

# IMMUNOGLOBULIN CLASSES G,A,M IN BRAIN TUMOURS

Pages with reference to book, From 157 To 158

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## ABSTRACT

Serum of 37 brain tumour patients was studied for, Total protein, Protein electrophoresis, IgG, IgA, and IgM in an attempt to ascertain humoral immune response. Findings were compared with 20 healthy subjects, matched for age, sex and socioeconomic status. There was significant rise in alpha-II globulin, while IgG was suppressed in tumour patients. Decrease of IgG was more marked in patients with malignant tumours. Immunoglobulin A was low in children when compared with adults. Immunoglobulin M remained unchanged (JPMA 42: 157, 1992).

## INTRODUCTION

Brain tumours have attracted less attention than other human neoplasms, because of the widely held view that the brain is an immunologically privileged site<sup>1</sup>. This statement was supported by the evidence of lack of metastasis, which is postulated to being the result of efficient extra cerebral immune surveillance.<sup>2</sup> A study of the inter-relationship between the tumour and the host immune system is important for research in the field of, immunotherapy; so the present work was carried out to fathom any immune response in the sera of brain tumour patients.

## PATIENTS AND METHODS

Thirty seven patients with brain tumours were chosen for this study from the Department of Neurosurgery, Lahore General Hospital. Selection was based on signs and symptoms of space occupying lesion and later on craniotomy revealed tumours, ratified by histopathology. Serum of all patients was assayed for total protein, protein electrophoresis and IgG, IgA, IgM immunoglobulins. The reference values were derived from 20 healthy subjects matched for age, sex and socioeconomic status. MI samples were assayed for total protein on same day while immunoglobulins (G,A,M) and protein electrophoresis were done on sera stored at -40k' C. Immunoglobulin estimation was carried out by Radial Immunodiffusion technique using kits provided by Kallsted Laboratories, USA. Electrophoresis was carried out on cellulose acetate membrane on elvi-70 tank and different protein fractions were quantitatively measured by elvi-165 densitometer. Student 't' test was used for comparison.

## RESULTS

Mean levels of total serum proteins, albumin, alpha 1 and gamma globulins were similar in patients and controls Table-I)

**Table I. Serum proteins and their fractions in brain tumour.**

	Patients (37)	Controls (20)	P. Value
T* Protein (g/l)	69.94 ± 1.12 (52-81)	68.25 ± 1.60 (58.77-77)	N.S.**
Albumin (g/l)	41.22 ± 1.77 (30.2-56.7)	41.64 ± 1.23 (32.5-54.8)	N.S.**
Alpha-1 (g/l)	3.11 ± 0.27 (1.80-10.3)	2.71 ± 0.29 (1.3-6.7)	N.S.**
Alpha-2 (g/l)	4.46 ± 0.31 (3.5-11.3)	5.54 ± 0.33 (2.4-8.9)	< 0.05
Beta (g/l)	7.55 ± 0.42 (3.8-13.5)	7.45 ± 0.37 (4.0-10.0)	N.S.**
Gamma (g/l)	11.59 ± 0.64 (1.86-21.5)	11.10 ± 0.71 (4.7-15.4)	N.S.**

\* Total

\*\* Non-significant

The values are expressed as mean ± SEM. The number of observations and range values are given in parenthesis.

except one patient with astrocytoma had high albumin (72.7 g/L) and one with epidermoid cyst had very low (1.8 g/L) gamma globulin levels. Mean values of serum IgG were significantly lower in patients than controls (p < 0.001) (Table-II)

**Table II. Serum immunoglobulins (IgG, IgA, IgM) in brain tumour.**

Group.	Ig G (mg/dl)	Ig A (mg/dl)	Ig M (mg/dl)
Brain Tumours (37)	1134 ± 42 (725-1625)	244 ± 21 (26-523)	195 ± 21.85 (75-845)
Controls (20)	1490.25 ± 87.09 (875-2475)	291 ± 24.18 (140-460)	184.65 ± 13.91 (92-327)
P. Value Patients vs Controls	> 0.001	NS*	N.S.*

\* Non significant.

The results are expressed as mean ± SEM. The number of observations and range values are given in parenthesis.

and in patients with malignant tumours (P < 0.05) (Table-III)

**Table III. Serum immunoglobulins G,A, and M in malignant and benign brain tumours.**

Group	IgG mg/dl)	IgA (mg/dl)	IgM (mg/dl)
Malignant (07)	955 ± 43.94 (800-1100)	198.71 ± 47.82 (39-345)	190.57 ± 42.77 (90-389)
Benign (30)	1073 ± 50.24 (725-1625)	224 ± 24 (26-520)	196.2 ± 25.75 (75-845)
P. Value Malignant vs Benign	<0.05	N.S*.	N.S*.

\* Non-significant

The results are expressed as mean ± SEM. The number of observations and range values are given in parenthesis.

when compared with those with benign lesions. The difference in mean serum IgA levels between patients with benign and malignant tumours and between patients and controls was statistically insignificant but the mean values in adult patients were significantly higher ( $P < 0.01$ ) than in children (Table-IV)

**Table IV. Serum total protein, IgG, IgA and IgM in children and adults with brain tumours.**

	Children (11)	Adults (26)	P. Value
T* . Proteins (g/dl)	7.09 ± 0.18 (5.48-7.88)	6.97 ± 0.14 (5.21-8.17)	N.S**
IgG (mg/dl)	1178 ± 84.2	1158.3 ± 52.4	N.S**
IgA (mg/dl)	177.2 ± 27.3 (50-310)	279 ± 26.5 (26-520)	
IgM (mg/dl)	184.2 ± 27.6 (75-389)	202.7 ± 29.3 (75-845)	N.S**

\* T=Total

\*\* Non-significant

The values are expressed as mean ± SEM. The number of observations and the range values are given in parenthesis.

There was no difference in mean values of IgM in various groups.

## DISCUSSION

Humoral immunity has its role in host tumour interactions<sup>3</sup>, and changes in different serum proteins in patients with cancer reflect chiefly the reaction of the host to the presence of tumour. Normal total

serum protein levels observed in this study and by others<sup>5</sup> indicate adequate nutritional status in patients with brain tumours. Protein electrophoresis was normal except for an elevated alpha 2 globulin levels which may be due to an increase in some constituent of alpha 2 band<sup>5</sup>. Significantly low IgG levels particular in those with malignant tumours observed in this and some previous studies<sup>6,7</sup> may be due to immunosuppressive effect of neoplastic process. All our patients were on , steroid therapy which may have contributed to immunosuppression<sup>8</sup>. Immunoglobulin A was within normal range, but it was significantly low in children (11 cases) when compared with adults. The cause for this difference is not clear and needs further evaluation. IgM levels were normal in this study but both normal and high levels have been reported by other workers<sup>5,7</sup>. In this study findings of suppressed IgG, more in malignant cases and low IgA in children seems to be due to well known suppressive effect of neoplastic and corticosteroid therapy. The increase of alpha-II globulin needs further evaluation.

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