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Original Research Paper

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CYTOLOGICAL EVALUATION OF ASCITIC FLUID IN SUSPECTED OVARIAN MALIGNANCY USING THE INTERNATIONAL SYSTEM FOR REPORTING SEROUS FLUID CYTOPATHOLOGY (TIS): A CASE SERIES

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ABSTRACT

Background: Ascitic fluid cytology is an important ancillary investigation in ovarian malignancies, particularly in patients presenting with advanced-stage disease and peritoneal dissemination. Standardized reporting systems in serous fluid cytopathology have improved diagnostic uniformity and clinical communication.[1] **Aim:** To evaluate the cytomorphological spectrum of ascitic fluid samples in suspected ovarian malignancy cases using the International System for Reporting Serous Fluid Cytopathology (TIS). **Materials and Methods:** This retrospective study included 15 ascitic fluid samples received over a one-year period in the Department of Pathology. Smears prepared from centrifuged deposits were stained using routine cytological stains and examined microscopically. Reporting was performed according to the International System for Reporting Serous Fluid Cytopathology (TIS). Cases were categorized as nondiagnostic (ND), negative for malignancy (NFM), atypia of undetermined significance (AUS), suspicious for malignancy (SFM), and malignant (MAL). **Results:** Among the 15 cases studied, 6 cases (40%) were categorized as nondiagnostic (ND), 4 cases (26.7%) as negative for malignancy (NFM), and 5 cases (33.3%) as malignant (MAL). No cases were categorized as atypia of undetermined significance (AUS) or suspicious for malignancy (SFM). Malignant effusions predominantly showed features suggestive of metastatic adenocarcinoma and high-grade serous carcinoma, including papillary fragments, cellular crowding, pleomorphic nuclei, and prominent nucleoli. **Conclusion:** Ascitic fluid cytology, when interpreted using a standardized reporting system, provides valuable diagnostic information in ovarian malignancies. The International System for Reporting Serous Fluid Cytopathology improves reporting consistency and facilitates better clinical correlation.

KEYWORDS :

INTRODUCTION

Ovarian carcinoma is one of the most lethal gynecological malignancies and is frequently diagnosed at an advanced stage because of vague and nonspecific symptoms.[2] Ascites is a common manifestation in advanced ovarian tumors and usually indicates peritoneal involvement by malignant cells.[3]

Cytological examination of ascitic fluid is a simple, minimally invasive, and cost-effective diagnostic modality that aids in the detection of malignant cells and assessment of disease spread.[4] Positive ascitic fluid cytology has important implications in staging and prognosis.[5]

Interpretation of serous fluid cytology may occasionally be challenging because reactive mesothelial cells can mimic malignant epithelial cells.[6] To improve diagnostic reproducibility and standardize reporting practices, the International Academy of Cytology and the American Society of Cytopathology proposed the International System for Reporting Serous Fluid Cytopathology (TIS).[1] This system categorizes serous fluid specimens into five diagnostic categories:
Nondiagnostic (ND)
Negative for malignancy (NFM)
Atypia of undetermined significance (AUS)
Suspicious for malignancy (SFM)
Malignant (MAL)

The present study was undertaken to analyze the cytomorphological findings in ascitic fluid samples from suspected ovarian malignancy cases using the TIS reporting framework.

MATERIALS AND METHODS

This retrospective observational study included 15 ascitic fluid samples received in the Department of Pathology between May 2025 and May 2026 from patients clinically and radiologically suspected to have ovarian malignancy.

Ascitic fluid samples were processed using conventional cytological techniques. Following centrifugation, smears were prepared from the sediment and stained using hematoxylin and eosin and Papanicolaou stains wherever applicable.[7,8]

All smears were evaluated microscopically, and reporting was performed according to the International System for Reporting Serous Fluid Cytopathology (TIS).[1] Cases were categorized into:
Nondiagnostic (ND)
Negative for malignancy (NFM)
Atypia of undetermined significance (AUS)
Suspicious for malignancy (SFM)
Malignant (MAL)
Clinical and radiological findings were reviewed wherever available.

RESULTS

A total of 15 ascitic fluid samples were evaluated during the study period.
Based on TIS categorization:
6 cases (40%) were categorized as nondiagnostic (ND)
4 cases (26.7%) as negative for malignancy (NFM)
5 cases (33.3%) as malignant (MAL)
No cases were categorized as atypia of undetermined significance (AUS)
No cases were categorized as suspicious for malignancy (SFM)

The malignant category predominantly included cases showing cytomorphological features suggestive of metastatic adenocarcinoma and high-grade serous carcinoma. Smears demonstrated high cellularity with atypical epithelial cells arranged in papillary fragments, three-dimensional clusters,

and singly scattered cells. Tumor cells showed enlarged pleomorphic nuclei, coarse chromatin, irregular nuclear membranes, and conspicuous nucleoli.[6]

Cases reported as negative for malignancy showed reactive mesothelial cells, inflammatory cells, and occasional macrophages in a proteinaceous background without evidence of malignant cells.

The nondiagnostic category constituted a significant proportion of the study. These samples showed markedly scant cellularity, hemorrhagic background, poor preservation, or degenerative changes that limited definitive interpretation. Inadequate sampling and low cellular yield were considered major contributing factors.[11]

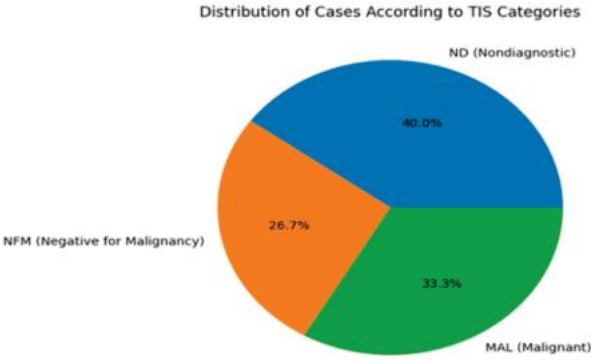

Fig 1- Distribution of Cases According to Tis Categories

TIS Category	Number of Cases	Percentage
ND (Nondiagnostic)	06	40%
NFM (Negative for Malignancy)	04	26.7%
AUS(Atypia of undetermined significance)	00	0%
SFM(Suspicious for malignancy)	00	0%
MAL (Malignant)	05	33.3%

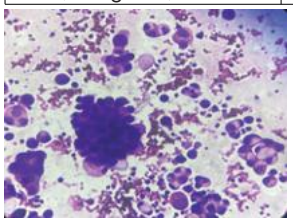

Fig 2

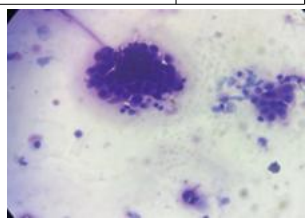

Fig 3

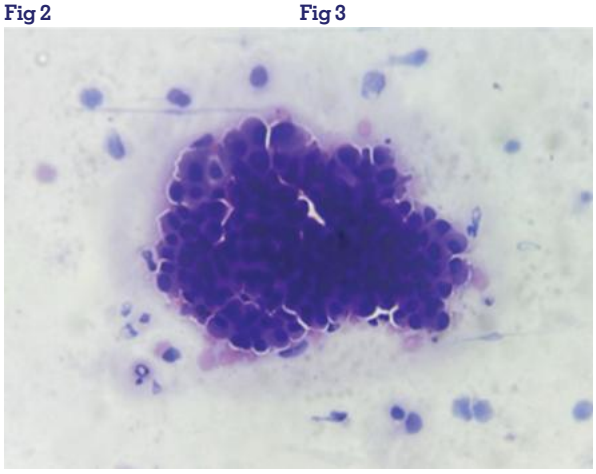

Fig 4

Fig 2,3,4- Cytology Smear Showing Cohesive Three Dimensional Clusters of Atypical Epithelial Cells with Enlarged Hyperchromatic Nuclei, Prominent Nucleoli, and Moderate Pleomorphism in a Hemorrhagic Background (MGG Stain, ×400)

DISCUSSION

Ascitic fluid cytology plays a significant role in the evaluation of ovarian malignancies, particularly in advanced disease associated with peritoneal dissemination.[4,5] The present study demonstrated that a substantial proportion of cases showed malignant cytology, reinforcing the utility of ascitic fluid examination in routine diagnostic practice.

High-grade serous carcinoma is the most common ovarian malignancy associated with malignant ascites.[2,9] The malignant cases in this study demonstrated typical cytological features including papillary fragments, marked nuclear atypia, prominent nucleoli, and cellular crowding, which are consistent with previously documented findings.[6]

One of the important diagnostic challenges in effusion cytology is differentiating reactive mesothelial cells from malignant epithelial cells.[6,7] Reactive mesothelial cells may show nuclear enlargement and prominent nucleoli, leading to potential diagnostic difficulty. Careful assessment of cellular architecture, nuclear morphology, and background features is therefore essential.

The International System for Reporting Serous Fluid Cytopathology (TIS) has introduced a structured reporting approach that improves diagnostic reproducibility and communication between pathologists and clinicians.[1] Use of standardized terminology also helps in risk stratification and facilitates uniform reporting practices across laboratories.

In the present study, the nondiagnostic category accounted for 40% of cases. Low cellularity, hemorrhagic background, degenerative changes, and inadequate sampling may have contributed to the increased proportion of nondiagnostic specimens. Similar limitations have been described in previous studies evaluating serous fluid cytology.[11] No cases in the present study fell into the AUS or SFM categories, possibly reflecting relatively clear-cut benign and malignant cytomorphological features in the evaluated specimens.

Ancillary techniques such as cell block preparation and immunocytochemistry may further improve diagnostic accuracy, particularly in paucicellular or morphologically challenging samples.[10,11]

Although the present study included a relatively small number of cases, it reflects the practical spectrum of cytological findings encountered in routine pathology practice and highlights the usefulness of TIS-based reporting in ovarian malignancy-associated ascitic fluid cytology.

CONCLUSION

Ascitic fluid cytology remains an important minimally invasive investigation in patients with suspected ovarian malignancy. The use of the International System for Reporting Serous Fluid Cytopathology provides a standardized and reproducible framework for reporting serous fluid specimens. Accurate cytomorphological evaluation, combined with proper specimen processing and standardized terminology, improves diagnostic reliability and aids in patient management.

REFERENCES

1. Farahani SJ, Baloch ZW, Retamero JA, et al. The International System for Reporting Serous Fluid Cytopathology—diagnostic categories and clinical management. J Am Soc Cytopathol. 2020;9(6):469-477.
2. Reid BM, Permuth JB, Sellers TA. Epidemiology of ovarian cancer: a review. Cancer Biol Med. 2017;14(1):9-32.
3. Runyon BA. Malignancy-related ascites and ascitic fluid "humoral tests of malignancy". J Clin Gastroenterol. 1994;18(2):94-98.
4. Karoo RO, Lloyd TD, Garcea G, Redway HD, Robertson GS. How valuable is ascitic cytology in the detection and management of malignancy? Postgrad Med J. 2003;79(932):292-294.
5. Zuna RE, Behrens A. Peritoneal washing cytology in gynecologic cancers: long-term follow-up of 355 patients. J Natl Cancer Inst. 1996;88(14):980-987.

6. Davidson B. The diagnostic and molecular characteristics of malignant mesothelioma and ovarian/peritoneal serous carcinoma in effusions. Diagn Cytopathol. 2007;35(7):442-447.
7. Koss LG, Melamed MR. Koss' Diagnostic Cytology and Its Histopathologic Bases. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2006.
8. Bibbo M, Wilbur DC. Comprehensive Cytopathology. 4th ed. Philadelphia: Elsevier Saunders; 2015.
9. Prat J. Ovarian carcinomas: five distinct diseases with different origins, genetic alterations, and clinicopathological features. Virchows Arch. 2012;460(3):237-249.
10. Nathan NA, Narayan E, Smith MM, Horn MJ. Cell block cytology: improved preparation and its efficacy in diagnostic cytology. Am J Clin Pathol. 2000;114(4):599-606.
11. Bhanvadia VM, Santwani PM, Vachhani JH. Analysis of diagnostic value of cytological smear method versus cell block method in body fluid cytology: study of 150 cases. Ethiop J Health Sci. 2014;24(2):125-131.