CASE SERIES OF INTERESTING SCALP SWELLINGS DIAGNOSED ON FINE NEEDLE ASPIRATION USING ANCILLARY TECHNIQUES

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INTRODUCTION

- There are varied spectrums of lesions that occur in scalp that include non-neoplastic, benign and various primary and secondary malignant neoplsms.
- Aspiration cytology does not only differentiates between benign and malignant lesion, but the use of ancillary techniques helps in further subtyping of the malignant lesions[1].
- FNAC offers a minimally invasive, rapid pre-operative diagnostic procedure in skull lesions, avoiding the hazards of open biopsy at this vital site.
- It is essential to establish an accurate diagnosis as management and prognosis depends on it[2].

MATERIAL AND METHODS

- A series of fourteen cases of malignant scalp lesions as diagnosed on FNAC. Conventional smears were prepared and stained with MGG & H&E stains.
- Extra FNA material was retrieved in each case to be utilized for ancillary techniques which included cell block preparation, Flow cytometry and Immunocytochemistry.

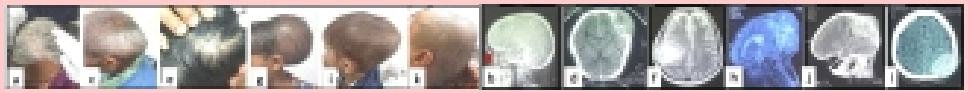

Figure-1: (a-i) Pictures of the patients showed malignant scalp lesions in first row with corresponding radiological images in second row demonstrating underlying skull involvement

Table-1: Cytomorphological features of malignant scalp lesions with application of ancillary techniques

Case No.	Age/ Gender	Cytological Findings	Ancillary Technique	Final Diagnosis
1	43Y/F	Papillaroid clusters of atypical cells with nuclear grooves and pseudo-inclusions	Cell block prepared and IHC performed. CK7:Positive, TTF1:Positive Thyroglobulin:Positive, Napsin: Negative	Based on the clinical history, cytomorphological and IHC findings diagnosis of **Metastasis from Papillary Thyroid Carcinoma** was rendered. [Figure-2a-d]
2	67Y/F	Clusters of atypical cells forming acini at places.	Cell block prepared and IHC performed. CK-7:Positive, CK-19: Positive,CK-20:Negative, CDX-2: Negative	Based on the clinical history, cytomorphological and IHC findings diagnosis of **Metastatic Adenocarcinoma with Primary in Gall Bladder** was rendered.
3	50Y/F	Clusters of atypical cells with focal acinar formation	Cell block prepared, IHC performed. CK20: positive, CDX-2 Positive, CK-7: Negative, WT-1: Negative	Based on the clinical history, cytomorphological and IHC findings diagnosis of **Metastatic Adenocarcinoma with Primary in Colon** was rendered
4	65Y/M	Clusters of atypical cells with focal papillaroid and acinar formations	Cell block prepared and IHC performed. CK-7:Positive, CK-19: Positive,CK-20:Negative, CDX-2: Negative	Based on the clinical history, cytomorphological and IHC findings diagnosis of **Metastatic Adenocarcinoma with Primary in Gall Bladder** was rendered. [Figure-1c-d]
5	80Y/M	Papillae and acinar structures are seen lined by columnar cells along with hemosiderin laden macrophages.	Cell block prepared, IHC performed. CK20: positive, CDX-2 Positive, CK-7: Negative, PSA: Negative	Based on the clinical history, cytomorphological and IHC findings diagnosis of **Metastatic Adenocarcinoma with Primary in Colon** was rendered.
6	58Y/M	Clusters and sheets of atypical keratinized squamous cells seen	ICC was performed for p-40, which was positive	Based on the clinical history, cytomorphological and ICC findings, diagnosis of **Metastatic Squamous Cell Carcinoma-Lung** was rendered.
7	60Y/M	Papillae and Clusters of atypical cells	Cell block prepared, IHC performed. CK20: positive, CDX-2 Positive, CK-7: Negative, PSA: Negative	Based on the clinical history, cytomorphological and IHC findings diagnosis of **Metastatic Adenocarcinoma with Primary in Colon** was rendered.
8	55Y/F	Sheets and acini of atypical cells	Cell block prepared, IHC performed. CK7: positive, CK-20: Negative, TTF-1: negative, Thyroglubulin: Negative, CDX-2: Negative, WT-1: negative	Based on the clinical history, cytomorphological and IHC findings, diagnosis of **Metastatic Adenocarcinoma of unknown primary** was rendered. [Figure-1a-b]
9	49Y/F	Spindle to epithelioid cells with eccentric nuclei and moderate amount of cytoplasm.	Cell block prepared, IHC performed. Vimentin: Positive, S100:Positive,CD99: Positive, Desmin: Negative, SMA: Negative	Based on the clinical, radiological findings along with the aid of IHC and cytomorphology diagnosis of **Pleomorphic sarcoma likely Osteosarcoma** was rendered. [Figure-1e-f, Figure-3a-d]
10	21Y/M	Pleomorphic spindle cells with eccentric nuclei and moderate amount of cytoplasm.	Cell block prepared, IHC performed. Vimentin: Positive, S100:Positive,CD99: Positive, Desmin: Negative, SMA: Negative	Based on the clinical, radiological findings along with the aid of IHC and cytomorphology diagnosis of **Pleomorphic sarcoma likely Osteosarcoma** was rendered.
11	10Y/M	Malignant round cell tumor	ICC was performed on alcohol fixed smears. Cell block prepared, IHC performed. Vimentin: Positive, ,CD99: Positive, FLI-1: positive, Desmin: Negative, SMA: Negative	Based on the clinical, radiological findings along with the aid of ICC/IHC and cytomorphology diagnosis of **Ewing's sarcoma** was rendered. [Figure-1g-h, Figure-4a-d]
12	6Y/M	Sheets of malignant small round cells	Cell block prepared, IHC performed. Vimentin: Positive, ,CD99: Positive, FLI-1: positive, Desmin: Negative, SMA: Negative	Based on the clinical, radiological findings along with the aid of IHC and cytomorphology diagnosis of **Ewing's sarcoma** was rendered. [Figure-1i-j]
13	45Y/F	Scattered population of atypical plasma cells	ICC was performed on alcohol fixed smears. Additional material utilized for FNA flow cytometry CD 138: Positive CD 56: Positive Lambda: Positive Kappa: Negative	Based on the clinical history, ICC and flow cytometry findings diagnosis of **Multiple Myeloma with Lambda chain restriction** was rendered. [Figure-1k-l, Figure-5g-k]
14	61Y/M	Scattered lymphoid population with highly atypical lymphoid cells showing doughnut, wreath like and embroid body shape nuclei	Cell block prepared, IHC performed. LCA: Weak positive CD3: Positive CD30: Positive EMA: Positive CD20: Highlights scattered B cells ALK: Negative	Based on the clinical, radiological findings along with the aid of IHC and cytomorphology diagnosis of **Anaplastic Large Cell Lymphoma-ALK negative** was rendered. [Figure-5a-f]

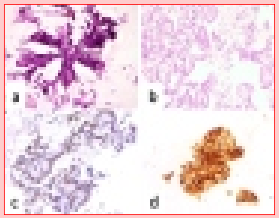

Figure-2: Cytosmear and cell block section showing a papillary adenocarcinoma with corresponding cell block sections show TTF1 and thyroglobulin positivity (A-D) consistent with metastatic papillary thyroid carcinoma (A,B: H & Ex100, C: DABx100, D: DABx400)

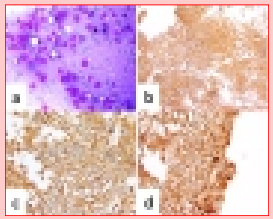

Figure-3: Cytosmear showing singly scattered pleomorphic epithelioid cells suggestive of pleomorphic sarcoma (A), corresponding cell block sections show diffuse vimentin, CD99 and S100 positivity (B-D) suggestive of osteosarcoma (A: MGGx400, B-D: DABx400)

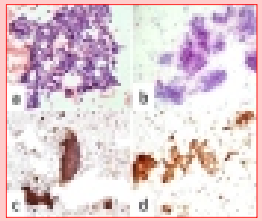

Figure-4: Cytosmear showing a malignant round cell tumor with inconspicuous vacuolated cytoplasm (A), with cytoplasmic PAS positivity (B), corresponding immunocytochemistry shows diffuse CD99 and FLI1 positivity (C,D) consistent with Ewing's sarcoma (A: PAPx200, B: PASx100, C, D: DABx100)

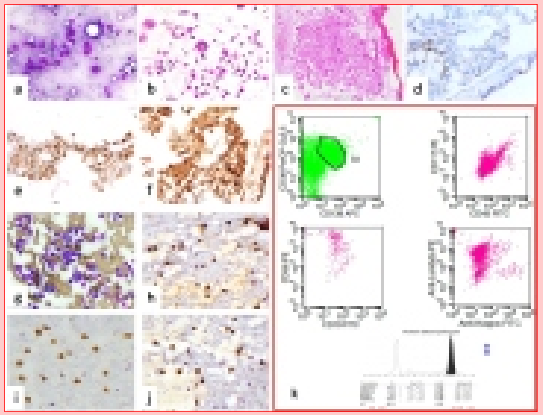

Figure-5: Cytosmears and cell block section showing a pleomorphic lymphoid neoplasm with singly scattered cell demonstrating doughnut/embryoid shaped nuclei and polymorphic inflammatory background (A-C), corresponding cell block sections show patchy CD45, diffuse CD3 and CD30 positivity (D-F) consistent with anaplastic large cell lymphoma, cytosmear showing singly scattered atypical plasma cells with binucleated and multinucleated forms (G), corresponding immunocytochemistry shows diffuse vimentin, lambda light chain, CD138 and CD56 expression (H-J) consistent with neoplastic plasma cell disorder, flow cytometry on corresponding FNA material demonstrate plasma cells with CD38/138 expression, dim CD45, bright CD56 expressions, absence of CD19 expression with lambda light chain restriction, serum electrophoresis of same patient shows "M"band (K) [A: MGGx400, B,C: H&Ex100, D-F: DABx400, G: MGGx400, H-J: DABx200: K: flow cytometry scatter plot and serum protein electrophoresis diagram]

RESULT

Cases	Cytological Diagnosis	Subtyped
4 cases Skull primary	Case 9 & 10:Pleomorphic sarcoma Case 11 & 12:Malignant round cell tumor	Osteosarcoma Ewing sarcoma
8 cases of Metastic skull lesions	Case1,2,3,4, 5, 7 & 8:Metastatic Adenocarcinoma and case 6: Metastatic SCC from lung	Case 1: Metastasis from Thyroid carcinoma, Case 2 & 4: Metastasis from gall bladder, Case 3, 5 & 7: Metastasis from colon, Case6: Metastasis from squamous cell carcinoma lung.
2 cases of hemato-lymphoid neoplasms	Case13: Plasmacytoma, Case14: Non-hodgkin lymphoma	Mutiple myeloma with lambda chain restriction, Anaplastic large cell lymphoma Alk- negative

CONCLUSION

- FNAC of skull lesions is a minimally invasive, easy out-patient procedure that offers rapid diagnosis.
- Not only does it help in the diagnosis of malignancy but, the implementation of ancillary techniques help in further subtyping also.
- This guides the clinician to plan an appropriate management for the patient.
- In our study we have highlighted the importance of "Do more with less" policy so as to utilize cytological material optimally for accurately diagnosing skull lesions.

CONCLUSION

1. Mondal A, Ray CK. Role of fine needle aspiration cytology in diagnosis of malignant scalp and underlying bone tumours. Indian J Pathol Microbiol 1996;39:265-9.
2. Hingway and Kodate: Cytodiagnosis of Scalp Lesions Journal of Medical Sciences and Health Volume 1/Issue 1 2015 :1-09