SQUASH CYTOLOGY: AN EFFECTIVE TOOL FOR INTRA OPERATIVE DIAGNOSIS OF NEUROSURGICAL LESIONSArun Jain¹, Aditya Shrivastava², Bharat Jain³, R. L. S. Sengar⁴**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: The present study was done to study the effectiveness of Squash cytology as an intra-operative diagnostic tool for neurosurgical lesions. Forty Cases received from Department of Neurosurgery were randomly included in the study. The patients were from all the age groups with varying symptoms. Squash cytology showed 90% diagnostic accuracy when compared with histopathological Diagnosis. Thus it was concluded that squash cytology is a very effective tool for intra operative diagnosis of neurosurgical lesions.

KEYWORDS: Squash Cytology.

INTRODUCTION: Squash smear technique for as a means of obtaining rapid diagnosis for neurosurgical biopsies was used by Eisenhardt and Cushing in USA and simultaneously by European neurosurgeons in early 1930.¹

In 1937, Russel et al, from United Kingdom, championed the technique.^{2,3}

A rapid Pathological diagnosis of the space occupying lesion of the nervous system using squash smear cytology help the surgeon to monitor and modify the approach during surgery.

It is very important to obtain a pathological diagnosis intra operatively.

Squash smear cytology provides rapid diagnosis and facilitates quick decision both in neoplastic and non-neoplastic conditions.⁴

The aim of our study was to assess the usefulness and accuracy of cytologic smears by making squash preparation as a means of intraoperative diagnostic method in the neurosurgical lesions and its correlation with histopathological diagnosis on paraffin sections.

MATERIAL & METHODS:

We received the cases from the Department of Neurosurgery.

Material was obtained during craniotomy and as stereotactic biopsies.

The tissue was received in normal saline (Unfixed).

Small bits of tissue were selected avoiding necrotic and haemorrhagic areas.

The tissue is squashed and smeared between two clean grease free glass slides.

Minimum two smears were prepared from a particular site of the tissue.

The smear preparations were rapidly fixed in absolute alcohol for 1–2 min.

The slides were stained by haematoxylin and eosin and mounted in DPX.

The procedure takes approximately 10 minutes.

OBSERVATION: Total 40 cases were examined. Out of 40 cases, 33 cases were tumours, 05 cases were (Infective) benign lesions and in 02 cases in no opinion could be drawn. Of the 33 tumour cases, the distribution was as follows:

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Metastatic tumors and meningioma (07 cases each), Glioblastoma and pituitary adenoma (05 cases each) Astrocytoma (04 cases) and 1 case each of Gliosarcoma, Schwannoma, Medulloblastoma (PNET), undifferentiated carcinoma and choroid plexus papilloma.

The cases of undifferentiated carcinoma and choroid plexus papilloma were confirmed as olfactory neuroblastomas and Astrocytoma respectively on paraffin sections.

05 cases of chronic granulomatous lesion and 1 case each of abscess and haematoma were reported.

The overall diagnostic accuracy was 90 % (36 out of 40 cases were diagnosed correctly on squash smear examination and confirmed on permanent sections).

Age: Age ranged from 1 ½ yrs to 79 yrs.

1 ½ year old male child presented with PNET (Medulloblastoma) and a 79 year old male presented with Cerebellar abscess. Maximum cases were reported in 21 – 30 years age group.

Sex: Sex ratio was 1.6: 1 male to female.

DISCUSSION:

Smear technique can provide a rapid and reasonably accurate diagnosis.

The method could be utilized for needle biopsy or aspirated material at craniotomy.⁵

The method is simple, safe and rapid.

The haematoxylin and eosin staining in contrast to the usual supravital staining facilitated a permanent preparation and easy comparison of smear with the paraffin sections for accurate interpretation.

The variable thickness of the smear offered an advantage; the thin peripheral portions give cytological details and the thick central portion provides the general architectural details. Gliomas were diagnostically challenging due to diversity of cells and in resolving the general architectural details. (Reactive v/s Neoplastic).

The accuracy of Diagnosis by Squash Cytology depends on:

- a) Adequate and pertinent clinical history.
- b) Information about location of tumour or lesion.
- c) Adequate sampling at surgery.
- d) Selection of proper and adequate amount of material.

The overall diagnostic accuracy in our study was 90%.

A study at NIMHANS in 1989, by Asha et al reported the diagnostic accuracy of 87%.⁶

In literature the reported diagnostic accuracy varied from 89 – 94 %.⁷

It is worth emphasizing that the stress of providing diagnosis within minutes is partially responsible for some of the wrong labels.

However, in most published series the technique, appears to be highly reliable in experienced hands.

CONCLUSION: There is fairly good correlation between intra- operative squash cytology and the final histopathological diagnosis on permanent sections.

The squash technique is cheap, quick, does not require special equipment's and is suitable to small tissue received in stereotactic biopsies.

Squash smear cytology is a time tested tool for quick and reliable intra operative diagnosis.

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Fig. 1: Smear preparation shows astrocytes In a Astrocytoma. (H & E 200X)

Fig. 1

Fig. 2: Smear preparation shows bundled (Twisted Rope appearance) of neoplastic cells in a Schwannoma (H & E 200X)

Fig. 2

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Fig. 3: Smear preparation shows clusters of meningioma cells with uniform oval nucleoli and whorl formation. (H & E 200X)

Fig. 3

Fig. 4: Smear preparation shows oval blue tumor cells with distinct nucleoli and invisible cytoplasm in a medulloblastoma. (H & E 200X)

Fig. 4

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