RESEARCH COMMUNICATION

ABO Blood Group Frequency and Brain Tumors

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Abstract

The influence of blood group types on development of brain tumors is unclear since there are conflicting reports from surveys regarding the distribution of ABO blood groups and primary intracranial neoplasms. The present descriptive, retrospective study was therefore made of 907 patients with reliable records for ABO blood groups and proven histological diagnosis who were hospitalized with brain tumors at the Shariati Hospital neurosurgical center, between 1980 and2002. The distribution of the ABO blood groups in this study population was compared with that in the general population by the chi-square test. Data analysis showed that there are no significant differences between types of intracranial tumors and frequencies of four major blood groups. The distribution of the ABO blood groups in patients did not differ significantly from that of the general population. Of our patients with craniopharyngioma, however, significantly more were in group A (P<0.05) compared with the general population of Iran.

Key Words: ABO blood groups - brain tumors - frequency

Asian Pacific J Cancer Prev, **6**, 582-584

Introduction

A correlation between specific ABO blood types among patients and susceptibility to certain diseases such as carcinoma of the stomach, peptic ulcer and diabetes was proposed in the 1950s (Aird et al., 1953, McConnell et al., 1956). In the medical literature of the past decades, conflicting reports have arisen from surveys regarding the distribution of ABO blood groups and primary intracranial tumors (Atwell, 1962, Choi et al., 1970, Garcia et al., 1963, Mayer et al., 1956, Sowbhagya et al., 1991., Streif et al., 2004., Zampieri et al., 1994). Some authors (Selverstone et al., 1961, Zampieri et al., 1994, Sowbhagya et al., 1991) noted that patients with astrocytomas exhibited a higher incidence of blood type A than did the general hospital population and fewer in group O compared with individuals in the general population. Yates and Pearce (1961) found astrocytoma less frequent in group O types and Campbell et al (1961) in a study of determination of the distribution of the ABO blood groups in childhood malignancies from Manchester region, England, reported that glioma was more frequent in Group O individuals. In contrast, others (Carter et al., 1964, Garcia et al., 1963) noted no significances in frequency of blood types in studies of patients with astrocytomas or other brain tumors.

Sowbhagya et al, (1991) compared blood groups in medulloblastoma patients with those of general population and found a significantly higher frequency in those with group B. In contrast, Atwell (1962) found no significant difference in blood group distribution in a study of children with embryonic tumors. Compared with the general population, Sowbhagya et al (1991) found significantly fewer of patients with schwannoma were in group O than the proportion in the general population, and most of patients with meningioma were also in this group. Contrary to this observation Yates and Pearce (1961) found a higher significant association of meningiomas and blood group A, while Mayer et al (1956) pointed to a link with group B. In contrast they found a considerable excess of pituitary adenomas in group O in the study population and there was a striking deficiency in group A (Mayer et al., 1956). However, Aird et al (1953) in a larger series of pituitary adenoma found the ABO blood group distribution to be within normal limits. Furthermore, Choi et al (1970) found no specific association among the groupings of tumor types and ABO blood type in a retrospective study of epidemiology of primary central nervous system neoplasm.

The influence of blood group types on development of brain tumors is thus not well established and more studies are indicated. Here we therefore determined the distribution of the ABO blood groups in a series of the common brain tumors.

Materials and Methods

This retrospective study was design to study the distribution of ABO blood groups related to intracranial neoplasms. All consecutive case records of patients with histopathologically verified intracranial tumors from 1980-2002 treated at neurosurgical department at the Shariatee

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Table 1. Distribution of ABO Blood Groups in Series Studied by Brain Tumor Types

Category Frequency in Iran	A 32.4%	B 23.3%	O 36.4%	AB 7.8%	Total
Pituitary adenoma	39 (27.1%)	35(24.3%)	61(42.4%)	9(6.3%)	144 (100.0%)
Schwannoma	24 (30.8%)	19(24.4%)	28(35.9%)	7(9.0%)	78 (100.0%)
Medulloblastoma	9 (34.6%)	6(23.1%)	11(42.3%)	0 (0.0%)	26 (100.0%)
Meningioma	117 (35.9%)	78(23.9%)	100(30.7%)	31 (9.5%)	326 (100.0%)
Craniopharyngioma	17 (50.0%)	5(14.7%)	7(20.6%)	5 (14.7%)	34 (100.0%)
Glioma	91 (30.4%)	68(22.7%)	114(38.1%)	26 (8.7%)	299 (100.0%)
Total	297 (32.7%)	211(23.3%)	321(35.4%)	78 (8.6%)	907 (100.0%)

hospital, Tehran, Iran, were reviewed and the blood groups of the patients noted. The distribution of blood groups in the general population of Iran was obtained from Iranian Red Cross Society. The total number of patients treated for primary intracranial tumors during the last two decades was 3000. Of these, 907 patient's blood groups were available. Cases include in the series only if there is a reliable records of the ABO blood group available and if the diagnosis has been confirmed by histological examination diagnosis. The distribution of the four major blood groups in this population was compared with that in the general population by the chi-square test.

The six commonest brain tumors were studied namely, pituitary adenoma, schwannoma, medulloblastoma, Meningioma, craniopharyngioma and glioma

Results

The results of our analysis of our total series of brain tumors is summarized in Table 1. The distribution of the four major blood groups in this study population was compared with that in the general population by the Chi-square test. Data analysis shows that there are no significant differences between types of intracranial tumors and frequencies of four major blood groups (Table 1). The distribution of the ABO blood groups in patients did not differ significantly from that of the general population (Table 2). Of our patients with craniopharyngioma, significantly more were in group A ($P<0.05$) compared with individuals in the general population of Iran (Table 3).

Table 2. Distribution of ABO Blood Groups in Patients with Brain Tumors

Blood Group	Frequency	Percentage
A	297	32.7
B	211	23.3
O	321	35.4
AB	78	8.6
Total	907	100.0

Table 3. Distribution of ABO blood groups in Patients with Craniopharyngioma Brain Tumors

Blood Group	Observed N	Expected N
A	17	11.0
B	5	7.9
O	7	12.4
AB	5	2.7
Total	34	P<0.05

Discussion

An analysis of our total cases of brain tumors showed no significant differences overall between types of tumors and frequencies of blood groups. The distribution of the ABO blood groups in patients does not differ significantly from the general population. Of our patients with Craniopharyngioma, significantly more were in group A compared with individuals in the general population.

Differences in the distribution of ABO among patients with primary brain tumors have been reported between countries worldwide and differences are also seen between ethnic groups within country (Mayer et al., 1956). Our results do not support the findings of other studies previously mentioned in the literature (Atwell, 1962; Carter et al., 1964; Garcia et al., 1963; Mayer et al., 1956; Sowbhagya et al., 1991; Selverstone et al., 1961; Zampieri et al., 1994).

Sowbhagya et al (1991) compared blood groups in medulloblastoma patients with those of general population and found a significantly higher frequency of medulloblastoma in those with group B. In contrast, Atwell (1962) found no significant difference in blood group distribution in a study of children with embryonic tumors compared to the general population. Compared with the general population, Sowbhagya et al (1991) found significantly fewer of patients with schwannoma were in group O than the proportion in the general population.

Variation in the results of studies is related to different study methodologies and sample size that affect the power to detect increased risk. Further work on the influence of genetic factors and environmental exposures for the occurrence of brain tumors are suggested.

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