An unusual presentation of intracranial metastasis
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Citation

Abstract
Solitary intraventricular metastasis is an extremely rare entity with poor outcome following surgery. A 26 years old male presented with features of raised intracranial pressure. An extensive intraventricular tumor was diagnosed as septal glioma on imaging. A gross total microsurgical excision of a vascular infiltrative tumour with subependymal infiltration resulted into marked pneumocephalus and progressive oedema of white matter. The patient died on 4th postoperative day the biopsy of tumor specimen revealed a metastatic papillary adenocarcinoma. Venous infarct was thought to be the cause of an extensive white matter infarct. Literature is reviewed to explore the primary sites, clinical manifestations and causes of mortality in these cases.

INTRODUCTION
The common intraventricular lesions in adult are colloid cyst, choroid plexus papilloma, intraventricular gliomas (septal) and subependymal giant cell astrocytomas. The rare tumours in this location include meningioma, oligodendroglioma and ependymoma. Solitary intraventricular metastasis is a rare entity with commonest primary site being renal cell carcinoma. Surgical resection is the main modality of treatment, if the primary disease is under control. Surgery for these lesions is difficult as compared to other parenchymal metastases owing to their deep location and complicated vascular (venous and arterial) anatomy in the region. We report a case of solitary intraventricular metastatic adenocarcinoma mimicking a glioma. Various aspects of such lesion are discussed here with pertinent review of literature.

CASE REPORT
A 26 years old male patient presented to our center with 3 months history of holocranial headache and vomiting. On examination he had bilateral papilledema without any neurological deficit. The routine investigations including x-ray chest were within normalcy. The patient was evaluated with a CT scan and MRI (Figure -1, 2, 3).
Thalamostriate veins were recognized and preserved bilaterally. A near total decompression of the tumour was achieved. On reversal from anesthesia, the patient was opening eyes, following command and moving all the limbs off the bed. After 1 hour, when there was no expected recovery in his sensorium, and the patient followed commands on coaxing only, a CT scan was done. CT revealed near total removal of the tumour, but intraventricular pneumocephalus causing a mass effect (Figure - 4).

Figure 4
Figure 4 : Postoperative CT scan revealing presence of pneumocephalus and near total excision of tumour.

The pneumocephalus was evacuated by brain needle and he improved marginally. On the next day patient became irresponsive, hence a scan was repeated, which revealed that the pneumocephalus had reduced but an extensive edema appeared noted in the deep white matter surrounding operative site (Figure - 5).
Figure 5
Figure 5: CT scan revealing reduced pneumocephalus and presence of edema in right thalamus, basal ganglia.

The patient was managed on decongestants, but the patient never improved to die on 4<sup>th</sup> postoperative day.

Histopathological examination of the specimen revealed it to be metastatic papillary adenocarcinoma (Figure - 6).

Figure 6
Figure 6: Photomicrograph showing infiltration of brain parenchyma by metastatic papillary adenocarcinoma.

The ultrasound examination revealed presence of renal swelling about 3x4 cm. Since the patient died early postoperatively, we could not investigate him further for the renal pathology. The relatives of the patient did not give consent for a pathological autopsy.

DISCUSSION

The tumors of lateral ventricle arise from the walls of the ventricle or tissues within and around the ventricle notably choroid plexus, septum pellucidum and thalamus. Most of the tumours are low grade and slow growing which, includes astrocytoma, oligodendroglioma, choroid plexus papilloma, meningioma. Few of them are highly malignant like malignant ependymoma and choroid plexus carcinoma.

Metastasis accounts for a rare differential diagnosis of intraventricular mass. True intraventricular metastases arise within the ventricle, while parenchymal metastasis which protrudes into the ventricle are nodular deposits, seen in meningeal carcinomatosis and these should not be classified as intraventricular metastasis [1,2]. These comprise about 0.9% of all brain metastases [1]. Single intraventricular (IV) metastases were found in 0.14% cases only, in an autopsy series of cancer patients [1]. On reviewing case reports of IV metastasis in pubmed we could found only 21 case reports.

In most of the cases it was the lateral ventricle, which is the site of metastasis followed by 4<sup>th</sup> and 3<sup>rd</sup> ventricle [Table -1].

<table>
<thead>
<tr>
<th>Reference</th>
<th>Site of primary tumor (Pathology)</th>
<th>Presenting symptoms</th>
<th>Location in</th>
<th>Surgical Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escott (6)</td>
<td>? Melanoma</td>
<td>Headache</td>
<td>Left trigone</td>
<td>Gamma knife radiation</td>
</tr>
<tr>
<td>Hnelly &amp; Forster Ikanda (14)</td>
<td>Lung (carcinoma)</td>
<td>Decreased consciousness</td>
<td>Bilateral</td>
<td>None (tissue biopsy)</td>
</tr>
<tr>
<td>Hardal (15)</td>
<td>Breast (breast carcinoma)</td>
<td>Decreased consciousness</td>
<td>Right trigone</td>
<td>Fourth</td>
</tr>
<tr>
<td>Naculal (16)</td>
<td>Lung (poorly differentiated)</td>
<td>Asymptomatic</td>
<td>Left trigone</td>
<td>Stereotactic biopsy</td>
</tr>
<tr>
<td>Wibberz (17)</td>
<td>Kidney (renal cell carcinoma)</td>
<td>?</td>
<td>Right trigone</td>
<td>?</td>
</tr>
<tr>
<td>Bieniewski (18)</td>
<td>Multidrug (medullary) malignant germ cell tumor-mature teratoma</td>
<td>Decreased consciousness</td>
<td>?</td>
<td>Aspiration biopsy</td>
</tr>
<tr>
<td>Tissermo et al (19)</td>
<td>Lung (large cell carcinoma)</td>
<td>Headache</td>
<td>Right trigone</td>
<td>Transtorial (middle temporal gyrus)</td>
</tr>
<tr>
<td>Kaji (20)</td>
<td>Glioblastoma</td>
<td>Decreased consciousness</td>
<td>Left ventricle</td>
<td>Anterior interhemispheric</td>
</tr>
<tr>
<td>Mizuno et al (21)</td>
<td>Kidney (renal cell carcinoma)</td>
<td>Headache</td>
<td>Left lateral body</td>
<td>Posterior interhemispheric transcallosal</td>
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<td>Suttle (22)</td>
<td>Kidney (renal cell carcinoma)</td>
<td>Decreased consciousness</td>
<td>Right trigone</td>
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<tr>
<td>Spitzer et al (23)</td>
<td>Kidney (renal cell carcinoma)</td>
<td>Headache</td>
<td>Right trigone</td>
<td>Fourth ventricle</td>
</tr>
<tr>
<td>Brandicour et al (24)</td>
<td>Colon (adenocarcinoma)</td>
<td>?</td>
<td>Third ventricle</td>
<td>?</td>
</tr>
<tr>
<td>Gotoh et al (26)</td>
<td>Stomach (adenocarcinoma)</td>
<td>Deceased</td>
<td>Right lateral ventricle</td>
<td>Transtorial (temporal)</td>
</tr>
<tr>
<td>Watabusi (27)</td>
<td>Kidney (renal cell carcinoma)</td>
<td>Decreased consciousness</td>
<td>Left trigone</td>
<td>Approach not specified</td>
</tr>
<tr>
<td>Arbaeian et al (28)</td>
<td>? (melanoma)</td>
<td>Headache</td>
<td>Left trigone</td>
<td>Transventricular (temporal)</td>
</tr>
<tr>
<td>Paul et al (29)</td>
<td>Kidney (renal cell carcinoma)</td>
<td>Headache and somnolence</td>
<td>Right trigone</td>
<td>Approach not specified</td>
</tr>
</tbody>
</table>

In the lateral ventricle also, it is the region of trigone which remained the commonest site, possibly due to high vascularity of choroid plexus. Most of these patients presented with features of non localized raised intracranial pressure like headache, vomiting and altered sensorium. Few
of them presented with seizures and one patient presented as
an intraventricular hemorrhage. Reviewing the literature
for primary site, (Table -1) the most common site of primary
was renal cell carcinoma followed by melanoma, breast
cancer and lung cancer. The reason why renal cell
carcinoma has predilection for IV metastasis is not known
but definitely it is in contrast to parenchymal brain
metastasis where commonest primary sites are lung and
breast.

Treatment options available are surgical excision,
radiotherapy and radiosurgery. Since in all intracranial
metastases the death of the patient is secondary to
progression of the primary disease rather than by brain
involvement, hence surgery is considered in only those
patients, whose control of primary disease is such that
his/her life expectancy is more than 4 months. The patients
who don't satisfy this criteria the radiotherapy or radio
surgery is an alternative option. Surgery appears to be
superior than radiotherapy in single brain metastasis because
of the rapidity with which the lesion is removed, ability to
get tissue for histopathological diagnosis, rapid reversal of
symptoms and specific treatment depending on tumour
histology. The special intraoperative features of IV
metastasis are:

Usually they are well defined lesions with gliotic
pseudocapsule, which enable and total resection.
Derive blood supply from choroid plexus, so early
interruption of attachment from choroid plexus helps in
excision.

SURGICAL APPROACH
The routes to lateral ventricle are divided into anterior,
posterior and inferior. The anterior approach is directed for
frontal horn and body lesions, while posterior approaches are
directed to atrium and inferior approaches are mainly to
temporal horn. The approaches can be further divided into
trans-callosal and transcortical. Transcallosal approaches are
more suitable for the lesion where ventricles are normal in
size or if the tumor has bilateral extension. Transcortical
approach is easier if ventricles are dilated. The mortality
following removal of intraventricular tumors varied from
70% in older series to 5% in some recent series. In a few cases
where cause of death was determined, it was found to be massive brain edema and intraventricular
hemorrhage. The cause of edema is proposed to be
either due to surgical trauma or due to venous infarct
secondary to trauma to the veins in the vicinity. The main
preventive measure would be to prevent injury to any major
venous tributary, which may be become difficult in
extensive lesions.

References
1. Khoshyomn S, Braff SP, McKenzie MA, Florman JE,
Pendlebury WW, Penar PL. Metastatic intraventricular melanoma. Case
2. Bugiani O.Bava GL. Metastasis of bronchial carcinoma to the
choroids plexus and the roots of the cranial and spinal nerves.
Anatomo-clinical
3. Kohno M.Matsutani M, Sasaki T, Takakura K. Solitary metastasis to
the choroids plexus of the lateral ventricle. Report of three cases
4. Schreder D, Bernstein K, Schneider J. Metastases of the central nervous
system : a prospective study. 3rd communication : metastases in the
pituitary gland, pineal gland and choroids plexus. Zentralbl Allg Pathol
1982; 126(1-2): 64-73.
5. Sawaya R.Bindal RK. Metastatic brain tumours. In : Kay
6. Escort EJ. A variety of appearances of malignant melanoma in the head
7. G Veil, Friduch Flang. Surgical resection of metastatic intraventricular
surgery in the treatment of single metastases to the brain.. N
Choroid plexus metastasis from carcinoma of the bladder: case report and
10. Morita A, Kelly PJ. Resection of intraventricular
tumours via a computer-assisted volumetric stereotactic approach.
Neurosurgery 1993 ;
Brain 1961 ; 84 :
605.
Unusual scalp recorded
SSEP after removal of large intraventricular meningomas. Clin
13. Healy JF, Rosenkrantz H. Intraventricular metastases
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