Stereotactic Biopsy of Brain Tumours

Pages with reference to book, From 176 To 178

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Abstract

Computerized tomography assisted Stereotactic biopsy technique using Leksell stereotactic frame was performed on 27 patients with small, multiple and deep seated brain turnout's. There were 19 men and 8 women with an age range from 17 to 65 years. Histological diagnosis of 18 glial tumours, 9 non-glial turnout's (5 colloid cysts, 4 metastatic lesions) was obtained. There was no mortality and minimal morbidity of 3.7%, histological diagnosis provided the information regarding differentiation from infectious and vascular lesions and grading of malignancy leading to logical guidance for therapeutic management of each lesion, confirming the value of stereotactic biopsy in brain tumours (JPMA 46:176, 1996).

Introduction

Stereotactic brain biopsy using computerized tomography (CT) assisted imaging technique provides a method of obtaining tissue for pathological diagnosis under local anaesthesia without an open craniotomy. Modem stereotactic surgery has reduced the high mortality rate formerly associated with open or free hand needle biopsy technique[1,2]. Stereotactic biopsy has a high accuracy rate and decides the course of clinical management[3]. In this study, we retrospectively review the location, histological findings, mortality and morbidity associated with stereotactic biopsy ofbrain tumours and its clinical implications in management.

Patients and Methods

Twenty-seven patients underwent stereotactic biopsy procedures between November, 1994 to February, 1996 for 177brain tumours diagnosed on computed tomography (CT) and then confirmed on histological report. Leksell stereotactic system compatible with Siemens Somatom DR CT scanner was used. Indications for application of technique were small, deep or multiple intrinsic intracranial lesions. There were 19 men and 8 women between 17 and 65 years of age (mean 37.5 years). Histological diagnosis for glial tumours was made according to Kernohan's grading system. In order to take stereotactic biopsy, coordinate base of Leksell frame was placed on all patients under local anaesthesia in the operation theatre. Then patients were shifted to CT scan room where contrastenhanced CT scanwas obtained. A targetpointwithin the lesion was selected by computer of CT scanner calculatedvalues of X, Y and Z coordinate (Figure 1).

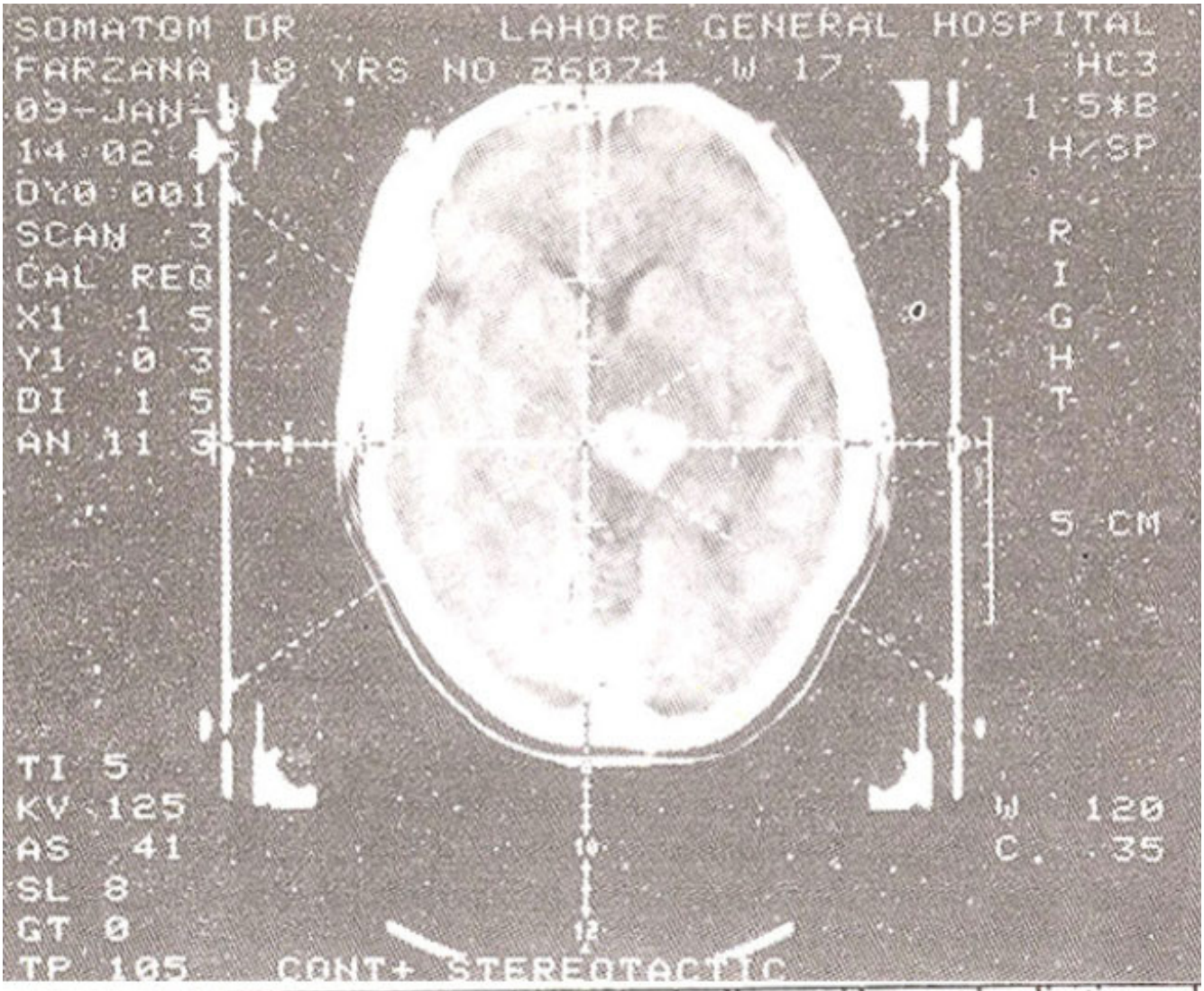

Figure 1. Axial CT scan showing right thalamic glioma with target localization and calculation of coordinates.

The patients were then brought back to operating room where a semicircular arc was mounted on the coordinate base of Leksell frame and coordinates were fixed according to the values. A burr hole was placed at the entry point under local anaesthesia such that probe trajectory avoided eloquent areas and vascular structures. Biopsy was taken from two Sites, centre and peripheral edge of the lesion, using a 2mm biopsy forceps (Figure 2).

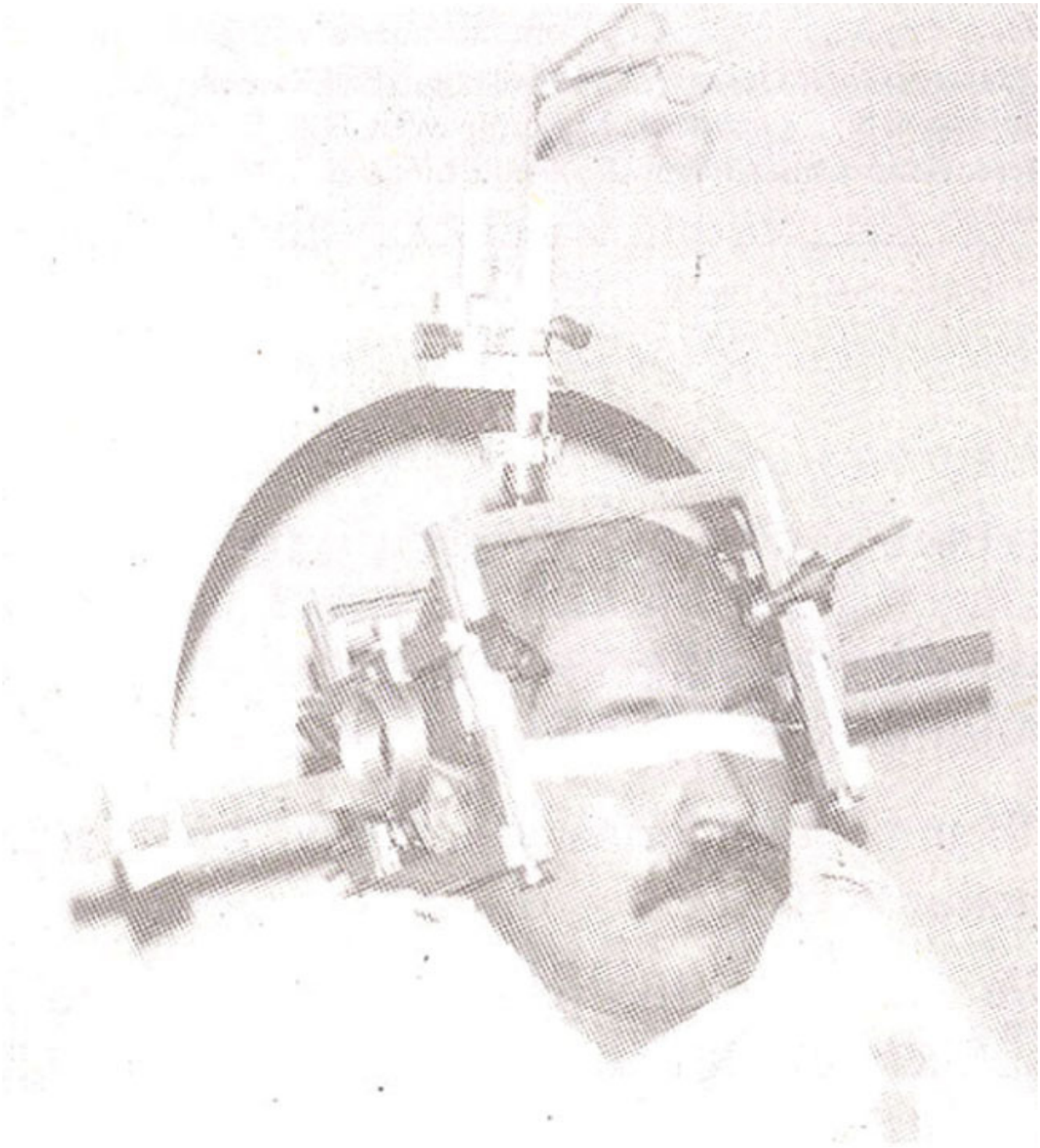

Figure 2. Leksell stereotactic frame application.

Results

Twenty-seven patients underwent stereotactic biopsy for brain tumours. Location of lesions are shown

in Table I.

Table I. Location of brain tumours (n=27).

Site	No. of patients
Frontal	5
Parietal	6
Temporal	2
Occipital	1
Lateral ventricle	2
Third ventricle	5
Pineal region	1
Pons	3
Cerebellum	2

Twenty-two biopsies were from supratentorial region and 5 infratentorial. Histological diagnosis of the 18 glial tumours and 9 non-glial tumours was obtained as shown in Table II.

Table II. Histological findings in Stereotactic biopsy of brain tumours (n=27).

Histological type	No. of lesions
Glial tumours	18
Astrocytoma	
Grade IV	6
Grade III	4
Grade II	3
Grade I	2
Oligodendroglioma	2
Mixed glioma	1
Non-glial tumours	9
Colloid cyst	5
Metastatic	4

High grade (III and IV) astrocytorna was the commonest lesion diagnosed.There was no mortality and minimal morbidity in 1 patient (3.7%) of right thalamic glioma with deterioration of left sided weakness which improved after 72 hours. On the basis of histological diagnosis, these tumours were differentiated from infectious (tuberculoma, abscess) and vascular lesions (infarction) benign from malignant tumours. Categorization and grading of glial tumours was known. All this information lead to a correct and definite course of therapeutic management of each lesion safely and accurately.

Discussion

Stereotactic brain biopsy has greatly improved the neurosurgeon's ability to obtain tissue from lesions with little risk to patient even when the lesion is located deep in cerebral hemispheres orposteriorfossa. The calculation of coordinates is accurate to 1 mm margin. In studies of Apuzzo et al, pathological diagnosis is in excess of 90% which compares with our study[4]. In stereotactic biopsy specimen despite, its small size, provides more representative material from a lesion than open biopsy specimen in which tissue is obtained without radiological guidance[5]. The enhancing periphery of a lesion has the 91% diagnostic yield as compared to 67% in central necrotic areas[6].

Neurosurgeons continue to refer patients with deeply seated intracranial lesions for radiation and chemotherapy where diagnosis is inferred from CT scanning. With CT compatible stereotactic system histological nature of suspicious lesion can be determined safely and accurately. Biopsy procedures are associated with few complications including haemorrhage, seizure, local infections and traumatic aneurysms[7].

Mortality and morbidity for stereotactic procedure is low and reported 1-4%[8,9]. In our study we had no mortality and morbidity of 3.7%. In conclusion, this study confirms the value of stereotactic biopsy in diagnosis and rational decision making in management of small multiple and deep seated brain tumours.

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