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Arthur S. Tucker

Bisamai Aramsri

W.James Gardner

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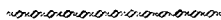
* SPINAL TUMORS: A SEVEN-YEAR STUDY

By

** Arthur S. Tucker, M.D.

*** Bisamai Aramsri, M.D. and

**** W. James Gardner, M.D.



Primary spinal tumors originate predominantly from nervous tissue and its investments. Whereas in the intracranial cavity tumors originate much more frequently from the brain than from the meninges and nerve roots, in the spinal canal this ratio is reversed. Apparently this is because the amount of nerve tissue within the brain is much higher in proportion to the nerve roots and meninges than is the case in the spinal cord. In other words, the occurrence of gliomas, neurofibromas, and meningiomas within the cranium and spinal canal is roughly proportional to the relative volumes of the tissues which give rise to these commonest of the tumors of the central nervous system. Adson¹ reports that spinal tumors arising in the meninges, nerve roots, blood vessels, and supporting tissues outnumber tumors arising within the spinal cord 4 to 1.

MATERIAL

Primary spinal tumors were found in 96 patients seen in the Cleveland Clinic during the seven years, 1949 to 1955 inclusive. To this experience has been added 71 tumors of the spinal cord previously seen at the Cleveland Clinic and reported in 1949 by Hannan, Hughes, and Mulvey⁵. Operations were performed on 165 of the 167 total tumors. Histologic identification was obtained in 162 cases of these; the other three were intramedullary tumors, in which the surgeon hesitated to perform an adequate biopsy for fear of increasing the patient's neurological deficit. Biopsy of one of these was reported by the pathologist as "tissue insufficient for diagnosis," another as merely "hyaline fibrous tissue." In the third no biopsy was attempted. All three were considered grossly to be gliomas.

Our findings have been carefully compared with reports made by other authors. We are indebted particularly to Rasmussen, Kernohan, and Adson⁷, who reported the largest series in the literature. They gave a very careful account of 557 histologically verified neoplasms of the spine. At the same time they found another 64 intramedullary lesions which were not identified by biopsy, and which they consider to be "presumably tumors or cysts of the spinal cord."

The classification in our series, as well as that given by Hannan, Hughes, and Mulvey⁵, is given in Table I. Neurofibromas were the commonest tumor, with meningioma a close second. Two of our tumors listed as neurofibroma are unverified, however. Although the clinical signs and roentgenographic picture (including, in one instance, a myelogram) were typical, the two patients refused surgical treatment.

The present study differs from that of Hannan, Hughes, and Mulvey, in that it includes a number of tumors which have their origin outside the spinal canal. These chordomas and bone tumors have been added because by pressure upon the spinal cord or its nerves they produce symptoms indistinguishable from those caused by tumors originating within the spinal canal. The cases listed as sarcoma or lymphoma would ordinarily be classed as metastatic tumors, but in each of these instances no primary source elsewhere in the body could be identified, and all acted like primary tumors affecting the cord.

*From the Departments of Radiology and Neurosurgery, the Cleveland Clinic Foundation, and the Frank C. Bunts Educational Institute, Cleveland, Ohio.

** Radiologist in Cleveland clinic.

*** Fellow in Radiological Department of Cleveland clinic.

บัดนี้กลับมาเป็นอาจารย์ในแผนกรังสีวิทยา ร.พ. จุฬาลงกรณ์ แล้ว.

**** Professor & Head Department of Neurosurgery of Cleveland clinic.

DISTRIBUTION OF TUMORS

Approximately half the spinal tumors were found in the thoracic region, which of course constitutes the longest portion of the spinal column. Table II shows the distribution in our series and in those of several other authors, all of whom show even higher preponderances of thoracic lesions.

A breakdown showing the distributions of the commonest intraspinal tumors is also given. Although the incidence of all except ependymomas is highest in the thoracic region, the outstanding incidence here is that of meningiomas. We found 84 per cent of our meningiomas in the thoracic spine. Rasmussen, Kernohan, and Adson⁷ reported 82 per cent of their 140 meningiomas were thoracic; Bull² 92 per cent of 59; and Horrax, Poppen, Wu, and Weadon⁶ 70 per cent of 24. We have been impressed by this universally-reported overwhelming preponderance of occurrence of meningiomas in the thoracic portion of the spinal cord. We do not know the exact reason, but it may be that the multiple connections and attachments which occur between pia and arachnoid over the cervical and thoracic portions of the spinal cord constitute a predisposing factor. In the lumbar spine, by contrast, the pia and arachnoid are generally completely separated, and here meningiomas occur but rarely. In the sacral portion of the spinal canal they apparently are not seen at all.

The locations of the tumors relative to the spinal cord are given in Table III. A total of 61 per cent of the tumors were intradural but extramedullary—which is the same percentage reported by Rasmussen, Kernohan, and Adson. The great majority of neurofibromas and, especially, meningiomas, fell into this category. Except for ependymomas, all gliomas were intramedullary.

The percentage distribution of the tumors in our series, as well as in that of Rasmussen, Kernohan, and Adson, is given in Table IV.

AGE AND SEX

The youngest patient in our series was a boy of six years with fatty tumor associated with a conge-

nital incomplete formation of the sacrum. The oldest patient was a man of 87 with a neurofibroma at T—12.

Bull² reported a significant difference in the age distribution of neurofibromas and meningiomas. Although he found considerable overlap of ages, the average age of his 52 neurofibroma patients was 38, of his 59 meningioma patients was 50. A similar difference, although not so striking, occurred in our series. The peak incidence for both meningiomas and neurofibromas was in the sixth decade. (See Table V.) Ependymomas and other gliomas, it will be noted, tended to occur a little younger.

In previous studies of spinal neoplasms there have been more female than male patients. Such is the case in our series also (Table VI). The sex difference is due apparently entirely to the fact that women are more prone to develop meningiomas. Horrax, Poppen, Wu, and Weadon⁶ reported twice as many female as male patients among the 61 neurofibromas and meningiomas they collected in a 14-year period, but did not mention a difference in sex incidence between the two tumors. Bull² reported no marked sex difference among 52 neurofibroma patients, but an 85 per cent female preponderance among 59 patients with meningiomas. In like manner, we have an almost equal sex incidence among our 25 patients with proven neurofibromas, but 80 per cent of our meningioma patients were female.

SUMMARY

1. Spinal tumors were encountered in 96 patients. By adding our study to a previous one made at the Cleveland Clinic by Hannan, Hughes, and Mulvey, we have obtained a series of 167 tumors for comparison with other studies.

2. Almost half of the tumors were in the thoracic spine. Five out of six meningiomas were thoracic; none were found in the sacrum.

3. Sixty-one per cent of the tumors were intradural but extramedullary.

4. Neurofibroma was the commonest spinal tumor, followed by meningioma. Each of these tumors is responsible for approximately one fourth of all spinal tumors.

5. Neurofibromas and meningiomas both had their peak incidence between 50 and 60 years.

Ependymomas and other gliomas tended to occur earlier.

6. The sex difference was not significant except for meningiomas, where four out of five occurred in females.

Table I. HISTOLOGIC CLASSIFICATION

	Present Series	Hannan et al	Cleveland Clinic
Neurofibroma	27	30	57
Meningioma	25	22	47
Ependymoma	5	10	15
Glioma	10	6	16
Cyst	2		2
Mixed (Teratoma)	3	2	5
Lipoma	1		1
Vascular	$\frac{3}{76}$	$\frac{1}{71}$	$\frac{4}{174}$
Chordoma	6		
Giant cell tumor	1		
Aneurysmal bone cyst	1		
Sarcoma	4		
Lymphoma	$\frac{8}{96}$		

Table II. ANATOMIC DISTRIBUTION

	Cervical	Thoracic	Lumbar	Sacrum	Total
Present series	21	52	19	4	96
Neurofibroma	5	14	8		
Meningioma	3	21	1		
Ependymoma	2	1	2		
Glioma	5	4	1		
Hannan, Hughes, and Mulvey	16	29	25	1	71
Cleveland Clinic	37 (22%)	81 (48%)	44 (26%)	5 (3%)	167
Rasmussen, Kernohan, and Adson	100 (18%)	304 (54%)	117 (21%)	35 (7%)	556
Grant	24 (22%)	70 (65%)	6 (6%) Cauda	8 (8%)	108
Horrax, Poppen, Wu, and Weadon	12 (20%)	35 (57%)	14 (23%)		61

Table III. LOCATION IN SPINE

	Extradural	Intradural	Intramedullary	Total
Present series	31	53	11	96
Neurofibroma	5	20		
Meningioma	3	22		
Ependymoma		4	1	
Glioma			10	
Hannan et al	11	48	12	71
Cleveland Clinic	43 (26%)	101 (61%)	23 (14%)	167
Rasmussen et al	196 (36%)	339 (61%)	128 (22%)	663

Table IV. PERCENTAGE DISTRIBUTION

	Present Series	Rasmussen et al
Neurofibroma	27 (28%)	163 (26%)
Meningioma	25 (26%)	140 (23%)
Ependymoma	5 (5%)	Intramedullary 160 (26%)
Glioma	10 (10%)	
Cyst	2 (2%)	
Mixed (Teratoma)	3 (3%)	Miscellaneous 33 (5%)
Lipoma	1 (1%)	
Vascular	3 (3%)	47 (8%)
Chordoma	6 (6%)	23 (4%)
Giant cell tumor	1 (1%)	
Aneurysmal bone cyst	1 (1%)	
Sarcoma	4 (4%)	55 621 (9%)
	8	
Lymphoma	96 (8%)	

Table V. AGE DISTRIBUTION FOR SELECTED TUMORS

Years	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Neurofibroma			3	7	1	9	6		1
Meningioma				2	3	11	3	6	
Ependymoma			1	2		2			
Glioma	1	2	2	2	1	1			

Table VI. SEX

	♂	♀	Total
Hannan et al	27	41	68
Present series	43	53	96
Neurofibroma	13	12	25
Meningioma	5	20	25

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Urticaria

Of what significance is such basic vascular physiology? Is one clinically confronted with such redness and whealing of acetylcholine origin as well as of histamine origin? If so, how can one differentiate them, and how can they be treated?

Urticaria produced by histamine release—the so-called histamine urticaria, for example—is seen in true allergy, in serum-sickness reactions to drugs like penicillin, as a secondary effect of systemic disease such as the malignant lymphomas and on a functional basis.

These lesions can be recognized by the fact that the whealing component is quite large in relation to the small axon-reflex flare or redness around the wheal. Sometimes, the itching that is present is not too severe.

On the other hand, urticaria developed via the acetylcholine mechanism (the so-called cholinergic urticaria) has minute papular wheals, sometimes not more than 1 or 2 mm. in diameter. The ratio of wheal to flare is just the reverse of that seen in histaminic urticaria. The cholinergic urticaria flare is striking, producing a large area of redness around the minute hive in the center. The itching associated with such cholinergic urticaria is quite severe. It is interesting that to date only two major etiologic mechanisms are recognized as responsible for cholinergic urticaria. They are seen in true physical allergy produced by heat and, commonly, as emotional urticaria.

From the therapeutic standpoint it is essential to differentiate these two mechanisms. An antihistamine is not the drug of choice in the treatment of cholinergic urticaria. And, by the same token, cholinergic blocking agents, such as atropine-like drugs, are of no value in the treatment of histaminic urticaria.

Walter c. Lobitz Jr.

“Some physiologic Aspects of dermatologic problem.”