Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Pathology and Oncology

Journal homepage: www.ijpo.co.in

Case Series

Six months with fluid cytology in a regional cancer Institute: Three awkward cases worthy of discussion

Sarbashis Hota[1*], Dipkana Das[1], Pronati Gupta[1]

[1]Dept. of Laboratory Medicine, Chittaranjan National Cancer Institute, Kolkata, West Bengal, India

Abstract

In dedicated cancer care centres, the major bulk of cases deal with adenocarcinoma deposits in effusion fluid cytology or lymphoblasts in CSF as occasional findings, where there is a functional hemato-oncology unit. Here, we present three not so common cases even for a regional cancer Institute- Pleural effusion due to secondary involvement of DLBCL, CSF spread of Medulloblastoma, and a case of AML with CNS relapse. It is mostly challenging for the practising pathologists, to provide a diagnosis based on the smear findings on first hand; as universally(not just in our Institute!) there is reluctance on behalf of the clinicians to provide at least a bare minimum case history.

Keywords: Fluid cytology, Lymphomatous effusion, Medulloblastoma, CSF, AML, CNS relapse.

Received: 30-01-2025; **Accepted:** 10-03-2025; **Available Online**: 15-03-2025

1. Introduction

The complete utilization of the scope that the field of cytopathology provides, is still in its early stages in most of the centres in India. In dedicated cancer care centres, the major bulk of cases deal with adenocarcinoma deposits in effusion fluid cytology or lymphoblasts in CSF as occasional findings, where there is a functional hemato-oncology unit. Here, we present three not so common cases even for a regional cancer Institute. It is mostly challenging for the practising pathologists, to provide a diagnosis based on the smear findings on first hand; as universally (not just in our Institute!) there is reluctance on behalf of the clinicians to provide at least a bare minimum case history.

2. Case Reports

2.1. Case 1

A pleural fluid was received in the lab, collected from a 44 years old lady. The cell count was 8000/cmm. The stained centrifuged deposit showed high cellularity comprising predominantly of singly dispersed atypical mononuclear cells without any cluster formation. The cells were large, round with high N:C ratio and irregular nuclear membrane, having fine chromatin, prominent nucleoli and basophilic cytoplasm (**Figure 1**).

History revealed that the patient is admitted with shortness of breath with pleural effusion for which tapping was done. She is referred from a peripheral centre with large conglomerated retroperitoneal mass with omental thickening associated with retroperitoneal and mediastinal lymphadenopathy. The cell block prepared from the fluid (**Figure 2**) was diffusely and strongly positive for CD45 and CD20 (**Figure 3**), where as calretinin highlighted the scattered occasional mesothelial cells. A report suggestive of lymphomatous pleural effusion was made. The core biopsy from abdominal mass later revealed that indeed it's a case of Diffuse Large B cell Lymphoma, Germinal Centre B cell Type;- which has secondarily involved pleura. The patient was started R CHOP, and is stable now.

*Corresponding author: Sarbashis Hota
Email: sarbashishota94@gmail.com

https://doi.org/10.18231/j.ijpo.2025.009

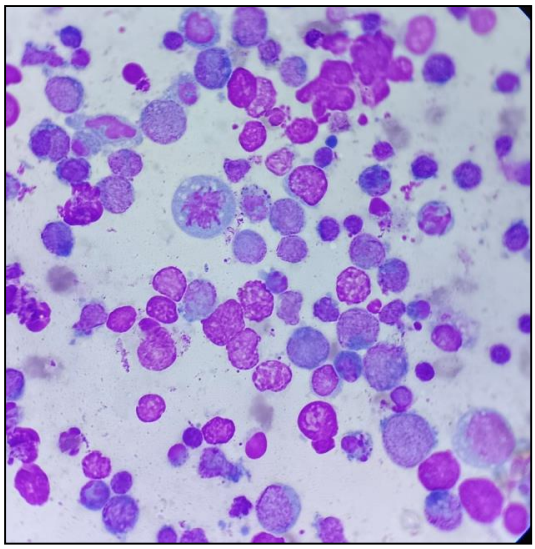

Figure 1: Pleural fluid cytology, MGG, 400X

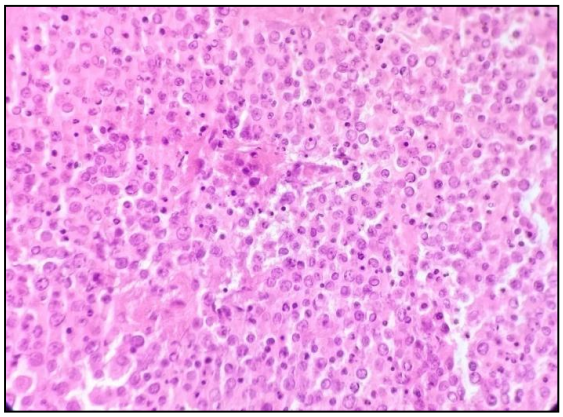

Figure 2: Cell block, H & E, 100X

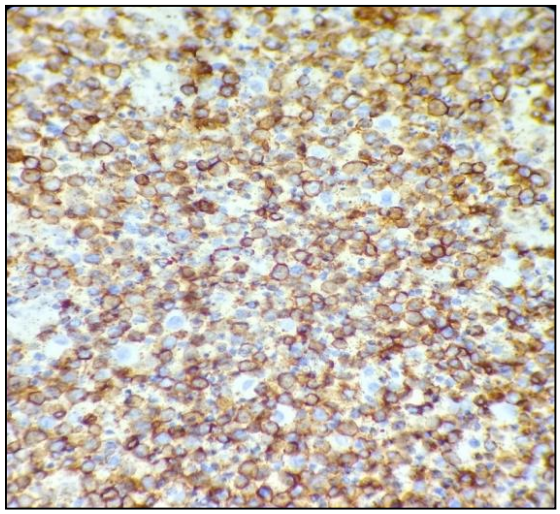

Figure 3: IHC, CD 20 on cell block, 100X

2.2. Case 2

2 ml of CSF was sent for routine examination collected from a 13 year old boy. Cell count was 20/cmm. Stained cytospin preparation showed singly dispersed large atypical mononuclear cells with nuclear hyperchromasia and high N:C ratio. A single cluster was found containing similar cells with prominent nuclear moulding (**Figure 4**).

History revealed that the patient is being treated in the radiation oncology unit, who was admitted with complaints of vomiting. Clinical records uncovered that the patient was a known case of classic Medulloblastoma, who was operated outside three months back with implantation of Ventriculo-peritoneal shunt.

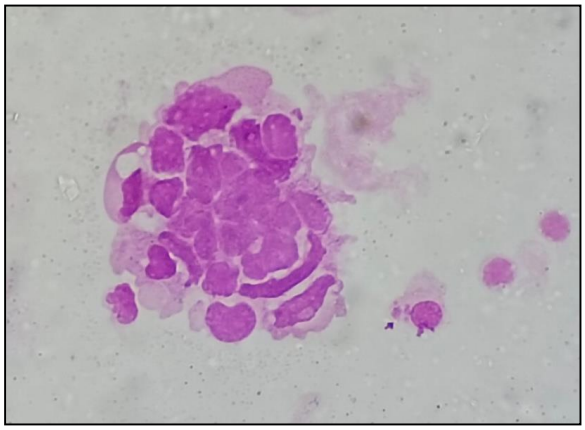

Figure 4: Medulloblastoma cell cluster in CSF, 400X, MGG

The report was dispatched as CSF positive for Medulloblastoma spread.

2.3. Case 3

4 ml of CSF was received for cell type, cell count and culture sensivity testing, from a 54 year old male patient. The cell count was 2500/cmm. Stained cytospin preparation revealed singly dispersed atypical mononuclear cells of blastoid morphology having large indented nuclei with multiple prominent nucleoli, fine chromatin and relatively abundant granular cytoplasm (**Figure 5**).

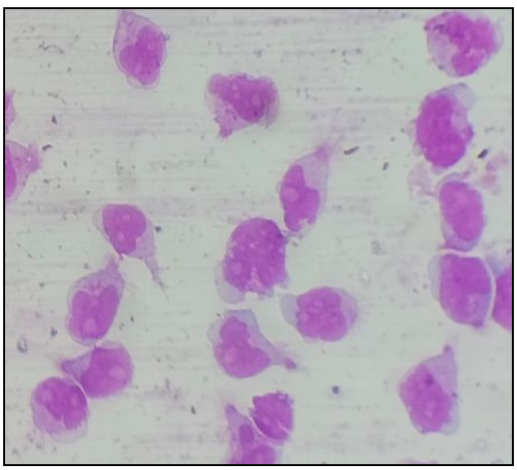

Figure 5: Myeloid blasts in CSF, MGG, 400X

History revealed the patient is a known case of Acute Myeloid Leukaemia with monocytic differentiation who was treated with induction using 7+3 regimen and was in remission. The CBC on the same day showed circulating

blasts. The patient was admitted with signs and symptoms of meningeal irritation and the clinician suspected a case of bacterial meningitis.

The case was reported as 99% blasts/blast equivalents in CSF and declared as a CNS relapse.

3. Discussion

Usually discohesive cells in cytology specimens suggest a hematolymphoid process,[1] though few cases of Anaplastic large cell lymphoma may present with cohesive clusters. In adults, lymphoma is the third most common cause of malignant pleural effusion,[1] after lung and breast carcinoma. Pleural effusion is not an uncommon feature in case of lymphoma, chylous effusion often develops as a sequale to mediastinal nodal involvement especially in Hodgkin Lymphoma.[2] According to the study carried out by Vega et al,[3] the most common lymphoma involving the pleura is Diffuse Large B cell Lymphoma. The next important categories in the row are Follicular lymphoma, Chronic Lymphocytic Leukaemia and Precursor T-Acute lymphoblastic Leukaemia. The prognostic significance of pleural effusion in DLBCL is discussed by Porcel J M et al.[4] When no other focus is visible in PET CT, possibility of Diffuse B cell lymphoma associated with chronic inflammation (Pyothorax associated lymphoma) and Primary effusion lymphoma should be investigated in appropriate clinical settings.

Here, in case 1, primary diagnosis of the patient was made from pleural fluid cytology, before final biopsy report came. The patient was transferred to Haemato-oncology unit, staging investigations were done accordingly and chemo was started at the earliest after arrival of the final report.

Anaplastic ependymoma may come as a closest differential diagnosis of Medulloblastoma in CSF,[1] though the age group is slightly higher. Synaptophysin positivity in cell block/ immunocytochemistry may be used for confirmation,[5] however, in this case, on obtaining a known history of previously diagnosed Medulloblastoma, the report was despatched;- as the residual specimen was scanty for any definite work up. CSF dissemination (M1 stage) is a high risk prognostic factor in Medulloblastoma.[6] Hagel C et al,[7] recommended CSF medulloblastoma staging should be performed routinely 14 days after surgery. Cytological tumour dissemination alone is associated with an outcome comparable to M2/M3 stage. According to their study, tumour cell clusters seem to have a greater impact on prognosis than single tumour cells.

In case 2, adjuvant craniospinal irradiation and chemotherapeutic regimen were restructured after arrival of report, as the tumour was upstaged.

Meningeal involvement of AML is not so common that of ALL or other aggressive lymphoid neoplasms like DLBCL or Burkitt lymphoma.[8] According to the study by Yasar H et al,[9] 4.6% cases of AML are complicated by CSF involvement. Bar M et al[10] has discussed about CNS involvement in AML patients undergoing hematopoietic stem cell transplantation. CNS involvement is more common during relapse and cases with isolated CNS relapse have been reported in literature.[9] CNS involvement at diagnosis is associated with poor prognosis in adult AML, though it is not the case in pediatric population. Monocytic component predominant AML, Inversion 16, chromosome 11 abnormalities, FLT3 internal tandem duplications mutations are the reported risk factors[9] for CNS involvement. Hyperleucocytosis, increased lactate dehydrogenase level, systemic relapse of acute promyelocytic leukaemia are the other postulated factors described by some.

Our case was an AML with monocytic differentiation, which was previously confirmed by flow cytometry. Intrathecal cytarabine was started along with advanced chemotherapy regimen to treat the patient following the CSF report.

4. Conclusion

Thorough evaluation of fluid cytology by an experienced pathologist can yield important diagnostic clues or act pivotal in patient management, if supplemented by appropriate clinical details and ancillary techniques when necessary.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Gray W, Kocjan G. Diagnostic Cytopathology. 3rd ed. Churchill Livingstone, Elsevier; 2010.
2. Weick JK, Kiely JM, Harrison EG Jr, Carr DT, Scanlon PW. Pleural effusion in lymphoma. *Cancer*. 1973;31(4):848–53.
3. Vega F, Padula A, Valbuena JR, Stancu M, Jones D, Medeiros LJ. Lymphomas involving the pleura: a clinicopathologic study of 34 cases diagnosed by pleural biopsy. *Arch Pathol Lab Med*. 2006;130(10):1497–502.
4. Porcel JM, Cuadrat I, García-Cerecedo T, Pardina M, Bielsa S. Pleural Effusions in Diffuse Large B-Cell Lymphoma: Clinical and Prognostic Significance. *Lung*. 2019;197(1):47–51.
5. Damiani D, Suciu V, Andreiuolo F, Calderaro J, Vielh P. Cytomorphological analysis of cerebrospinal fluid in 70 pediatric patients with Medulloblastoma and review of the literature focusing on novel diagnostic and prognostic tests. *Cancer Cytopathol*. 2015;123(11):644–9.
6. von Bueren AO, Hagel C, Rutkowski S. Cerebrospinal fluid evaluation in adult patients with medulloblastoma. *Lancet Oncol*. 2020;21(3):e120.
7. Hagel C, Sloman V, Mynarek M, Petrasch K, Obrecht D, Kuhl J et al. Refining M1 stage in medulloblastoma: criteria for cerebrospinal fluid cytology and implications for improved risk stratification from the HIT-2000 trial. *Eur J Cancer.* 2022;164:30–8.
8. Deak D, Gorcea-Andronic N, Sas V, Teodorescu P, Constantinescu C, Iluta S et al. A narrative review of central nervous system involvement in acute leukaemias. *Ann Transl Med*. 2021;9(1):68.

9. Yasar HA, Cinar OE, Koylu NY, Barista I, Goker H, Buyukasik Y. Central nervous system involvement in patients with acute myeloid leukaemia. *Turk J Med Sci*. 2021;51(5):2351–6.
10. Bar M, Tong W, Othus M, Loeb KR, Estey EH. Central nervous system involvement in acute myeloid leukemia patients undergoing hematopoietic cell transplantation. *Biol Blood Marrow Transplant*. 2015;21(3):546–51.

Cite this article: Hota S, Das D, Gupta P. Six months with fluid cytology in a regional cancer institute: Three awkward cases worthy of discussion. *Indian J Pathol Oncol*. 2025;12(1):46–49.