

THE IMPACT OF MAGNETIC RESONANCE IMAGING ON THE MANAGEMENT OF SPINAL CORD TUMORS

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1. Summary

The impact of MRI on neurosurgical and radiation therapy planning was investigated in 27 patients presenting with spinal cord tumors. In 16 of 27 patients MRI information led to a change in the therapy plan.

2. Introduction

The diagnostic impact of MRI in the evaluation of the spine and spinal cord has steadily increased as the technology has refined. The usage of multislice and multiecho techniques, the application of surface coils and zooming techniques at moderate and high field strength has made significant contribution to MRI of the spinal cord (3).

The results of recent studies (1,2) demonstrate important diagnostic implications especially with respect to such entities as intramedullary cystic and neoplastic changes as well as extramedullary expanding lesions. It is suggested from many reports, that MRI provide diagnostic information beyond that from CT regarding to tumor presence, type and extent.

The experiences of MRI regarding to the therapeutic impact are scarce. Therefore we investigated the impact of the additional MR-generated information on the planning of therapy, f.e. on the neurosurgical intervention and radiation therapy planning. The aim of this paper is to evaluate the therapeutic importance of MRI in neurological patients presenting with various spinal cord syndroms.

3. Material and method

Between August 1983 and December 1985 27 selected patients with various spinal cord disease were examined. All patients underwent a complete neurodiagnostic examination before MRI was performed.

18 patients were examined with a Picker 0.15 tesla system, 9 patients by Siemens 0,5 tesla system respectively. In all cases T1 and T2 weighted SE sequences have been used. Sagittal and axial sclicing was preferred. First, a neurologist, a neuroradiologist and a neurosurgeon as well as a radiotherapist discussed the therapeutic management of the patients without MR information and gave the proposals to therapy by written. Then, the MR-generated information has been given additionally and the final descision of patients treatment has been made. The differences between these two therapeutic regimes as well as the neurosurgical advantages received by MRI information are analyzed.

4. Results

MRI and the preceeded examinations revealed following results (table 1). 10 patients was found to have intramedullary tumor. 8 of them surgi- cally and histologically proven (4 glioma, 3 ependymoma, 3 haemangioma). In 17 patients extradural/extramedullary mass lesions were visualized: 5 neurofibroma, 4 meningeoma, 1 lipoma, 4 metastasis, 1 chordoma and 2 neuroblastoma.

Table 2 demonstrate the therapeutical decision by the physician team before achieving MR information, no surgery was recommended in 5 cases surgical exploration in 6 cases, radiation therapy was proposed in one patient and 15 patients should be operated on. In view of the MRI findings there was a shift to surgical excision (15 to 22) as well as a shift to radiation therapy. Surgical exploration decreased 6 to 2 and a least no surgery was performed in 3 patients.

5. Discussion

At present MRI of the spinal cord is a superior diagnostic approach for several reasons. MRI provides direct visualization of spinal cord in multiplanar slices, MRI reveals the exact craniocaudal extension in sagittal plane. MRI differentiate cystic cavities from tumor mass as well as sourrounding edema. MRI enables to distinct intramedullary and extramedullary tumors. MR shows a mass lesion or spinal canal blockage, whether from an intra- or extradural process accurately

and obviates contrast studies above and below the level of the mass lesion. These informations given by MRI are even needed for the neurosurgical excision of a mass lesion. The neurosurgeon has to be informed preoperatively on the exact craniocaudal extension of the tumor, on the connection to the surrounding tissue, on the delineation to the adjacent tissue to a tumor and on the intramedullary extension as well as on tissue characterization.

Reasons cited by the neurosurgeon for the relatively high impact rate include identification of previously unappreciated tumor volume and more precise delineation of tumor margin with MRI. Changes to neurosurgery resulting from MRI concerned the indication for operation, the operative approach, complete or partial removal of the tumor mass, which implicates the aggressiveness of excision and the estimation of surgical possibilities. In few cases MR did not show significant impact because of technical factors or incomplete study techniques.

References

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Tab. 1: SPINAL CORD TUMORS IN 27 PATIENTS

| INTRAMEDULLAR TUMORS | EXTRAMEDULLARY TUMORS | |
|----------------------|-----------------------|----------|
| 4 GLIOMA | 5 NEUROFIBROMA | LYMPHOMA |
| 3 EPENDYMOMA | 4 MENINGEOMA | LIPOMA |
| 3 HAEMANGIOMA | 4 METASTASES | |
| | 2 NEUROBLASTOMA | |

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