



Case Report

Cytomorphological analysis of body fluids in tertiary care centre

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ABSTRACT

Introduction: Cytological study of body fluids has become integral part in both diagnostic and management of suspected malignant cases. The meticulous examination of body fluid for these cytomorphological properties throws light on the cause, presence of metastatic cells, typing of unknown cases, staging and prognosis of cancer.

Aims and Objectives: 1) To study and evaluate current trends in cytological evaluation of body fluids for various pathological conditions in a tertiary care centre. 2) To analyse their frequency in relation to diagnosis.

Materials and Methods: The present study is prospective type of analysis of 311 body fluids received in Department of pathology for duration of one year from Jan 2018 to Dec 2018 in our tertiary care centre.

Results: A total of 311 body fluid samples were analyzed in this study. Pleural fluid comprised of the major bulk of the study with 120 cases followed by peritoneal fluid with 100 cases. Non-malignant diagnosis was given in majority of the cases. Slight male preponderance was noted with male to female ration 1.37:1.

Conclusion: Cytological analysis of body fluid is routine diagnostic investigation which offers definite aid to the treating physician. Preliminary body fluid analysis in resource limited setups still remains the most simple, convenient and cost effective technique in reaching to a particular diagnosis.

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1. Introduction

Cytology is a study either on exfoliated cells or the cells aspirated by the needle. Normally, all the body cavities are lined by monolayered mesothelial cells with minimal amount of fluid in it and the main function being the lubrication and safe guarding the underlying viscera. Any imbalance between fluid formation and removal leads to effusion, as stated by Starling's law.¹ The peritoneal, pleural, cerebrospinal and pericardial fluids comprise the major chunk of body fluids.² And accumulation of fluid in various body cavities can occur in vast range of benign conditions and it also a frequent clinical presentation and complications of Malignant disorder.

Cytological analysis of body cavity fluid is a quite cost effective procedure, rapid and easy to perform with another

prime utility of serving both as a diagnostic as well as a therapeutic intervention. It serves as definitive guide in disease progression with monitoring of treatment with good accuracy.

2. Aims and Objective

Our present study was undertaken with the objective of assessing the incidence and trends of different types of cytological fluid for various pathological diseases received at our tertiary care hospital.

3. Materials and Methods

The present study was prospective hospital based study of body fluids received in the cytology section of department of Pathology for a duration of one year from Jan 2018 to Dec 2018. All the body fluid samples received for the cytological examination was included in our study. Relevant clinical

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details such as age, sex, history and accompanying clinical presentation were documented from the requisition.

All the received samples were centrifuged for 2000-3000 rpm for 15 minutes, supernatant was discarded and both wet smears and air dried smears were prepared from the sediments. They were stained with Leishman, H & E and Papanicolau stain. Improved Neubauer chamber was used for cell count. All the sample were evaluated for biochemical parameters and cytology, data were summarized and analyzed.

4. Results and Observation

A total of 311 body fluid samples were analyzed in this study, with the age range of 12 – 81 years. Maximum number of cases were encountered in 4th decade followed by 3rd decade.

In our study male preponderance was noted with male to female ration of 1.37: 1.

Out of 311 body fluids across both sexes, pleural fluid comprised the major bulk accounting to 120 cases, followed by peritoneal fluid accounting to 100 cases, 20 were synovial fluid, 40 were CSF, 20 were sputum and remaining 11 belonged to miscellaneous body fluids.

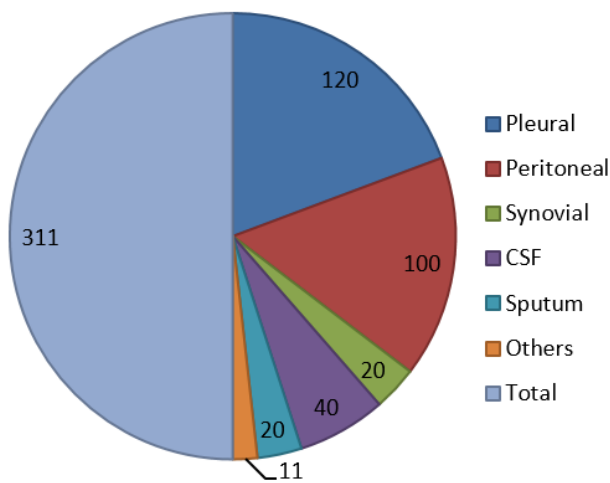


Fig. 1: Distribution of various body fluids

In our study, a total of 15 cases (4.82%) were found to be malignant, out of which 08 cases (2.57%) were encountered in pleural fluid and 07 cases (2.55%) in peritoneal fluid. None of the other fluids showed malignancy. Among the non neoplastic cases, 181 cases (58.19%) were transudative and 90 cases (28.93%) were exudative. We also encountered 20 cases (6.43%) of sputum for malignant cells out of which 18 cases were non malignant and no opinion was possible in 2 cases. In our study we received 20 cases (6.43%) of synovial fluid, none of them were malignant.

Out of 40 cases of CSF received, 36 cases were non neoplastic and 04 cases were of scant cellularity with no

opinion possible. One case of cryptococcal meningitis was observed in immunocompromised patient.

Among other fluid we received 5 cases of ovarian tumours, 2 cases of cyst, 2 cases from pancreatic fluid and 2 cases from Liver abscess.

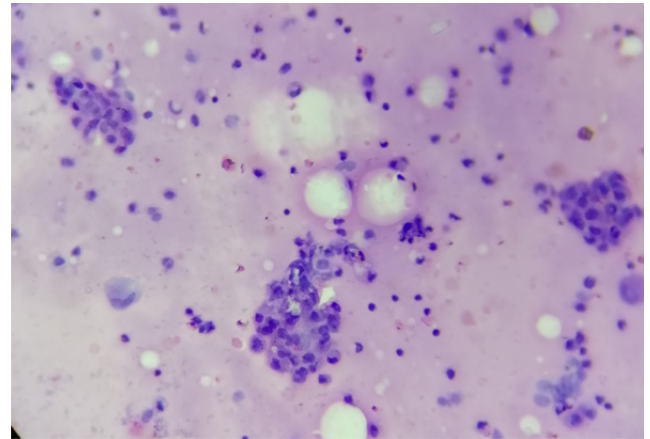


Fig. 2: Reactive Mesothelial cells: Smears shows reactive mesothelial cells in the background of inflammatory infiltrate in peritoneal fluid.(Leishman, 10x)

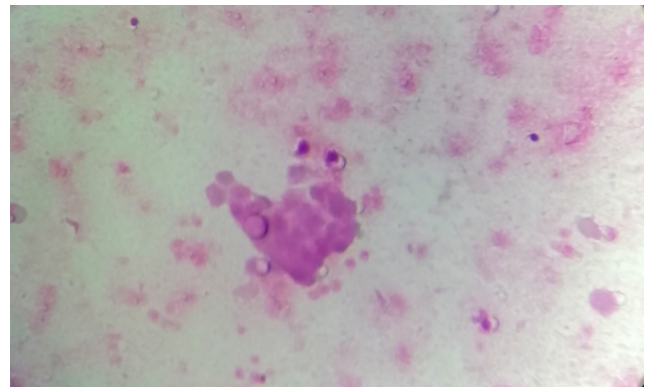


Fig. 3: Metastatic Adenocarcinoma in pleural fluid: Smear shows three dimensional cluster of malignant cells in pleural fluid.(H&E, 40x)

We encountered 01 cases of Cryptococcus meningitis and Indian ink and Mucicarmine stain was done to confirm the diagnosis.

5. Discussion

Lucke and Kiebs (1867), were among the pioneers of effusion cytology. They are credited with the description of atypical or malignant cells in the ascitic fluid. Malignancy in pleural effusion was first described by Quincke in 1882. After the introduction of lumbar puncture in 1891, CSF examination gained momentum.²

Table 1: Age wise distribution of various cases.

Age	Pleural	Peritoneal	Types of fluid		
			Synovial	CSF	Sputum
0-10	02	00	00	05	00
11-20	09	05	00	02	00
21-30	10	10	01	03	01
31-40	24	15	03	04	04
41-50	37	32	08	09	09
51-60	12	12	02	06	02
61-70	11	11	03	02	03
71-80	8	08	02	05	01
>80	7	07	01	04	00
Total	120	100	20	40	20

Table 2: Sex wise distribution of various body fluids.

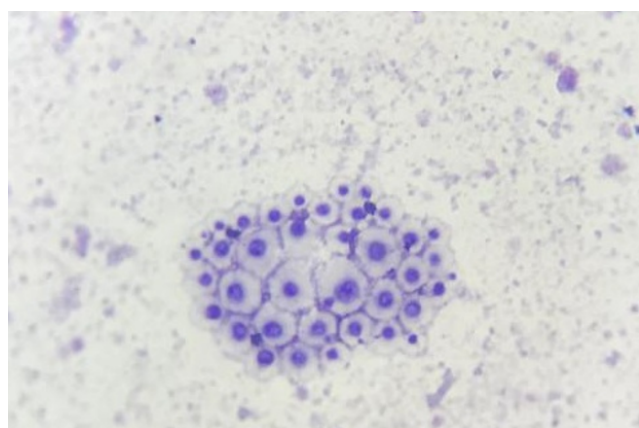
Gender	Pleural	Peritoneal	Synovial	Types of fluid			Total
				CSF	Sputum	Others	
Male	72	56	13	19	16	04	180
Female	48	44	07	21	04	07	131
Total	120	100	20	40	20	11	311

Table 3: Distribution of transudate and exudate in our study population

Type of fluid	Transudate	Exudate
Pleural	75	45
Peritoneal	63	37
CSF	34	6
Others	09	02
Total	181	90

Table 4: Distribution of neoplastic and non neoplastic lesions in various body fluids.

	Pleural	Peritoneal	CSF	Synovial	Sputum	Others	Total
Non neoplastic	106	88	36	18	17	10	275
Neoplastic	08	07	00	00	00	00	15
Scant cellularity	06	05	04	02	03	01	21
Total	120	100	40	20	20	11	311

**Fig. 4:** Cryptococcus Meningitis: Smears showing capsulated Cryptococcus organism in honeycomb pattern. (Leishman, 40x)

Cytological evaluation of different body fluids is diagnostically challenging and tricky as reactive mesothelial cells are close mimickers of malignant cells. Hence this study was taken to study the importance of body fluids analysis in diagnosis of neoplastic and non neoplastic conditions.

In our present study 311 body fluid were analyzed. Most common fluid to be encountered was pleural fluid accounting to 120 cases (38.58%), which is in concordance with Bhanvadia et al,³ Kumavat et al¹ and Hathila et al⁴ who also noted pleural effusion to be the commonest body fluid.

Our study showed male preponderance with male to female ratio of 1.37: 1. Studies done by Joshi A et al⁵ and Chakrabarti PR et al.⁶

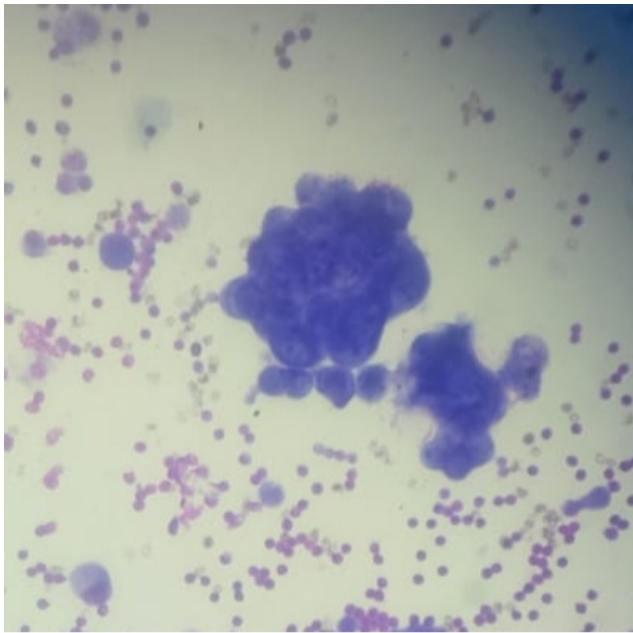


Fig. 5: Metastatic adenocarcinoma in peritoneal fluid: Centrifuged smear shows three dimensional ball formation of malignant cells.(H & E, 40x)

Maximum number of cases were seen in 41-50 years (95 cases), which was in comparison with the studies done by Shulbha et al,⁷ Pradhan et al.⁸ and Joshi et al.⁵

Transudative effusions are seen when there is an imbalance of hydrostatic and oncotic pressures and clinically, common causes are congestive heart failure (CHF), cirrhosis and nephrotic syndrome. Exudative effusions are because of injury to the cavity lining and causes for this are malignancy, inflammation or infection, lupus, pulmonary infarction, trauma.⁹

Maximum number of cases were transudative nature 181 cases(58.19%), which was in concordance with study done by Kumavat PV et al.¹

In the present study, 15 cases (4.82%) were neoplastic and 275 cases (88.42%)were benign, which was in comparison with various studies.^{4,5,7,8} Majority of malignancy was found in pleural fluid 8 cases (2.57%) in our study which in comparison with study done by Pradhan et al⁸ and Wong JW et al.¹⁰ Adenocarcinoma was the most common cause of malignant effusions in pleural and peritoneal fluid. This is in concordance with the study done by Jha R et al¹¹ and Kol PC et al.

6. Conclusion

This study highlights the significance of cytological examination as a method to categorize them as neoplastic or benign. And presence of malignant cells in the body fluids

worsens the prognosis. Cytological analysis although is not an alternate for conventional histopathology, still remains the simple, cost effective, reliable and forms definitive aids in reaching to a particular diagnosis.

7. Source of Funding

None.

8. Conflict of Interest

None.

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