

COMPARATIVE STUDY OF PLEURAL FLUIDS USING CYTOSPIN AND CONVENTIONAL CENTRIFUGE TECHNIQUE

Laboratory Medicine

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KEYWORDS

AIM

To conduct a comparative study of pleural fluids using Cytospin and conventional Centrifuge technique with emphasis on improvement of diagnosis yield in Tuberculosis effusions.

MATERIALS & METHODS

Study Site And Duration

The study was conducted by the Department of Pathology at Owaisi Hospital and Research Centre and Princess Esra hospital, Hyderabad, Telangana.

Study Design

It is a comparative, prospective study with a duration of 18 months, conducted on 200 patients. The study population is divided into 2 study groups based on the technique used to observe and study pleural fluid smears.

This study protocol was approved by the hospital medical ethics committee and ethical clearance was taken prior to the study.

Group Allocation

Centrifuge Method Group (n=100): -

Pleural fluid smears were observed through Centrifuge technique.

Cytospin Method Group (n=100): -

Pleural fluid smears were observed through Cytospin technique.

Selection Criteria

Inclusion Criteria

- All the pleural fluids of infective pathology and Benign effusions received in the department of pathology.

Exclusion Criteria

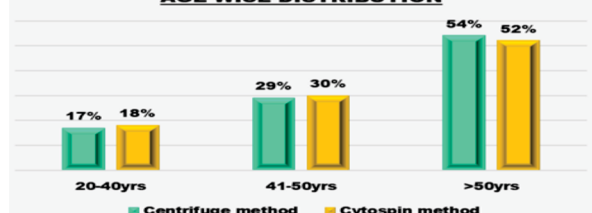
- Urine samples
- Fluid aspirated from deep-seated cysts.
- Other body fluids including Metaplastic/Neoplastic effusions.

Methodology

- Clinical findings of all cases whose body fluid was found to be around 2ml to 5ml were received in the laboratory.
- After proper labelling, gross examination of the fluid was done.
- Half of the fluid was subjected to Centrifugation for 15 minutes at 2500rpm.
- The remaining half of the fluid was subjected to Cytospin as per the SOP after fixation with combination of Ethyl alcohol and Formalin for 10 to 15 minutes.
- The slides were strained with H&E stain. Special stains like AFB stains were used for all the fluid samples.
- Microscopic examination was done for the technique slides and findings were compared to observe cellularity, cell morphology, cell background and cell distribution.

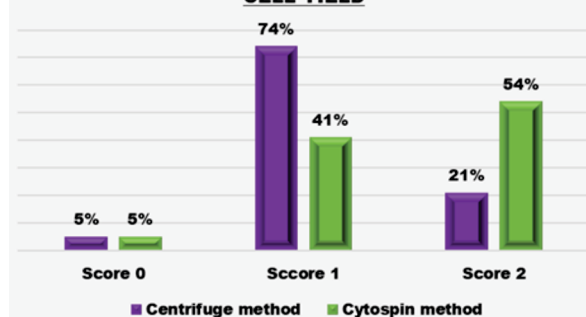
RESULTS

AGE-WISE DISTRIBUTION



Age (In Years)	Centrifuge Method		Cytospin Method	
	Frequency (N=100)	Percentage (%)	Frequency (N=100)	Percentage (%)
20-40yrs	17	17%	18	18%
41-50yrs	29	29%	30	30%
>50yrs	54	54%	52	52%
TOTAL	100	100%	100	100%

CELL YIELD



Comparison Of Cell Yield In Pleural Fluid Samples

Comparison Of Cell Distribution In Pleural Fluid Samples

Methods	Score 0	Score 1	Score 2	Chi-Square	P Value
Centrifuge Method	15 (15%)	61 (61%)	24 (24%)	13.683	0.001*
Cytospin Method	10 (10%)	25 (25%)	65 (65%)		

DISCUSSION

The present study was conducted by the Department of Pathology at Owaisi Hospital and Research Centre and Princess Esra hospital, Hyderabad, Telangana.

It is a comparative, prospective study with a duration of 18 months, conducted on 200 patients. The study population is divided into 2 study groups based on the technique used to observe and study pleural fluid smears.

This study protocol was approved by the hospital medical ethics committee and ethical clearance was taken prior to the study. The groups were divided as, 1. Centrifuge method group- Pleural fluid smears were observed through Centrifuge technique. 2. Cytospin method group- Pleural fluid smears were observed through Cytospin technique.

All the pleural fluids of infective pathology and Benign effusions received in the department of pathology, were included in the study. Urine samples, fluid aspirated from deep-seated cysts and other body fluids including Metaplastic/Neoplastic effusions were excluded from the study.

Clinical findings of all cases whose body fluid was found to be around 2ml to 5ml were received in the laboratory. After proper labelling, gross examination of the fluid was done. Half of the fluid was subjected to Centrifugation for 15 minutes at 2500rpm. The remaining half of the fluid was subjected to Cytospin as per the SOP after fixation with combination of Ethyl alcohol and Formalin for 10 to 15 minutes. The slides were strained with H&E stain. Special stains like AFB stains were used for all the fluid samples. Microscopic examination was done for the technique slides and findings were compared to observe cellularity, cell morphology, cell background and cell distribution.

In the present study, the Centrifuge method group showed a cellularity Score of 0 in 5% cases, Score 1 in 74% of cases and Score 2 in 21% of cases.

In the present study, the Cytospin method group showed a cellularity Score of 0 in 5% cases, Score 1 in 41% of cases and Score 2 in 54% of cases.

The maximum cellularity Score 2 was seen in the Cytospin method group smears of 54% cases whereas it was observed in only 21% cases of centrifuge method group.

The Chi-square value is 9.578 and no statistical significance was observed, the p value is 0.08.

In the present study, the cell yield is better in Cytospin than conventional. The results showed that there is statistically significant difference between the two methods.

(p value=0.08)

In the present study, the Centrifuge method group Cell morphology was studied. It has Score of 0 in 2% cases, Score 1 in 65% of cases and Score 2 in 33% of cases.

In the present study, the Cytospin method group Cell morphology was studied. It has Score of 0 in 2% cases, Score 1 in 20% of cases and Score 2 in 78% of cases.

The maximum clear cell morphology Score 2 was seen in the Cytospin method group smears of 78% cases whereas it was observed in only 33% cases of centrifuge method group. The Chi-square value is 15.468 and statistical significance was observed with a p value of 0.04*.

Cell morphology is better preserved in smears obtained by Cytospin than conventional. These results show statistically significant difference between the methods.

(p value=0.04*).

In the present study, the Centrifuge method group Cell background was studied. It has Score of 0 in 12% cases, Score 1 in 56% of cases and Score 2 in 32% of cases.

In the present study, the Cytospin method group Cell background was studied. It has Score of 0 in 7% cases, Score 1 in 56% of cases and Score 2 in 37% of cases.

The maximum clear cell background Score 2 was seen in the Cytospin method group smears of 37% cases whereas it was observed in only 32% cases of centrifuge method group. The Chi-square value is 0.6427 and no statistical significance was observed, the p value is 0.732.

Cell background is better in smears obtained by Cytospin than conventional. These results show no statistically significant difference between the methods.

(p value=0.732).

In the present study, the Centrifuge method group Cell distribution was studied. It has Score of 0 in 15% cases, Score 1 in 61% of cases and Score 2 in 24% of cases.

In the present study, the Cytospin method group Cell distribution was studied. It has Score of 0 in 10% cases, Score 1 in 25% of cases and Score 2 in 65% of cases.

The maximum clear cell distribution Score 2 was seen in the Cytospin method group smears of 65% cases whereas it was observed in only 24% cases of centrifuge method group.

The Chi-square value is 13.683 and statistical significance was observed with a p value of 0.001*.

Cytospin demonstrated more uniform distribution of cells than conventional, which was statistically significant.

(p value=0.001*).

CONCLUSION & SUMMARY

- Cytospin was found superior to conventional centrifuge smears in terms of cell yield, preservation of cell morphology and uniformity of cell distribution. Cytospin helped in better diagnosing effusions than conventional smears. Hence, Cytospin can be preferred to conventional smears for cytologic examination of body cavity fluids.
- The maximum cellularity Score 2 was seen in the Cytospin method group smears of 54% cases whereas it was observed in only 21% cases of centrifuge method group. The Chi-square value is 9.578 and no statistical significance was observed, the p value is 0.08.
- The maximum clear cell morphology Score 2 was seen in the Cytospin method group smears of 78% cases whereas it was observed in only 33% cases of centrifuge method group. The Chi-square value is 15.468 and statistical significance was observed with a p value of 0.04*.
- The maximum clear cell background Score 2 was seen in the Cytospin method group smears of 37% cases whereas it was observed in only 32% cases of centrifuge method group. The Chi-square value is 0.6427 and no statistical significance was observed, the p value is 0.732.
- The maximum clear cell distribution Score 2 was seen in the Cytospin method group smears of 65% cases whereas it was observed in only 24% cases of centrifuge method group. The Chi-square value is 13.683 and statistical significance was observed with a p value of 0.001*.

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