which was recorded only in one case. Pulsating skull masses were the usual presenting clinical feature of metastatic brain tumour although one case of unilateral pulsating exophthalmos was recorded in a patient with advanced primary breast carcinoma. The chronic effects of raised ICP recorded in thirteen per cent of brain tumours are more usually associated with intra-tentorial tumours. Increased intra-cranial pressure could also represent the terminal event of all brain tumours when it results from sub-tentorial coning and coning through the foramen magnum leading to global cerebral ischaemia (GBI) and respiratory arrest.

Screening tests for cerebral tumours include brain scans, electroencephalography and skull x-rays. Roentgenograms of the skull carried a diagnostic value of 76% for tumours of meningeal origin and pituitary adenomas in this series. It is especially of value in many areas of the tropics where computed tomography scan (CT scan) and magnetic resonance imaging (MRI) are unavailable. Computed tomography scan is the mainstay of diagnosis of brain tumours and when combined with

high-field MRI or Gadolinium contrast enhanced imaging, they give a high positive yield of about 95%(6). Angiography is usually reserved for diagnosis of brain tumours in the absence of CT scan or MRI and when the vascular supply of a suitably placed tumour needs delineation for pre-operative embolisation. A histological diagnosis of brain tumour is usually possible following intra-operative open biopsy. In case of inoperable lesions, however, the risk of open biopsy must be weighed against the risk of misdiagnosis of other space-occupying lesions(7). This has been circumvented by CT-guided steriotactic methods which have reduced mortality figures to less than one per cent(8).

The general management of metastatic brain tumours is that of the primary lesion since these patients present with multiple lesions and widely disseminated disease. Dexamethasone is used to control raised ICP and to reverse or improve neurological deficits that resulted from the presence of brain tumour. Surgical palliative decompression could be used as an alternative to steroids. Craniotomy and radical excision is only curative in benign localised pilocytic astrocytomas of childhood, meningiomas and pituitary adenomas(9). We have tried such radical excisions with meningiomas and pituitary adenomas with little success. Currently, a trans-nasal, trans-sphenoidal excision of pituitary adenomas employing micro-surgical techniques is recommended for those in the stage of intrasellar development. Fronto-tempero-basal craniotomy with excision of the remaining tumour may be added in those with suprasellar extension. These operations have been uniformly successful among those patients with pituitary adenomas that were referred abroad for treatment from our centre.

Finally, the outcome of the management of brain tumours was disappointing with a distressing mortality of 83%. For all histological types of tumour, however, the prognosis is determined by the grade, age and performance status of patients. Without treatment, death could be expected to occur in one to two months in patients with advanced brain tumours. Most patients with pituitary adenomas with suprasellar extension might be expected to die within nine to twelve months. Such prognosis in terms of the intense physical and mental anguish for patients calls for guarded pronouncements on the part of attending surgeons since clinical evidence alone is of limited value in predicting the natural history of brain tumours.

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