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RESEARCH ARTICLE

EXFOLIATIVE CYTOLOGY OF BODY FLUIDS: A TERTIARY CARE STUDY OF JAMMU REGION.

Ritu Bhagat and *Roopali Jandial

Department of Pathology, Government Medical College, Jammu, India

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Corresponding author:
Roopali Jandial

ABSTRACT

Introduction: The cytological analysis of serous effusions helps in diagnostic, therapeutic and prognostic implications. The cytological interpretation of individual cells that are exfoliated into these fluids is of paramount importance since they provide an insight into the diagnostic, prognostic and therapeutic aspect of various pathological processes in the body. Cytological evaluation of fluids is a relatively simple, rapid, inexpensive and less invasive tool having a high accuracy with low incidence of false positive diagnosis. **Method and Material:** The study was conducted over a period of one year in the Department of Pathology. A total of 156 fluid cytology samples obtained from patients of various departments were analyzed. **Results**: A total of 156 cases were studied over a period of one year. Majority of the patients were in the 41 to 50 years of age group . Eighty-six cases were male which formed the majority. Among all fluids, peritoneal fluid comprised of maximum number of cases. On evaluation, a total of 12 cases were found to be malignant, of which 10 were encountered in peritoneal fluid whereas 02 were found in pleural fluids. **Conclusion:** Evaluation of body fluid is simple, safe and cost effective technique which helps the treating physician to reach a diagnosis and to understand the disease progression.

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INTRODUCTION

Normally, all the body cavities are lined by single layered epithelial cells and have minimal free fluid in them, for lubrication and protection of underlying viscera. Any imbalance between fluid formation and removal leads to effusion, as stated by Starling's law (Kumavat, 2013). These fluids during a disease process undergo abnormal and disproportionate qualitative and quantitative changes (Chakrabarti, 2015; Shulbha, 2015). The cytological analysis of serous effusions helps in diagnostic, therapeutic and prognostic implications (Koss, 2006). The cytological interpretation of individual cells that are exfoliated into these fluids is of paramount importance since they provide an insight into the diagnostic, prognostic and therapeutic aspect of various pathological processes in the body (Joshi, 2014; Poorana, 2015). Cytological evaluation of fluids is a relatively simple, rapid, inexpensive and less invasive tool having a high accuracy with low incidence of false positive diagnosis (El-Sheikh, 2012). The purpose of present study is to evaluate the significance of fluid cytology for various pathological conditions. Serving both a diagnostic as well as therapeutic intervention, tapping of these body fluids helps in better understanding of the underlying disease process. Peritoneal, pleural, cerebrospinal and pericardial fluids comprise the major chunk of body fluids (Pradhan et al., 2006). Disease progression can be monitored whereas response of disease to treatment can be assessed with fair accuracy. Our study aims to analyse the various body fluids received in our department and correlate individual case clinically.

MATERIALS AND METHODS

The study was conducted over a period of one year in the Department of Pathology. A total of 156 fluid cytology samples obtained from patients of various departments were analyzed. The clinical information including age, sex, history, provisional diagnosis were noted from the requisition forms. All fluids including pleural, peritoneal, cerebrospinal and sputum samples received were first submitted for gross examination and then subjected to conventional smear. The sample was taken in test tube and centrifuged at 2500 rpm for 15 minutes, supernatants were discarded and sediments were obtained for examination. Wet film was prepared by placing one drop of sediment and a drop of toluidine blue on a slide, mixing them and putting a cover slip. Wet film was observed under the microscope for identification of cell morphology. The remaining sediment was transferred with the help of pipette to glass slides and spread evenly and quickly. Some were air dried and stained with Giemsa. The others were fixed immediately in 95% alcohol and then stained with Papanicolaou stains (Pap).

For hemorrhagic fluids, glacial acetic acid was used as a haemolysing agent and then these were processed. Individual cells were studied under light microscope for cellular details and classified in benign, suspicious for malignancy or malignant entities.

RESULTS

A total of 156 cases were studied over a period of one year. The age range varied from 4 to 90 years. Majority of the patients were in the 41 to 50 years of age group. Eighty-six cases (55%) were male which formed the majority. Females constituted of 70 cases (45%). We received cerebrospinal, sputum, pleural and peritoneal fluids. All the fluids were classified on the basis of malignant, suspicious of malignant and non-malignant characteristics. Among all fluids, peritoneal fluid comprised of maximum number of cases with 88 (56%) followed by pleural fluid with 45 cases (29%), cerebrospinal fluid (CSF) 14 (9%) cases and sputum 9 (8%) cases. On evaluation, a total of 12 (8%) cases were found to be malignant, of which 10 were encountered in peritoneal fluid whereas 02 were found in pleural fluids. No other fluid showed malignancy other than these. We also received 09 cases of sputum all were non-malignant .

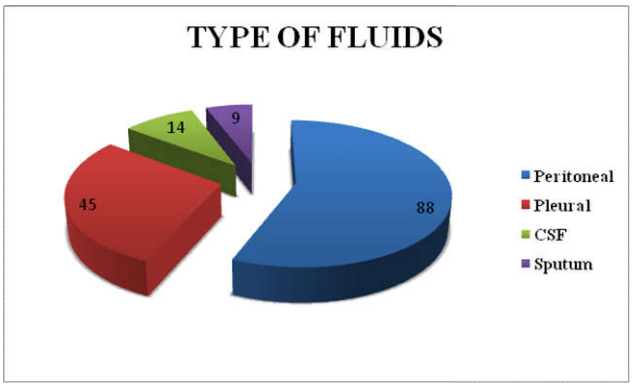

Figure 1. Depicting type of fluid.

Table 1. Distribution of cases according to diagnosis

Type of fluid	Non-malignant	Suspicious of malignanncy	Malignant
Peritoneal	67	11	10
Pleural	40	03	02
CSF	14	-	-
Sputum	09	-	-
Total	130	14	12

Table 2. Distribution of cases according to gross appearance

Gross appearance	Peritoneal	Pleural	CSF	Sputum
Clear	48	09	11	07
Haemorrhagic	28	05	-	-
Turbid	12	29	03	02
Total	88	45	14	09

Table 3. Agewise distribution of cases

Age in years	Peritoneal	Pleural	CSF	Sputum	Total
0-10	-	-	09	-	09
11-20	01	-	03	-	04
21-30	05	04	-	01	10
31-40	16	08	-	02	26
41-50	36	20	-	01	57
51-60	08	03	-	05	16
61-70	06	06	-	-	12
71-80	10	04	-	-	14
81-90	06	-	-	-	04
Total	88	45	14	09	156

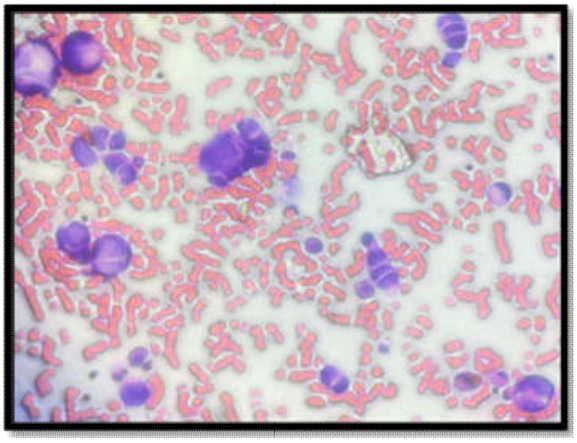

Figure 1. Adenocarcinoma showing signet ring cell (MGG; 40X)

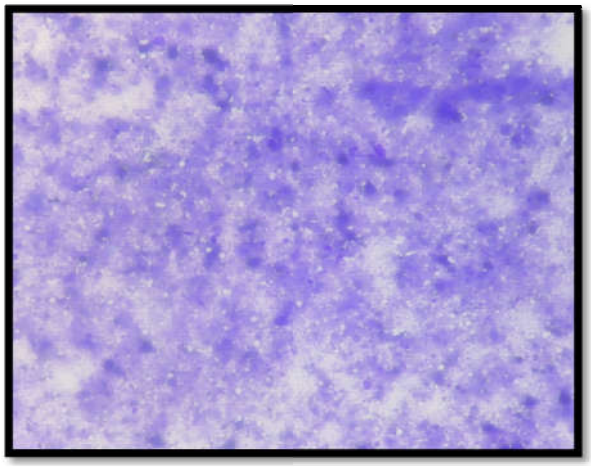

Figure 2. CSF showing lymphocytes (MGG; 10X)

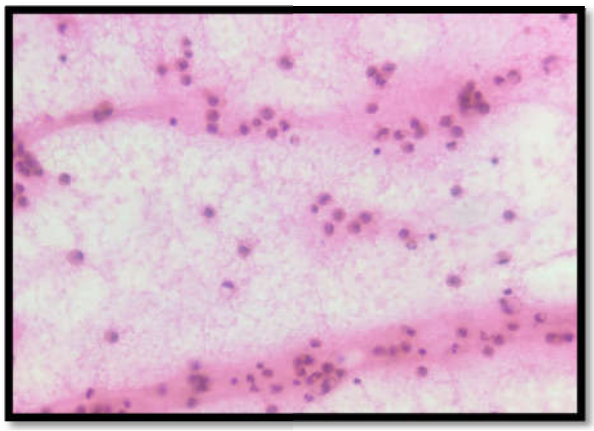

Figure 3. Adenocarcinoma showing signet ring cell (PAP; 10X)

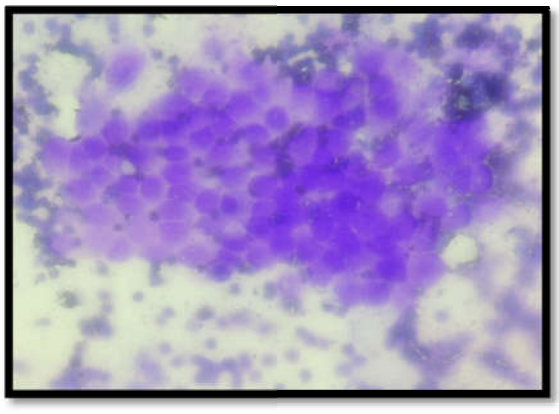

Figure 4. Sheet of reactive mesothelial cells (MGG; 40X)

DISCUSSION

In our study, males were more as compared to females, males being 55% and females 45%. Majority of the cases were in 41-50 age group. Our study was in concordance with studies done by Shulbha *et al.* (2015) Pradhan *et al.* (2006) and Joshi *et al.* (2014). Peritoneal fluid was the most frequently encountered effusion with 88(56.4%) cases followed by pleural fluid with 45(29%) cases. A total of 12(7.7%) cases were malignant, 130(83%) cases were non-malignant and 14(09%) cases were suspicious of malignancy in our study. These results were in concordance with other studies (Shulbha, 2015; Joshi, 2014; Pradhan, 2006). The presence of malignant cells in body fluids indicates spread of disease beyond the organ of origin and this is important both therapeutically as well as prognostically (Lin, 2009). However, the interpretation of malignancy is difficult in body fluids. This may be due to less number of malignant cells present in the fluid which may go unrecognized on cytological examination leading to false-negative diagnosis. Also, reactive mesothelial cells may mimic malignant cells in conventional cytological smears, largely because reactive mesothelial cells show nuclear enlargement and hyperchromasia, with or without presence of prominent nucleoli and they may be arranged in rosettes, pseudoacini or acini, resulting in a false-positive diagnosis (Joshi, 2014; Kumavat, 2013; Lin, 2009).

In our study, majority of the malignancies were found in the peritoneal fluid with maximum cases being adenocarcinoma. However Jha *et al.* (2006) found adenocarcinoma as the most common finding among all fluids. Smears in adenocarcinoma were characterized by clusters of round to oval cells with pleomorphic vesicular nuclei, focally prominent nucleoli and scant amount of eosinophilic cytoplasm. In four cases acinar pattern was noted and in two cases intracytoplasmic vacuoles were identified. Some of the cases showed binucleate cells and multinucleate giant cells also. Hemorrhagic fluid raises suspicion of malignancy as was found in our study with majority of malignancies presenting as haemorrhagic fluid. Presence of malignant cells in the effusion worsens the prognosis. The non-neoplastic effusions showed lymphocytic predominance. Majority of CSF fluid showed lymphocyte and macrophages. Most of sputum samples depicted squamous cells, lymphocytes and cystic macrophages. Majority of the non-neoplastic peritoneal effusions demonstrated reactive changes in mesothelial cells which corroborated with findings of other studies (Naylor, 1991; Gieisinger, 2004; Kinni, 1999).

Conclusion

Evaluation of body fluid is simple, safe and cost effective technique which helps the treating physician to reach a diagnosis and to understand the disease progression. Furthermore, studies such as tumor markers can be done of fluid, which can help in accurate diagnosis and alleviate patient's morbidity and mortality.

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