



## Clicopathological correlation in metastatic central nervous system tumor

Authors

Dr Anita A. M, Dr Neeraj Bhargava, Dr Anuradha G Patil, Dr S.K. Andola

### Abstract

**Introduction:** central nerves system neoplasm (CNS) manifest prominently by metastatic tumor. Metastatic CNS tumors are major cause of morbidity and mortality. Pathologist with small amount of tissue and within stipulated time give diagnosis by squash studied. The studied is carried out to study the metastatic brain tumor by squash studied and correlating with H&E.

**Material and Methods:** Operated CNS tumors biopsy received in department of pathology MR medical college Kalaburgi from BTGH Kalaburgi over period of twelve months from 1 April 2017 to 31 March 2018 examined isolated the cases of metastatic tumors. Fresh viable tissue is crush to make squash smears. Remaining tissue fixed with formalin and paraffin section is made correlate with squash cytology. Immunohistochemistry carried out whenever necessary.

**Results:** Present study showed sixteen cases of metastatic tumor. Maximum number of cases found in age group of 41 to 50 years age groups. Male and Female ratio approximate 0.7:1 seven cases are male and nine cases are of female. There is female predominance in this study. Site of metastasis in central nervous system are six in spinal cord, five cases in frontoparital region, three in cerebellum and two cases in occipital region.

Primary site of metastatic tumor are five cases of adenocarcinoma of colon, four cases of lung squamous cell carcinoma, four cases of thyroid, one case each of nasopharyngeal carcinoma, seminoma and prostate.

**Conclusion:** In central nerves system metastatic tumor Squash technique is an important diagnostic tools when accuracy is correlated with paraffin fixed H&E satin histopathological procedure.

### Introduction

Brain metastasis is more prevalent in India compare to primary brain tumors.<sup>[1]</sup> It's proved by certain pathological scientific study done by many institute in India.<sup>[1]</sup> Same trends are present in western country.<sup>[1]</sup> Lung breast and melanoma are the main primary organs that can spread the metastasis to central nervous system. Some cases of rare metastasis like colon, thyroid and seminoma of testis have been also reported.<sup>[2]</sup> Incidence rate of brain metastasis is 8.3 to 14.3

per million populations.<sup>[3]</sup> The pathologist gives an important clue about diagnosis and plane of dissection during intraoperative procedure. Consultation by pathologist with squash cytology and frozen section plays an important for central nervous system tumor management. Pathologist with small amount of tissue and within stipulated period give diagnosis by squash studied. This study is carried out to find out the importance of squash cytology in metastatic brain tumor by correlating them with formalin fixed paraffin

embedded H&E stained histopathological sections.

### Materials and Methods

Operated CNS tumor Biopsy received in department of pathology MR medical college Kalaburgi from BTGH Kalaburgi over period of 12 months from 1 April 2017 to 31 March 2018 examined and isolated the cases of metastatic CNS tumors.

Biopsy specimen measuring more than 2 mm. in diameter examined for necrosis and hemorrhage. Fresh Viable tissue is crush in between slide to make squash smear. One smear is prepared for toluidine blue and another for H&E stain. Remaining tissue was fixed in 10% neutral formalin, paraffin block are prepared and stained with H&E. Immunohistochemistry and special stain carried out whenever necessary. Squash cytology diagnosis correlate with histopathology. Results - Present study shows total number of sixteen cases of metastasis of CNS tumors from April 2017 to March 2018.

Maximum numbers of cases are in age group of 41 years to 50 years and least number of cases is in 21 to 30 years of age and 71 to 80 years age.

Sex distribution— Male and Female ratio approximate 0.7:1 seven cases are male and nine cases are of female. There is female predominance in this study.

Presenting clinical features are mainly headache and limb weakness in more than fifty percentages of cases.

**Table no.1** - Main presenting clinical features

S.N	Clinical features	Number of cases
1	Headache	8
2	Limb weakness	5
3	Blurring of vision	2
4	Bloody nasal secretion	1
5	Total	16

Primary site of metastatic tumor are five cases adenocarcinoma of colon, four cases of lung, four cases of thyroid, one case of seminoma, nasopharyngeal carcinoma and prostate .

**Table no.2** Primary site of tumor

SN.	Primary site organ	Metastatic tumor	Number of cases	Percentage of cases
1	Thyroid	Metastatic follicular carcinoma of thyroid	4	25%
2	LUNG	Metastatic adenocarcinoma	4	25%
3	Colon	Metastatic carcinoma colon	5	32%
4	Nasopharynx	Squamous cell carcinoma	1	6%
5	Testis	seminoma	1	6%
6	Prostate	Adenocarcinoma	1	6%

### Site of metastasis in central nervous system

A.Spinal cord in six cases

B .Frontoparital in five cases

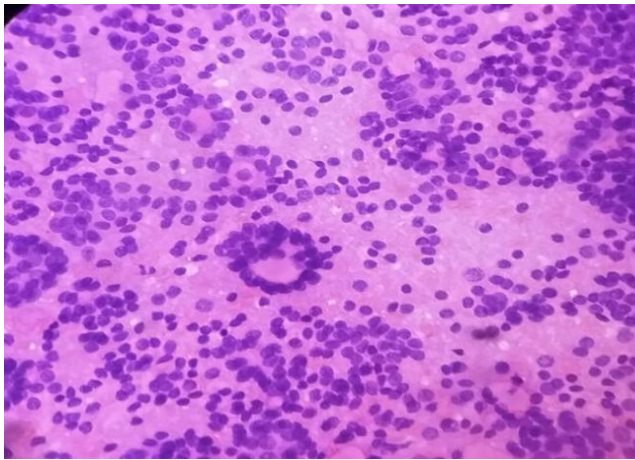
C .Cerebellum in three cases

D. Occipital in two cases

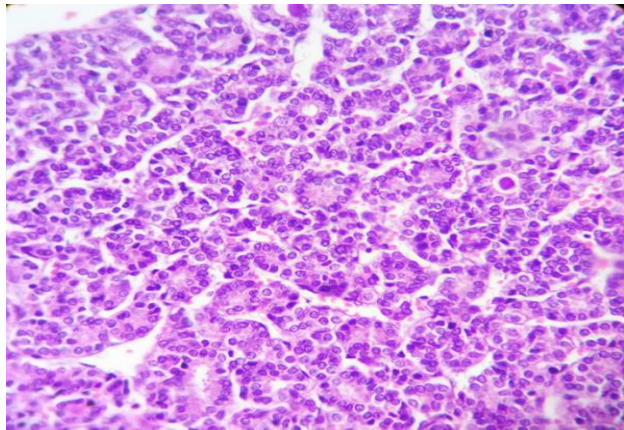
- 1) Metastasis from adenocarcinoma of colon five cases found four are of Right Colon and one from Left colon. Three has shown metastasis in parietal lesion of brain and one shows at retrobulbar lesion another one is in cerebellum.
- 2) Study shows four cases are metastatic carcinoma of thyroid. Out of four two metastasis is present in vertebral column at thoracic label, one is on CP angle tumor and another is on occipital region of brain.
- 3) Four metastasis squamous cell carcinoma of lung found two in thoracic vertebral column one retro -bulbar areas and one parietal lesion of lung.
- 4) One case of metastasis from nasopharyngeal carcinoma shown metastasis in cerebellum.
- 5) Single metastasis from seminoma of testis found in Lumbar vertebral column.
- 6) One case of metastatic adenocarcinoma of prostate found in lumbar vertebral column.

**Fig no.1-** 65 years, female; Backache, Paraparesis since 7 years

Squash diagnosis: Metastatic follicular Carcinoma of thyroid

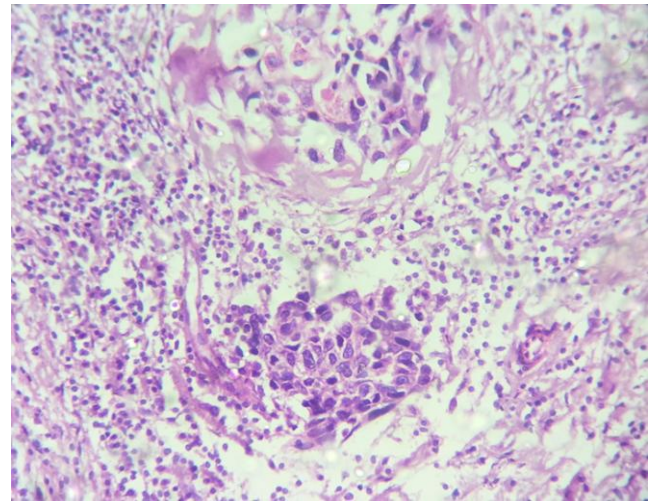
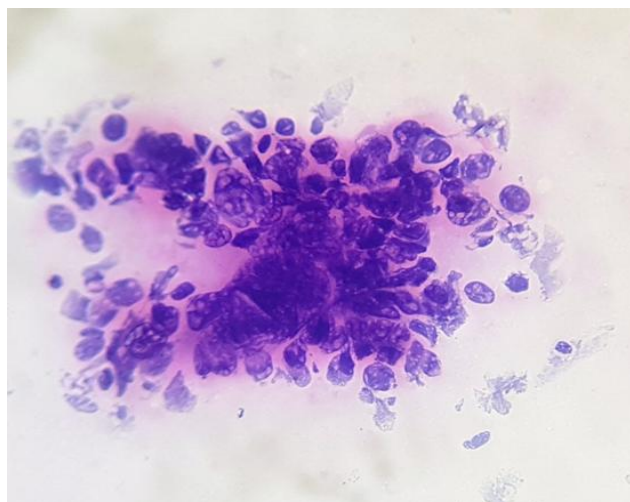


**Fig no.2** Metastatic follicular Adenocarcinoma (H&E) 40x



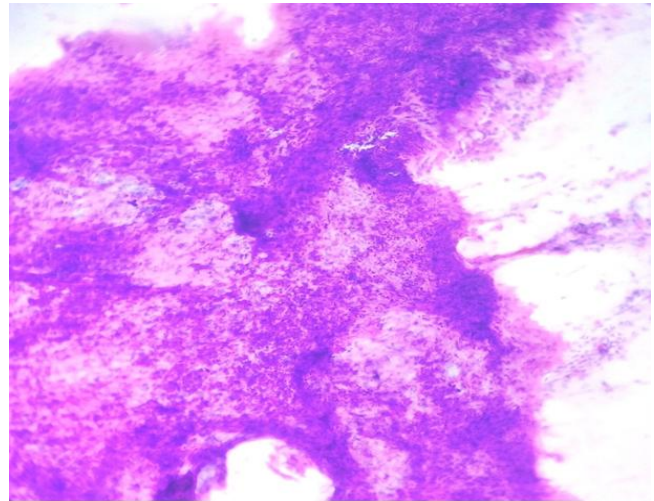
**Fig no.3** 47years, male; loss of right vision since 1year

Squash diagnosis: Metastatic adenocarcinoma 40 X

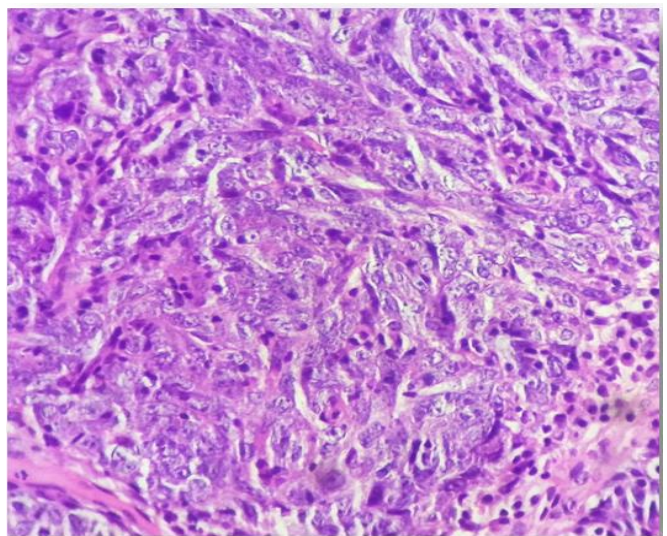


**Fig no.4** Metastatic Squamous cell Carcinoma (H&E 40 X)

Fig no.5 - 23years, female; headache on and off. Squash diagnosis is Metastatic tumor



**Fig no. 6-** Nasophayngeal carcinoma (H&E) 40 X



### Discussion

Central nervous tumor shows unique clinical presentation from other organs of human bodies .CNS tumor has is less than 2% of incidence of all malignant neoplasm. Metastasis of brain present in any part of brain from cerebral hemisphere, cerebellum, brain stem, spinal cord, pituitary duramater and leptomeninges.<sup>[3]</sup> Eighty percentage of brain metastasis located in cerebral hemisphere fifteen percent in cerebellum and five percent in brain stem. Lung, breast, melanoma are primary tumors that present as metastasis to brain.<sup>[1]</sup>

Metastasis is usually presents as a late manifestation of any carcinoma. In metastasis tumors it is essential to identify the primary tumor and its site. Immunohistochemistry studied helps to identify the primary tumor and its spread.<sup>[6]</sup>

The main advantage of squash cytology is that, it gives quick and reasonably working diagnosis to surgeon. Squash technique provides guidelines about what tissue has been resected and depth of tissue should be removed.<sup>[6]</sup>

Metastasis may present as single or multiple foci .Melanoma and lung cancer spread with multiple foci. Single metastatic foci is presents with renal and colon carcinoma. Multiple metastatic foci are presents with blood vessels with parenchymal involvements found in non-small cell carcinoma of lung.<sup>[7]</sup>

In our study total number of sixteen cases found as a brain metastasis. Mostly these are presented as primary from colon, thyroid, lung, nasopharynx, prostate and testis.

Diagnosis of metastatic tumor is primarily depends on two steps. First is to exclude that it is not primary CNS tumor. Most of metastatic tumor is sharply demarcated from surrounding brain. Solitary brain metastasis has a pit fall in patients with unknown primary malignancy. Metastatic lesion in brain is surrounded by reactive neovascularization and gliosis which will confuse Glioblastoma multiforme in small biopsy. IHC studied of GFAP, OLIG2 and SOX2 resolved the situation.<sup>[5]</sup>

Verify the primary site and identification of tumor is second step in metastatic CNS tumors. Microscopic features of metastatic tumor found similar to known primary tumor then diagnosis is clear. Grade and differentiation of metastatic tumor if differs then immunohistochemistry will be helpful.

CNS metastatic tumors may presents in late stage. CNS metastatic lesions if presents as first manifestation then its required detail clinical, radiological and pathological evaluation.<sup>[3]</sup>

Main importance of finding out of subtype of tumor is to start tumor specific therapy. Immunohistochemistry with positive stains are most useful than the negative stains.

### Conclusion

In our study sixteen cases of CNS metastasis are found. Accurate diagnosis is improved with CT and MRI finding and clinical correlation. Improper technique and sampling error found difficulty in squash technique. In centralnerves system metastatic tumor Squash technique is an important diagnostic tools when accuracy is correlated with paraffin fixed H&E satin histopathological procedure.

### References

1. A. Ezhil et al. Pathology of Metastatic Brain Tumours– A one-year Prospective Study, Indian Journal of Mednodent and Allied Sciences, Vol. 3, No. 1, February 2015, pp- 6-11
2. P. Rashmi et al. Metastasis in central nervous system: Clinicopathological study with review of literature in a tertiary care center in South India, South Asian J Cancer. 2013 Oct-Dec; 2(4): 245–249.
3. B. Teleflo,V.Karthika. An Analysis of CNS Tumors in Squash Preparations with Histological Correlation, IOSR Journal of Dental and Medical Sciences. Volume 16, Issue 1 Ver. VII (January. 2017), PP 81-86
4. A. Seema et al. Squash Smear Cytology, CNS Lesions – Strengths and Limitations,

National Journal of Laboratory Medicine.  
2016 Jul, Vol-5(3): PO01PO07.

5. Love S, Louis DN, Ellison DW. Greenfield's Neuropathology. 8th Edition. Volume 2. Hodder Arnold. London. 2008. 2002-2119.
6. Joseph JT. Diagnostic Neuropathology Smears. Lippincott Williams & Wilkins. Philadelphia. 2007. pp.205-220.
7. Harrison's Principles of internal medicine, Dennis Kasper et.al 19th Edition. Pp.1342-1345.