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Original Research Article

The Histopathological Spectrum of Spinal Nerve Root Lesions

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ABSTRACT

Introduction- The diversity and complexity of anatomic structures located in the spinal region poses a great challenge to both the neuro-clinicians and neuropathologists displaying a wide heterogeneous spectrum of pathological lesions. The objective was to study the spinal nerve root lesions with reference to age groups, gender, anatomical location, the histopathological features with the clinico-radio- pathological correlation.

Methods – This study is a retrospective and prospective analysis of spinal nerve root lesions diagnosed in the Neuropathology section over span of 10 years at a tertiary care and referral hospital. A total of 241 cases of spinal lesions were received during the study period out of which 80 cases of spinal nerve root lesions were reported. The clinical, radiological and therapeutic data was obtained from patients' original case paper records and the lesions were analyzed according to their age, sex, duration, clinical signs and symptoms and distribution. All cases were analyzed by examining Hematoxylin and Eosin stained slides by light microscopy with use of special stains if needed.

Results – Male predominance was seen in spinal nerve root lesions and 3rd and 4th decade age group was most commonly affected. These lesions were common in cervical region followed by thoracic region. Neoplastic lesions of spinal nerve roots were more frequently encountered than nonneoplastic lesions. Schwannoma (75%) was commonest among spinal nerve root lesions followed by Neurofibroma (22.50%).

Conclusion – In our study, Schwannoma (75%) was commonest among spinal nerve root lesions followed by Neurofibroma (22.50%). The combination of clinical, radiological, and histopathological features forms the basis of the multi-disciplinary diagnostic approach towards spinal nerve root lesions.

Keywords: Spinal lesions, spinal nerve root, neoplastic, non-neoplastic.

INTRODUCTION

The diversity and complexity of anatomic structures located in the spinal region poses a great challenge to both the neuro-clinicians and neuropathologists displaying a wide heterogeneous spectrum of pathological lesions. Spinal lesions are rare and form a small part of the central nervous system lesions. Spinal lesions pertain to tissues of the spine and epidural space which comprises of spinal meninges, spinal nerve roots and spinal cord. These lesions can involve any spinal level but more commonly affect thoracic region. The objective was to study the spinal nerve root lesions with reference to age groups, gender, anatomical location, the histopathological features with the clinico- radio- pathological correlation. Among the spinal nerve root lesions, intradural extramedullary lesions

schwannomas are frequently encountered lesions derived from the cells covering the nerve roots.

MATERIALS & METHODS

This study is a retrospective and prospective analysis of spinal nerve root lesions diagnosed in the Neuropathology section over span of 10 years at a tertiary care and referral hospital. A total of 241 cases of spinal lesions were received during the study period out of which 80 cases of spinal nerve root lesions were reported. The clinical, radiological and therapeutic data was obtained from patients' original case paper records and the lesions were analyzed according to their age, sex, duration, clinical signs and symptoms and distribution. Primary vertebral tumors and paraspinal soft tissue lesions were excluded. The biopsy and surgical resection specimen received were fixed overnight in 10% buffered formalin and submitted for processing. Gross examination of the specimen in relation to the size, color, consistency, cystic or hemorrhagic areas was noted. Paraffin sections were cut at 4-6 microns thickness and routine hematoxylin and eosin for light microscopy was performed. Special stains like PAS, Reticulin etc. were performed whenever necessary. The data was entered and analyzed while qualitative data was summarized as percentage and proportions.

RESULTS

Table 1: SHOWING AGE AND SEX DISTRIBUTION OF LESIONS OF SPINAL NERVE ROOTS.

Lesions Of Nerve Roots	Age In Years								Sex		
	00-10	11-20.	21-30	31-40	41-50	51-60	61-70	71-80	Male	Female	Total
SCHWANNOMA	0	4	14	18	11	9	3	1	41	19	60
NEUROFIBROMA	1	4	3	6	1	2	1	0	10	8	18

Table 2: SHOWING LEVEL AND LOCATION OF LESIONS OF SPINAL NERVE ROOTS.

Lesions of nerve roots	Spinal level					Location		
	Cerv	Cerv-thor	Thor	Thor-lumbar	Lumbo-sacral	Extra Dural	Extra Medullary	Intra Medullary
SCHWANNOMA	22	2	20	5	11	5	52	3
NEUROFIBROMA	6	0	6	1	5	7	8	3

Table 3: SHOWING LESIONS OF THE SPINAL NERVE ROOTS.

	Number of cases	Percentage
A.NEOPLASTIC (78)		
.SCHWANNOMA	60	75 %
.NEUROFIBROMA	18	22.50 %
B.NON-NEOPLASTIC		
NERVE BUNDLES	02	2.50 %
TOTAL	80	100 %

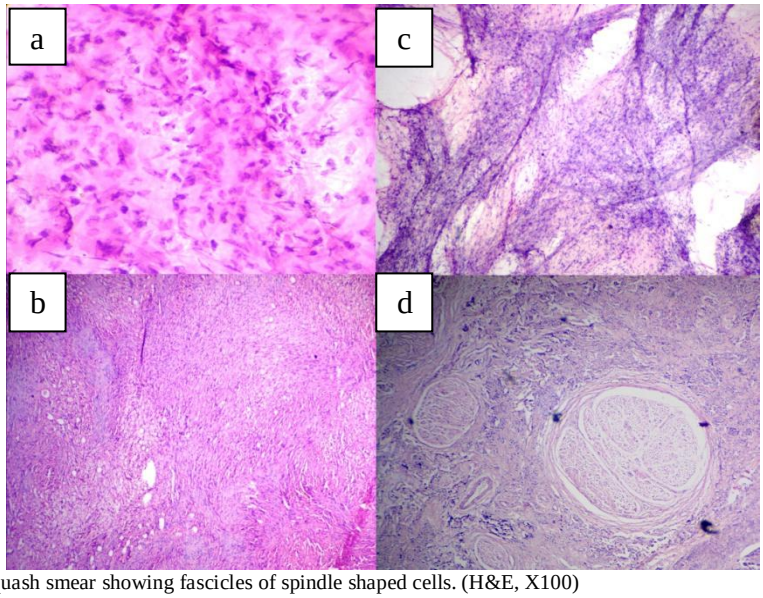

Fig 1 a: Schwannoma- squash smear showing fascicles of spindle shaped cells. (H&E, X100)

Fig 1 b: Schwannoma-biphasic pattern with cellular Antoni A and hypo cellular Antoni B areas. (H&E, X 40)
Fig 1 c: Neurofibroma- squash smear shows spindle shaped cells arranged in bundles (H&E, X 40)
Fig 1 d: Neurofibroma- fascicles of spindle cells and stromal collagen formation with bundled nerve fibers at centre (H&E, X100)

Male predominance was seen in spinal nerve root lesions and 3rd and 4th decade age group was most commonly affected (Table 1). These lesions were common in cervical region followed by thoracic region (Table 2). Neoplastic lesions of spinal nerve roots were more frequently encountered than non-neoplastic lesions. Schwannoma (75%) was commonest among spinal nerve root lesions followed by Neurofibroma (22.50 %) (Table 3).

DISCUSSION

Amongst the spinal nerve root lesions, schwannoma 60 (75 %) (Fig 1 a and b) was the commonest tumor. They accounted for 24.89 % of all spinal tumors in our study. This was concordant with the studies of Jeon et al, [1] Engelhard et al, [2] Celli et al, [3] Dorsi et al [4] and Seppala et al [5] who found that incidence of schwannoma ranges from 21% to 25 %.

71.66 % of schwannomas were seen in age group 21-50 years with male preponderance with M: F ratio 2.15:1. Findings in our study correlated well with studies of Abbasi et al[6] and Ruberti et al [7] who observed incidence of schwannoma was 61 % to 87.5 % in third to fifth decades with male predominance. Schwannomas were located equally in cervical (36.60 %) and thoracic (33 %) region. Similar was observation of Abbasi et al [6] and Ruberti et al [7] who documented cervical region was commonest site in 28 % to 50 % and thoracic region in 26 % to 40 %.

Intradural extramedullary compartment showed 86 % of schwannomas. The documented studies of Abbasi et al [6] and Jeon et al [8] observed intradural extramedullary location of schwannoma in 68 % and 95 % of cases respectively.

18 cases of neurofibromas (Fig 1 c and d) occurring as nerve root lesions accounted for 10.28 % of the total spinal tumors. Mwang'ombe et al [9] noted an incidence of neurofibromas about 15.8 % which was correlated with our study, however together with schwannomas they predominate in various studies. Neurofibromas were seen in 11-40 years of age and M: F ratio was 1:0.8. They were equally distributed in cervical (33 %), thoracic (33 %) and lumbar (27 %) region. Neurofibromas were seen in intradural as well as extradural compartment. Our findings correlated well with study of Traul et al [10] and Seppala et al [11] who noted equal gender incidence and equal spinal distribution of neurofibromas.

2 cases showed only unremarkable nerve bundles, hence no opinion was possible.

CONCLUSION

In our study, Schwannoma (75 %) was commonest among spinal nerve root lesions followed by Neurofibroma (22.50 %). The combination of clinical, radiological, and histopathological features forms the basis of the multi-disciplinary diagnostic approach towards spinal nerve root lesions.

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