Benefit and Complications of Frame-Based Stereotactic Biopsy in Old and Very Old Patients

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OBJECTIVE: **Stereotactic biopsy is an everyday procedure implemented in numerous neurosurgical departments. The procedure is performed to obtain tumor tissue of unclear diagnosis. Going in hand with low complication rates and high diagnostic yield, stereotactic biopsies can be performed in adults and children likewise for histopathologic evaluation of lesions in eloquent localizations.**

However, little is known about whether aged patients do benefit from stereotactic biopsy or rather the therapy that is derived from histopathologic results. In this study, we therefore focused on old (80–84 years) and very old patients (85 years and older) to evaluate whether stereotactic biopsy should be performed leading to further therapy. We also assessed the complication rates of the procedure in this aged population.

METHODS: **We performed a retrospective analysis of our database and included all patients older than 80 years who underwent stereotactic biopsy at our department from October 2005 until May 2016.**

Forty-seven patients were included in this study. These patients were divided into 2 subgroups: group 1 consisted of patients from 80 to 84 years old and group 2 of patients aged 85 years and older. All patients underwent stereotactic biopsy to establish histopathologic diagnosis. We excluded patients who underwent cyst puncture or puncture of a hemorrhage because the procedure was not performed for diagnostic purposes.

We assessed gender, neuroradiologic diagnosis, Karnofsky Performance Score (KPS), number of tissue samples taken, histopathologic diagnosis, localization, postoperative hemorrhage, modality of anesthesia anticoagulation, and further therapy.

RESULTS: **Group 1 consisted of 34 patients and group 2 of 13 patients. KPS was 80 and 70, respectively. A histopathologic diagnosis was possible in all but 1 patient. In group 1, 61.8% of the patients agreed to further postoperative therapy (radiation, 35.3%; chemotherapy, 11.8%; combined radiochemotherapy, 11.8%; complication that prevented therapy, 2.9%), as did 53.8% of the patients in group 2 (resection, 7.7%; radiation, 15.4%; combined radiochemotherapy, 30.7%). In group 1, 38.2% declined further therapy, as did 64.1% in group 2.**

CONCLUSIONS: **Also in old and very old patients, a final histopathologic diagnosis should be established to provide adequate therapy. Our data show that most of these aged patients want to be treated.**

INTRODUCTION

Stereotactic biopsy is a safe procedure, performed at numerous neurosurgical departments. Patients undergo the procedure to obtain tumor tissue of unknown entities. Surgery can be performed either under local or general anesthesia[1] and biopsies can be taken frame guided or frameless. In addition, recently biopsies can also be taken robot assisted.[2]

Biopsies of cerebral lesions have been shown to have a high diagnostic yield combined with low complication rates in eloquent and deep-seated lesions, which are difficult to reach by open

Key words
- Benefit of stereotactic biopsy
- Brain lesion
- Complications of stedreotaxtix biopsy
- Frame-based stereotactic biopsy
- Old patients

Abbreviations and Acronyms
CT: Computed tomography
GMB: Glioblastoma
KPS: Karnofsky Performance Score

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surgery. The tissue probes obtained are the basis of not only histopathologic examination but also molecular analysis.[3] Therefore adequate therapy can be based only on final histopathologic diagnosis and not on magnetic resonance imaging alone.

We recently showed that stereotactic biopsy is feasible with minimal risk not only in adults but also in children.[4] The current study focuses on another extreme age group: old and very old patients. The objective is to evaluate whether stereotactic biopsy should be performed in these aged patients and whether the result of the biopsy has therapeutic consequences.

METHODS

We performed a retrospective analysis of our database and included all patients aged 80 years and older who underwent stereotactic biopsy at our department between October 2005 and May 2016. Forty-seven patients were included and were divided into 2 groups: group 1 aged from 80 to 84 years (Table 1) and group 2 aged 85 years and older (Table 2). All patients underwent stereotactic, frame-guided biopsy to establish histopathologic diagnosis of etiologic unclear cerebral lesions. We excluded patients who underwent cyst punctures or punctures of hemorrhages, because in these patients, the biopsy was not performed for diagnostic but therapeutic reasons. We assessed gender, neuroradiologic diagnosis, Karnofsky Performance Score (KPS), number of tissue samples taken, histopathologic diagnosis, localization, postoperative hemorrhage, modality of anesthesia, anticoagulation, and further therapy.

RESULTS

Group 1

Thirty-four patients (72.3%) were included in group 1 (80–84 years), of whom 16 were male (47%) and 18 female (53%). Median age in this group was 82 years and median KPS was 80 (Table 1).

Most patients had malignant gliomas (n = 24; 70.6%), Low-grade gliomas were diagnosed in 2 patients (5.9%), Six patients had lymphoma (17.7%), metastasis was the final diagnosis in 1 patient (2.9%), and reactive astrogliosis was diagnosed in 1 patient (2.9%) (previously mentioned as the patient without a definite diagnosis).

Ten patients presented with hemiparesis (29.4%), 7 with aphasia (20.6%), 7 with seizures (20.6%), 4 with gait instability (11.8%), 2 with changes of personality (5.9%), 2 with vision impairment (5.9%), 1 with dizziness (2.9%), and 1 with syncope (2.9%).

Localization was right temporal in 8 patients (23.5%), left temporal in 3 (8.8%), right parietal in 6 patients (17.7%), left parietal in 4 patients (11.8%), right frontal in 7 patients (20.6%), and left frontal in 6 patients (17.7%). One patient harbored a lesion in the basal ganglia (2.9%). A median of 16 tissue samples were taken. Twenty-eight patients (82.4%) received general anesthesia, whereas 5 patients (17.6%) underwent the procedure under local anesthesia.

Twenty-five patients (73.5%) received postoperative computed tomography (CT). Local blood collections were found in 11 (32.3) patients, all of them less than 5 mm, with no further therapy required. None of the patients developed wound healing problems or medical complications or died within 30 days.

One of the patients (2.9%) showed clinical worsening during the further course of his hospital stay. His first postoperative CT scan had shown only small local blood collections <5 mm. His next CT scan showed a large secondary bleeding.

Six patients (17.7%) underwent the biopsy under anticoagulation. None showed any hemorrhage on CT. In 11 patients (32.4%), anticoagulation was paused before surgery.

Of the 34 patients in this group, 12 underwent radiation (35.3%), 4 (11.8%) chemotherapy and 4 (11.8%) radiochemotherapy. One patient died before he received therapy. Thirteen patients (38.2%) declined further therapy (and even control imaging) and went to palliative care. Of these patients, 9 had glioblastoma (GBM), 1 from a low-grade glioma, 1 from reactive astrogliosis, and 2 from lymphoma.

Group 2

Thirteen patients (27.7%) were older than 85 years, of whom 7 were male (53.8%) and 6 female (46.1%).

Seven patients had GBM (53.8%), 2 patients had metastasis (15.4%), and 1 patient each had lymphoma, meningioma, cerebritis, and low-grade glioma (each 7.7%). Median KPS was 70 in this group. Four patients presented with aphasia (30.7%), 2 with loss of motivation (15.4%), 2 with an incidental finding (15.4%), 2 with gait instability (15.4%), 1 with seizures (7.7%), 1 patient with hemiparesis (7.7%), and 1 with paresthesia (7.7%).

Localization of the lesion was right and left temporal in 2 patients each (each 15.4%), right parietal in 3 patients (23%), left parietal in 1 patient (7.7%), right frontal in 3 patients (23%), and left frontal in 2 patients (15.4%). The median number of tissue samples taken was 15. Eight patients (61.5%) underwent the procedure under general anesthesia, whereas 5 patients had local anesthesia (38.5%).

In 10 patients (77%), postoperative CT scans were performed. Three (23%) showed small local blood collections, none of which was larger than 5 mm and none of which required further treatment. None of the patients in this group underwent biopsy under anticoagulation. In 5 patients, anticoagulation was paused before surgery. One patient showed a small hemorrhage in postoperative CT. Also in this group, none of the patients developed wound healing or medical problems and postoperative 30-day mortality was zero.

In this group of 13 patients, 2 patients (15.4%) underwent radiation and 4 patients radiochemotherapy (30.7%). One patient underwent resection (7.7%) and 6 patients declined further therapy (46.2%). Among these patients, 3 (50%) had GBM, and meningioma, metastasis, and cerebritis were found in 1 patient each (each 16.6%).

The euroradiologic diagnosis before biopsy was correct in 76.9%.

Statistical Comparison Between the Two Groups

Using a Fisher exact test, P values of <0.05 were considered to be statistically significant. Median KPS was higher in group 1 (80) than in group 2 (70; P = 0.02). Small but clinically silent hemorrhages occurred in 11 patients in group 1 and 3 patients in group