

CLINICAL PATTERN OF INTRA-CRANIAL SPACE OCCUPYING LESION IN TERTIARY LEVEL HOSPITAL

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Abstract

Background : The term “Intra-cranial space occupying lesion” (ICSOL) is defined as any neoplasm, benign or malignant, primary or secondary, as well as any inflammatory or parasitic mass lying within the cranial cavity. Advances in intracranial imaging have made the detection of intracranial lesions relatively accurate and enabling us to focus on the etiology of these space-occupying lesions. Many reports suggested that both incidence and pattern of intracranial space occupying lesions are subject to considerable geographic and racial variations. Knowledge of the regional peculiarities of these lesions will help in identifications of possible risk factors.

Materials and Methods: This observational study was done in the department of medicine of Mymensingh medical college hospital, Bangladesh from November, 2011 to April, 2012 to evaluate the clinical pattern of ICSOL among the 75 adult admitted patients. Patient aged more than 15 years of either sex with symptoms and signs of ICSOL and at least one CT or MRI evidence in favour of diagnosis were included.

Results: The highest participation (22.7%) was observed from 55-64 years age group. Mean age of the participants was 54.35±18.68 years. Neoplastic tumor was (25.8%) in 15-24 years age group and non neoplastic lesion was (31.8%) in 55-64 years age group, among participants (76.0%) came from rural areas and 24% from urban. Population regarding the occupation 30.7% were housewives, 21.3% were service holders and 20.0% are farmers. Headache was the most common symptom noted in 93.33% of patients. Nausea/ vomiting, difficulty in limb movement and imbalance were the other most common three symptoms. In this series intracerebral hemorrhage was found in 53.3% of patients, Astrocytoma was the second most common (20.0%). Meningioma was found in 8% of the participants and another 8% had metastatic lesions in their brain. There were two cases of schwannoma while tuberculoma was diagnosed in another two participants (2.7%).

Conclusion: Patients with symptoms and signs of ICSOL should be dealt with great care and CT or MRI helps to evaluate them for early diagnosis and proper management.

J Dhaka Med Coll. 2019; 28(1) : 17-22

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Received: 10 February 2019

Revision: 02 March 2019

Accepted: 30 March 2019

Introduction

The term “Intra-cranial space occupying lesion” is defined as any neoplasm, benign or malignant, primary or secondary, as well as any inflammatory or parasitic mass lying within the cranial cavity¹. The list also includes haematomas² different types of cysts,^{3, 4} and vascular malformations^{5, 1, 6}. Intra-cranial space occupying lesion (ICSOL) is also known as intra-cranial mass lesions. ICSOL can be broadly classified into neoplastic lesions and non-neoplastic lesions⁷. Common non-neoplastic causes of ICSOL are Infective-Cerebral abscess (pyogenic, toxoplasma etc.), tuberculoma, cysticercosis, echinococcosis (as hydatid cyst), schistosomiasis; traumatic - subdural haematoma, extradural haematoma; vascular- intracerebral haematoma; Inflammatory - sarcoid mass; and others - arachnoid cyst, colloid cyst, embryonic dysplastic lesions (craniopharyngioma, hamartoma)⁸. Common primary neoplastic lesions are astrocytoma, meningioma, schwannoma, pituitary adenoma although brain and vertebral metastases from systemic cancer are far more prevalent than primary tumors. About 15% of patients who die of cancer have symptomatic brain metastases; an additional 5% suffer spinal cord involvement¹⁰.

Among the ICSOL, tuberculoma is very much common in the developing countries but in developed world cerebral neoplasms are more frequent.⁸ A study carried out by Neuro-pathology department, institute of neurological science, Glasgow, among 2.7 million populations over 5 years shows the incidence of anaplastic astrocytoma 40%, meningioma 15%, metastasis 12%, astrocytoma 8% and Pituitary adenoma 4% in adults. Among the infratentorial tumors schwannoma is the most common (6%). Metastasis is 4% - being the second most common.⁹

A patient with intracranial space occupying lesion may present with local effects of the mass on adjacent brain tissue (e.g. seizures, focal signs) - the symptoms depend on the site of the lesion. Features of raised intracranial pressure: headache, impairment of conscious level, papilloedema, vomiting, bradycardia, arterial hypertension, and false localising signs:

pupillary dilatation (ipsilateral to lesion), 6th cranial nerve lesion (unilateral or bilateral), hemiparesis (ipsilateral to lesion), bilateral extensor plantar responses⁸ may be presenting feature.

Diagnosis of intra-cranial space occupying lesion is done by compatible history, relevant examination findings and appropriate investigations. Advances in cranial imaging have made the detection of intracranial lesions relatively accurate and enabling us to focus on the etiology of these space-occupying lesions. Over the past three decades, many reports suggested that both incidence and pattern of intracranial space occupying lesions are subject to considerable geographic and racial variations. Knowledge of the regional peculiarities of these lesions will help in identifications of possible risk factors; demographic characteristics will also help in establishing measures for the correct diagnosis of ICSOL in this region. Very few accurate statistics reporting the clinical pattern of intracranial space occupying lesions are available in Bangladesh. Therefore, this study is designed to find out the clinical pattern of intra-cranial space occupying lesions.

Materials and methods:

This observational study was done in the department of Medicine of Mymensingh medical college hospital over the period of 6 months, from 1st November, 2011 to 30th April, 2012 to evaluate the clinical pattern of ICSOL among the adult admitted patient. A total number of 75 cases were included in this study. Patient aged more than 15 years of either sex with symptoms and signs of ICSOL and at least one CT or MRI evidence in favour of diagnosis were included. The term “Intra-cranial space occupying lesion” is defined as any neoplasm, benign or malignant, primary or secondary, as well as any inflammatory or parasitic mass lying within the cranial cavity. Patient aged less than 15 years or refused to do the investigation needed for diagnosis were excluded. Samples were taken by purposive way. Consent was taken from the patient or from their legal attendants and ethical consideration was approved by authorized ethical committee. A structured data collection form was developed

containing all the variables of interest which was finalized following pre testing. Data were collected by interview, observation, clinical examination and investigations. Data were processed and analyzed by using SPSS (Statistical Package for Social Science) 15.0. The test statistics were measured by Chi-square (c2) Test. The level of Significance was set at 0.05.

Result

Age distribution:

The highest participation (22.7%) was observed from 55-64 years age group. Mean age of the participants was 54.35±18.68 years. Neoplastic tumor was most common (25.8%) in 15-24 years age group and non neoplastic lesion was most common (31.8%) in 55-64 years age group (Table-I).

Table-I
Age distribution of the participants

Age of the patients (years)	Type of ICSOL	
	Neoplastic n=31	Non neoplastic n=44
15 – 24	8 (25.8%)	2 (4.5%)
25 – 34	3 (9.7%)	2 (4.5%)
35 – 44	2 (6.5%)	2 (4.5%)
45 – 54	5 (16.1%)	6 (13.6%)
55 – 64	3 (9.7%)	14 (31.8%)
65 – 74	6 (19.4%)	9 (20.5%)
75 and above	4 (12.9%)	9 (20.5%)

Sex distribution:

54.8% of all males and 63.6% of all females have non neoplastic lesions.

Distribution of residence:

Among the participants most (76.0%) came from rural areas and 24% from urban areas.

Distribution of occupation:

Among the participants irrespective of sex, 30.7% are housewives constituting the largest group, 21.3% are service holders and 20.0% are farmers. But sex wise distribution showed that farmers (36.7%) constituted the largest group among male and housewives (69.7%) constituted the largest group among female participants.

Distribution of the symptoms:

Headache was the most common symptom noted in 93.33% of patients. Nausea/ vomiting, difficulty in limb movement and imbalance were the other most common three symptoms. More than one symptom was noted in all most all patients. (Table-II)

Table-II
Distribution of patient according to presenting Symptoms

Symptoms	No. of cases	Percentage
Headache	70	93.3
Nausea/ Vomiting	66	88.0
Difficulty in limb movement	51	68.0
Imbalance	44	58.7
Aphasia	36	48.0
Convulsion	25	33.3
Mental change	21	28.0
Disturbance of consciousness	18	24.0
Fever	8	10.7
Visual disturbance	6	8.0
Vertigo	4	5.3
Cough	4	5.3
Ear discharge	1	1.3
Weight gain	1	1.3

Distribution of ICSOL by morphological diagnosis based on CT/ MRI:

Among the ICSOL, intracerebral haemorrhage was most commonly (53.3%) diagnosed depending on the morphological features observed on CT scan/ MRI. Astrocytoma was the second most common (20.0%) ICSOL. Meningioma was found in 8% of the participants and another 8% had metastatic lesions in their brain. There were two cases of schwannoma (2.7%) while tuberculoma was diagnosed in another two participants based on CTscan/ MRI findings. (Table-III). While considering the neoplastic tumors alone, Astrocytoma was the most common (48.4%). Meningioma was 19.40%, metastatic tumors 19.40%, schwannoma 6.5%, arterio-venous malformation

3.2%, pituitary adenoma 3.2% among all neoplastic tumors. Infective causes of ICSOL were observed less commonly. Tuberculoma was most common of them. It was only 2.7% of all ICSOL. Brain abscess and hydatid cyst was far less common (1.3%). (Table-IV and V)

Table- III

Distribution of tumors by CI/ MRI diagnosis

Type of ICSOL	Frequency	Percent
Astrocytoma	15	20.0
Meningioma	6	8.0
Schwanoma	2	2.7
A-V malformation	1	1.3
Pituitary adenoma	1	1.3
Metastatic tumors	6	8.0
Intracerebral haemorrhage	40	53.3
Tuberculoma	2	2.7
Brain abscess	1	1.3
Hydatid cyst	1	1.3
Total	75	100.0

Table-IV

Frequency of neoplastic tumors

Type of neoplastic tumors	Frequency	Percent
Astrocytoma	15	48.4
Meningioma	6	19.4
Schwanoma	2	6.5
Arterio-venous malformation	1	3.2
Pituitary adenoma	1	3.2
Metastatic tumors	6	19.4
Total	31	100.0

Table-V

Frequency of non neoplastic lesions

Types of non neoplastic lesions	Frequency	Percent
Intracerebral haemorrhage	40	90.9
Infective causes	4	9.1
Total	44	100.0

Discussion

This study was done to evaluate the clinical pattern of ICSOL in tertiary level hospital of Bangladesh. In this study, Mean age of the participants was 54.35±18.64 years. Highest participation was observed from 55-64 years age group (neoplastic 9.7% and non-neoplastic 31.8%). Highest number of the neoplastic lesions was found in 15-24 years age group. Non neoplastic lesions were found in 55-64 years age group in highest number. Male female ratio was 1.27:1. This result was consistent with a study conducted in Pakistan in 1999 where 54% participants were male. Although, highest participation was noted from third decade, a steep rise of number of cases in the sixth decade was also observed.⁷ This study is also consistent with other studies in home and also in abroad, like in Nairobi, Kenya¹¹.

The present study is not consistent with another study done in Karachi, Pakistan. They analyzed 386 cases and found ICSOL more commonly in 11-20 years age group. This discrepancy might be due to inclusion of participants from all age group¹⁹. Another study at Riyadh, Saudi Arabia showed maximum occurrence of ICSOL in fourth decade and male female ratio was 1.45:1. Although sex distribution was consistent with present study, the age distribution was not consistent. It might be due to the inclusion of 12% participants from age group less than 15 years¹.

Regarding the residence of the participants, the present study showed that most of the participants came from rural areas (76%) is consistent with the study done at BSMMU, Dhaka (2006-2007) by Mollah N et al. They found that 70% of the participants came from the rural areas¹⁰.

In this study, headache was found to be the most common (93.33%) symptoms. Nausea/ vomiting, difficulty in limb movement, imbalance, aphasia, convulsion, mental change and disturbance of consciousness was also noted. Fever was found in only 10.67% of participants. Visual disturbances, vertigo, cough, ear ache and weight gain were also noted in minority of the participants. Headache and vomiting were noted as the two most common

symptoms in many studies. Other symptoms noted here were also more or less similar to other studies^{10,11,12,15}. But in a Polish study, the most frequent manifestation were psychic changes and neurological deficit signs (hemiparesis). The study showed that intracranial raised pressure syndrome was rather infrequent, with the exception of headache. This finding is not consistent with present study. It might be due to the fact that Polish study only analyzed the clinical course of malignant brain tumor in patients aged over 50 years¹⁶.

In the present study, intracerebral haematoma was the most common ICSOL. It was found in 53.3% of the participants. It was also the most common (90.9%) non neoplastic lesion. Astrocytoma was the second most common (20.0%) ICSOL. Meningioma was found in 8% of the participants and another 8% had metastatic lesions in their brain. There were two cases of schwannoma while tuberculoma was diagnosed in another two participants based on CTscan/ MRI findings. But among the neoplastic tumors, Astrocytoma was the most common (48.40%). Meningioma was 19.40%, metastatic tumors 19.40%, schwannoma 6.50%, arterio-venous malformation 3.20%, pituitary adenoma 3.20% among all neoplastic tumors. Infective causes of ICSOL were observed less commonly. Tuberculoma was most common of them. It was only 2.7% of all ICSOL. Brain abscess and hydatid cyst was even less common (1.3%). A morphological analysis of 100 cases of intra-cranial space occupying lesion was conducted in Pakistan; 89% patient had neoplastic lesion and 11% had non neoplastic lesion. Among the neoplastic lesions neuroepithelial tumor (41%) was most frequent of which more than 80% was astrocytomas. Other neoplastic tumors were meningiomas (23%), nerve sheath tumours (Schwannomas) (11%), primary adenomas (2%), vascular tumours (1%), arterio-venous malformation (1%), extension from regional tumours (2%), metastatic Tumours (6%), germ cell tumours (1%), lymphomas (1%). Tuberculoma was the most frequent in non neoplastic group. Other non neoplastic tumors are fungal infection (2%), cysts (2%), haemorrhages (2%), cholesteatoma

(1%), and chronic infection (1%). On the basis of the total number of ICSOL, the percentage for most of the brain tumor was much lower in the present study than the study in Pakistan.⁷ This is also true for most other studies^{1,10,11,14,17,18,19,20}. Most of those studies were done in neurology or neurosurgery wards and they excluded intracerebral hemorrhage as a cause of ICSOL from their study. But the present study was conducted in medicine ward of a tertiary level hospital where emergency admission in neurology and neurosurgery ward was not available. So, most cases of intracerebral hemorrhage were admitted in medicine as acute stroke cases and subsequently diagnosed as space occupying lesion due to intracerebral haematoma on CT scan of brain or MRI of brain. As a result, the total number of nonneoplastic lesion became higher and neoplastic tumors became lower as compared to other studies. But when the neoplastic lesion alone was considered, the percentages of all tumor entities reached a level comparable to that reported by others^{1, 10, 11, 14,17,18,20}.

Two large Indian study showed that tuberculoma was the most common infective cause of ICSOL which is consistent with the present study.^{13, 15} In one study, it was mentioned that among all ICSOL the percentage for most brain tumours found in their study was much lower than the figures given in other series from countries where the incidence of tuberculoma is very low.¹³ This might not be true for the present study as the number of tuberculoma cases were not very high in this series. This result was consistent with the result of a study in Kuwait. Their study showed intracranial tuberculoma was present in 1.4% of all ICSOL.²¹ Another Indian study showed the maximum number of patients of ICSOL belonged to malignant etiology of 19 (37%) while 14 patients (27%) belongs to benign nature, 11 patients (21%) were belonged to infective etiology and 8 patients were of traumatic etiology (15%). Among the all benign tumors the distribution was 9% tuberculoma, 1% hydatid cyst, 1% abscess and 11% infective etiologies.¹⁵ Though the number of total malignant tumor could not be shown due to

lack of histopathology, the distribution of other neoplastic and infective ICSOL is more or less similar to the present study. The number of intracerebral hemorrhage cases could not be compared as they did not include them in their study.

Conclusion

In this study it is found that non neoplastic lesion more than neoplastic lesion. Rural peoples, housewife and age above 50 years are mostly affected. A very non specific neurological symptom like headache was observed in most of the participants. So, careful history taking, meticulous clinical examination and imaging (CT/MRI) will be helpful in the evaluation of the patient of ICSOL. Further large scale study will be required to draw a conclusion about the actual clinical pattern of ICSOL in Bangladesh.

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