

# Exfoliative Cellular Study of Pathological Body Fluids – 1 year Retrospective Study

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## Abstract

**Background:** Body fluids are straightforwardly gained by tapping. For fluid routine and microscopic examination, laboratory receives pleural, peritoneal, CSF, Urine and Synovial fluids. The cytological evaluation and biochemical study of these received fluids can be fruitful as assistance to the diagnosis. Present study is an attempt to analyze all the samples referred for cytological evaluation.

**Method:** The study is cross-sectional descriptive, analytical and retrospective kind of study carried out in Central Laboratory of Dhiraj Hospital, over a period of one year from June 2019 to May 2020. Fluids such as peritoneal, pleural, CSF, synovial, etc. were received were examined under light microscope and found pathologies are classified in malignant and non-malignant entities. A total of 506 body fluids were received in the one year period. Majority of the cases were Peritoneal fluid comprised of 242 (47.8 %) followed by pleural fluid with 162 cases (32.0 %). Majority cases were categorized under Non-malignant group. Slight male dominance was observed with the mean age of 46.2 years.

**Conclusion:** Thorough analysis and appropriate clinical correlation will aid in improving patient treatment and care. Cytology of the fluid is a rapid and simple diagnostic technique for diagnosis of pathological conditions in malignant and non-malignant cases.

**Keywords:** *Body fluids, Cytology, Peritoneal, Pleural, CSF*

## Introduction

Fluid cytology routine and microscopic test evaluation is found simple, swift, cost effective and quite patient-centric investigation done in regular. Allocating both as a therapeutic as well as diagnostic intervention, tapping of these cavity fluids helps in enhanced understanding of the underlying pathological process. Peritoneal, pleural,

CSF, Synovial, BAL and pericardial fluids comprise the major chunk of body fluids.<sup>1</sup> Generally, all the body cavities are lined by single layered epithelial cells and have nominal free fluid in them, with main function of lubrication and protection of underlying visceral organs. If the balance between fluid formation and its loss or removal leads to effusion of the fluid. This is defined as Starling's law.<sup>2</sup> Various pathological processes include acute / chronic infectious, inflammatory and neoplastic etiology. Presence or lack of atypia or frank malignant cells is a absolute guide to the disease progression. The overall cytological assessment with its clinical, physical and radiological examination is an aid to the provisional diagnosis. By these means pathological progression can be checked whereas response of disease to therapy can be evaluated with reasonable accuracy.

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Our study aims to do analysis the different exfoliated body fluids received in Cental Laboratory of Dhiraj

General Hospital.

### Material and Method

The study is cross-sectional descriptive, analytical and retrospective kind of study carried out in Central Laboratory of Dhiraj General Hospital (Pathology Unit), of a tertiary care hospital over a period of one year from June 2019 to May 2020. Various body fluids such as peritoneal, pleural, cerebrospinal fluid (CSF), Synovial, BAL and pericardial fluids were received in our laboratory were centrifuged at 2000 rpm for 20 minutes, supernatants were thrown out and thin and thick smears were prepared and stained with sedimented cellular button. Two slides (thin and thick each) were air dried and stained with the Field's stain. Individual cell morphologies were studied under the light microscope for their cellular details and classified in malignant and non-malignant groups by the expert pathologist. For the total cell count, improved Neubaur's chamber was used. Patient's history and clinical findings were collected from cytological requisition forms. All the data was then summarized and analyzed further.

### Result

Total of 506 body fluids received in the duration of one year. Preponderance of the patients was in the

4<sup>th</sup> decade with the mean age of 46.2 years. Observed age range varied from 15 to 75 years. 261 cases (51.5 %) out of 506 were male which the majority is. And females founded of 245 cases (48.4%). We received pleural, peritoneal, CSF, sputum, pericardial, BAL and synovial fluids. All the fluids were classified on the basis of malignant and non-malignant cellular details. Cases in which no opinion was possible due to paucity in cellularity, inadequacy of sample and stored / degenerative changes were also noted. Amongst these total fluids examined, peritoneal fluid (ascitic fluid) comprised of maximum cases with 242 (47.8 %) followed by pleural fluid with 162 cases (32.0 %). The next most frequently came across fluid was CSF with 68 (13.4 %) cases. Sputum, Synovial, BAL and pericardial fluids were total comprised of 6.71 % (34 cases).

On evaluation, malignant cases were 43 (8.49, of which 28 were encountered in peritoneal fluid whereas 15 were found in pleural fluids. We also received 16 cases of sputum of which 13 were non-malignant whereas no opinion was possible in a 3 cases. Of the 5 pericardial fluids we received 4 cases which were non-malignant while no opinion was possible in single case. Also 5 synovial fluids and 8 BAL fluid were there. [Table 1,2].

**Table 1: Distribution of cases according to diagnosis**

| Sr. No | Type of fluid | Total | %    |
|--------|---------------|-------|------|
| 1      | Peritoneal    | 242   | 47.8 |
| 2      | Pleural       | 162   | 32.0 |
| 3      | CSF           | 68    | 13.4 |
| 4      | BAL           | 8     | 1.58 |
| 5      | Sputum        | 16    | 3.16 |
| 6      | Pericardial   | 5     | 0.98 |
| 7      | Synovial      | 5     | 0.98 |

**Table 2: Distribution of cases according to diagnosis**

| Sr. No | Type of fluid | Total | Malignant | Non malignant | No opinion possible |
|--------|---------------|-------|-----------|---------------|---------------------|
| 1      | Peritoneal    | 242   | 28        | 214           | 00                  |
| 2      | Pleural       | 162   | 15        | 147           | 00                  |
| 3      | CSF           | 68    | 00        | 60            | 08                  |
| 4      | BAL           | 8     | 00        | 07            | 01                  |
| 5      | Sputum        | 16    | 00        | 13            | 03                  |
| 6      | Pericardial   | 5     | 00        | 05            | 00                  |
| 7      | Synovial      | 5     | 00        | 05            | 00                  |

Of the 68 cases, opinion was not possible in 08 (1.58 %) in CSF. Of the 60 non-malignant diagnoses of CSF 43 showed normal findings, rest of the cases showed neutrophil cell infiltration indicating bacterial meningitis, cryptococcal meningitis and viral meningitis. We received 05 cases of synovial fluids, none of which were malignant. In both the genders, the most common fluid to be tapped was pleural followed by peritoneal. On further evaluation, demographic characteristics and gross appearances of fluids is revealed below. [Table 3,4]

**Table 3: Demographic characteristics of various fluids**

| Sr. No | Type of fluid | Total (total 506) | Mean age (years) | Male (total 261) | Female (total 245) |
|--------|---------------|-------------------|------------------|------------------|--------------------|
| 1      | Peritoneal    | 242               | 42.5             | 125              | 117                |
| 2      | Pleural       | 162               | 41.2             | 80               | 82                 |
| 3      | CSF           | 68                | 46.0             | 38               | 30                 |
| 4      | BAL           | 8                 | 53.2             | 3                | 5                  |
| 5      | Sputum        | 16                | 58.5             | 8                | 8                  |
| 6      | Pericardial   | 5                 | 49.2             | 3                | 2                  |
| 7      | Synovial      | 5                 | 38.6             | 4                | 1                  |

**Table 4: Gross characteristics of various fluids**

| Sr. No | Type of fluid | Total (total 506) | Clear | Turbid | Hemorrhagic |
|--------|---------------|-------------------|-------|--------|-------------|
| 1      | Peritoneal    | 242               | 47    | 32     | 163         |
| 2      | Pleural       | 162               | 21    | 105    | 36          |
| 3      | CSF           | 68                | 50    | 0      | 18          |
| 4      | BAL           | 8                 | 0     | 8      | 0           |
| 5      | Sputum        | 16                | 0     | 15     | 0           |
| 6      | Pericardial   | 5                 | 0     | 3      | 2           |
| 7      | Synovial      | 5                 | 0     | 4      | 1           |

Transudates comprised of 283 (55.9%) cases among all fluids. Peritoneal fluid had the highest frequency of transudate, followed by Pleural fluid, CSF, and synovial fluid. Out of 506 cases, 223 (44.1%) cases had exudative effusion. Majority of them were pleural fluid with followed by peritoneal fluid, CSF, BAL, sputum, and synovial fluid.

## Discussion

The pioneers of effusion cytological examination were Lucke and Kiebs, whose concept was revealed in 1867.<sup>1</sup> They are accredited with the narrative of malignant cells/ atypical cells in the peritoneal fluid. In 1882, malignancy in pleural effusion was first labeled by Quincke. For CSF, when lumbar puncture was first introduced in 1891, its examination gained momentum.<sup>1</sup> Over the past many years various pathologies have come across in the innumerable literatures, which have mentioned the potential etiologies for different effusions. Owing to all these facts it is authoritarian that exact diagnosis of the underlying disease is known. Pathological fluid aspiration is a simple, cost-effective, swift and patient friendly technique. Over and above cytological microscopy, biochemical and microbiological analysis of these fluids are also important. In our study, males and females had almost equal incidence with males 208 (50.24 %) cases being slightly more than female 206 (49.75%) cases. Majority of the cases were in forth decade. Present study was in concordance with the studies done earlier by Shulbha et. al., Pradhan et. al., Joshi et. al., and Wasim et. al.<sup>3,4,5</sup> The peritoneal fluid was the most frequently encountered with 242 (47.8 %) followed by pleural fluid with 162 cases (32.0 %). A total of 43 (8.49 %) cases were malignant and 463 (91.50%) cases were non-malignant in our study. Our conclusions were in concordance with other studies' observations.<sup>3,4,5</sup> Transudates cases were maximum in our study with 55.9% whereas exudates constituted of 223 44.1%. Kumavat PV et. al. stated similar findings.<sup>1</sup> We encountered 0.72% cases of cryptococcal meningitis. India ink preparation was applied for cryptococci identification. In India, cryptococcal meningitis is the most common opportunistic CNS infection.<sup>6,7</sup> In our study, majority of the malignancies were found in the peritoneal fluid with maximum cases being adenocarcinoma. In one study done by Wong JW et. al., amongst all the fluids, pleural fluid was found to have the

highest positivity for atypical/malignant cells.<sup>8</sup> However Jha R et. al., found among all fluids, adenocarcinoma (AC) as the most common finding.<sup>9, 10</sup> Overall, current study was in agreement with other previously conducted studies. Hemorrhagic fluid raises strong suspicion of malignancy as was discovered in our study with majority of malignancies presenting as haemorrhagic effusions. And the presence of malignant cells in the effusion deteriorates the prognosis.

## Conclusion

For all the treating physicians, cytological assessment of pathological cavity fluid is a definite aid to the. This is a simple and safe investigation method which aids in understanding disease progression and pathology. Additionally, tumor markers studies can be done from fluids, which can help in accurate diagnosis and improve patient's morbidity and mortality.

**Conflicts of Interest:** All authors have no conflicts of interest to declare.

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**Ethical Clearance:** The ethical clearance was taken for the present study from the institute ethical committee.

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