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Klinika Neurochirurgii. Instytut Chorób Układu Nerwowego. Akademia Medyczna w Lublinie
Kierownik: prof. dr n. med. Halina Koźniewska

Krzysztof TUROWSKI

The Operative Treatment of Supratentorial Gliomas

Leczenie operacyjne glejaków nadnamiotowych mózgu

Операционное лечение глиом супратенторяльного мозга

The operative treatment of gliomas has a centennial tradition. The first brain tumor in medical history, probably a glioma, was removed by Rickman Godlee in November of 1884. Progress in the previously unsatisfactory treatment of gliomas depends upon a continual improvement of diagnostic and operative procedures.

A prerequisite for success in operative treatment of these tumors, emphasized by the majority of authors, is the completeness of extirpation (2). Others indicate the value of extent of resection (7, 11). Assumptions of a surgeon are often reduced to his intraoperative possibilities, limited by many clinical features, both on the patient's part and the tumor.

MATERIAL AND METHOD

The material comprises 71 operated patients out of 75 patients with cerebral gliomas treated in the Neurosurgical Department in Lublin between 1973—1975. The group of operated patients also contains three cases of needle biopsy which, apart from the diagnostic aspect, had also a therapeutical target: evacuation of tumoral cyst.

Operative procedures were analyzed from the viewpoint of macroscopic completeness of resection (total or partial) and the extent of resection (extensive or narrow). Statistical significance was estimated on the basis of χ^2 and t-Student tests.

RESULTS

71 patients (94.7%) out of 75 were operated. Partial extirpations of gliomas were more then twice as frequent as the total ($p<0.01$). Extensive resections of gliomas in most cases with internal decompression were as

frequent as narrow ones. Complete and extent resections were compared with some clinical features (preoperative clinical state, localization of gliomas, histopathological sort, age and duration of symptoms), Table 1.

Table 1. Completeness and extent of resection and their dependence on some clinical features

Sort of resection		Number of patients		Preoperative clinical state			Localization		Histopathological sort		Average age /years/	Average duration of symptoms /months/
		n	%	good	average	severe	superficial	deep	glioblastoma	astrocytoma		
Completeness	total	23	32.4	9	10	4	22	1	12	11	48.3	4.7
	partial	48	67.6	18	17	13	9	39	29	19	47.6	6.4
	significance p<	0.01		0.1	0.3	0.05	0.025	0.001	0.01	0.3	0.9	0.6
sum		71	100.0	27	27	17	31	40	41	30	48.0	5.9
Extent	extensive	37	52.1	14	16	7	24	13	21	16	47.6	6.9
	narrow	34	47.9	13	11	10	7	27	20	14	48.1	4.9
	significance p<	0.9		0.9	0.5	0.9	0.01	0.05	0.9	0.9	0.9	0.5

Good and average clinical state had no significant effect upon the complete resection of gliomas. Only in the cases of severe clinical state partial resections were significantly frequent ($p<0.05$). There was no significant correlation between the extent of extirpation and preoperative clinical state. Superficial gliomas were significantly frequently removed totally ($p<0.025$) and extensively ($p<0.01$) but profound ones were significantly frequently resected partially ($p<0.001$) and narrow ($p<0.05$). Glioblastomas were significantly frequently extirpated partially ($p<0.01$). A histopathological sort had no significant effect upon extensive resection. Age of patients and duration of symptoms had no significant effect upon the completeness and extent of resection.

DISCUSSION

Percentage of patients operated upon brain gliomas amounts 80—95% in the estimation of many authors (5, 7, 8, 12, 15). In this paper operative treatment was performed in 94.7% of cases.

A prerequisite for an effective surgical treatment of gliomas is the completeness of resection (2). Completeness in the estimation of many

authors has basic influence upon duration and quality of survival (2, 4, 5). Previous articles and routine neurosurgical practice suggest that total resection of gliomas is very difficult. The main obstacle is the infiltration by glioma of vital structures and a lack of methods allowing an infallible estimate of the border of infiltration.

The applied methods prove deceptive. The impregnation of tumor with radioactive phosphorus and democration with the help of a specially constructed Geiger's gauge proposed by Selverstone (10) and Sweet (14), demonstration of gliomas with Evans blue (14) or Fluoresceine (9) finally, the intraoperative, histopathological evaluation of the borders of the tumor applied by Maxwell (6), Kunicki (5) and other authors, did not give, in outlying analysis, better results than the macroscopic estimation of completeness. Most authors use the criterion of macroscopic completeness (2, 7, 8, 15).

Some surgeons discern the illusoriness of macroscopically complete resection and emphasize the value of the extent of resection of gliomas (6, 11). They take the view that extensive resection prolongs postoperative survival (3, 4, 5). It eliminates macroscopically invisible neoplastic infiltration, and by internal decompression it prevents a rapid increase of intracranial pressure during recidivation (4). Hoping for a complete resection of gliomas, Maxwell (6) performed extensive lobectomies and hemispherectomies. Nevertheless, he found incomplete resection in 75% of cases: obduction showed infiltration of corpus callosum (6). Extensive neoplasmic infiltration was found by other authors too (13).

The majority of authors performed, within their reach, extent and complete resections in patients in good and average clinical condition (2, 4, 5, 6, 11). Among patients in grave clinical condition, often with symptoms of intracranial herniation, Mazurowski et al. (7) and other authors often performed trepanopunction or bone decompression with biopsy.

Localization of gliomas seems to have fundamental significance for the kind of performed operation. Szapiro et al. (15) performed macroscopically total resection in 79% of superficial gliomas (I and II group) and 35% of profound gliomas (III, IV and V group). Poles of frontal, temporal and occipital lobes (8) are particularly useful sites for total resection by lobectomy. Słowik et al. (12) performed total extirpations in 42% of frontal lobe gliomas, 24% in temporal, and 20% cases of multilobar tumors. In multilobar and profound gliomas narrow resections were mostly performed (3, 8). Less extensive resections were performed in the dominant hemisphere.

Most authors point out to a similar frequency of completeness in histopathologically different kinds of gliomas (7, 8). Mazurowski et

al. (7) performed just as many total resections in astrocytomas and glioblastomas i.e. in 25%. Bromowicz et al. (1) performed extensive resections in gliomas, and in malignant gliomas confirmed by intraoperative histopathological examination they performed extensive decompression and removed bone flap. Bucy (3) performed internal decompression in such cases.

Conclusions

1. Macroscopically partial extirpations of gliomas were more than twice as frequent as total ones.

2. Partial resections were performed significantly more frequently in the cases in grave clinical condition.

3. Superficial gliomas were significantly removed totally and extensively while profound gliomas were removed partially and narrow.

4. Glioblastomas were significantly more frequently extirpated partially.

5. Age of patients and duration of symptoms had no significant influence upon the completeness and extent of resection.

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STRESZCZENIE

Wykonane resekcje glejaków nadnamiotowych mózgu zestawiono pod kątem ich makroskopowej doszczętności i rozległości. Stwierdzono, że resekcje doszczętne były możliwe do przeprowadzenia ponad dwukrotnie rzadziej niż częściowe. Resekcje rozległe wykonywano równie często jak oszczędne. W glejakach powierzchownych istotnie częściej przeprowadzano resekcje całkowite i rozległe, natomiast w głębokich — częściowe i oszczędne. Resekcje częściowe wykonywano istotnie częściej u chorych w ciężkim stanie klinicznym i w glejakach wielopostaciowych.

РЕЗЮМЕ

Проведено резекции глиом супратенторяльного мозга, учитывая их макроскопическую радикальность и протяжность. Показано, что тотальные резекции можно проводить почти в два раза реже, чем частичные. Протяжные резекции проводились так часто, как и частичные. В случае поверхностных глиом проводились полные и протяжные резекции, а в глубинных частичные и скупые. Частичные иссечения проводились чаще у больных находящихся в тяжелом клиническом состоянии и в случаях многовидных глиом.