Effectiveness Evaluation on Application of Hydrothorax and Ascites Cytological Examination on the Clinical Diagnosis of Tumor Patients

Lili Zhang[1], Xinchu Yuan[1], Qiong Yuan[1], Keke Zhu[2], Xianlin Li[3]

1 Medical college
Wuhan University of Science and Technology
Wuhan, Hubei Province 430065, China
2 Blood Transfusion Department
First People's Hospital of Xiangyang
Xianyang, Hubei Province 441000, China
3 Clinical laboratory
Langshan Hospital of Xinning
Hunan422700, China

***Abstract* — Objective: discuss the clinical value of application of hydrothorax and ascites cytological examination. Method: the research objects in this research mainly come from 76 patients with hydrothorax and ascites received and cured in our hospital from January 2015 to January 2016, all of whom have been conducted with hydrothorax and ascites cytological examination, pathological examination, and flow cytometry analysis so as to discuss the clinical effect of hydrothorax and ascites cytological examination on tumor diagnosis. Result: among 76 patients who have received hydrothorax and ascites cytological examination, 72.4% of the results are negative, 3.9% are questionable, and 23.7% are positive. With positive rate in the pathological examination as the standard, the accuracy rate of DNA heteroploid examination is 95.2%, slightly higher than hydrothorax and ascites cytological examination. But there is no obvious difference after the comparison (P＞0.05). Among 21 cases of malignant cell, false negative rate is 14.3% and the false positive rate is 4.8%. Conclusion: the application of hydrothorax and ascites cytological examination in tumor patients treatment has significant clinical value with a high positive rate and worthy of clinical promotion.**

Keywords- Hydrothorax and ascites; Cytological examination; Tumor diagnosis; clinical effect

I. INTRODUCTION

Conventional methods are usually used in the clinical examination of hydrothorax and ascites s. In traditional hydrothorax and ascites cytological examination, usually directly use microscope to conduct cell counting and carry out the classification work, which is with extremely low positive rate and high rate of missed diagnosis, bad for clinical diagnosis and treatment. With the continuous development of inspection technology, the sediment slicing dyeing technology has been gradually applied to clinical treatment to carry out hydrothorax and ascites cytological examination. There are many advantages, for example, it is simple and practicable, accurate and fast, and patients do not have obvious pain[1,2], and it can effectively improve detection rate and positive rate. Of malignant tumor. So far, it has become a primary method for early clinical diagnosis. Now 76 patients are included into this research, which are described as below.

II. MATERIALS AND METHODS

Research objects in this research are mainly selected from 76 patients with hydrothorax and ascites received and cured in our hospital from January 2015 to January 2016, all of whom have been conducted with hydrothorax and ascites cytological examination, pathological examination, and flow cytometry analysis. 76 patients have the age from 7 to 83 years' old with an average age of 59.4±7.5 years' old. Other information is shown in graph 1.

TABLE 1 GENERAL INFORMATION 76 PATIENTS

Gender	hydrothorax	ascitess	Total
Male	21	22	43
Female	13	20	33
Total	34	42	76

Collect samples of hydrothorax and ascites after the patients' admission to hospital for centrifugal treatment immediately with the speed of 1500r per minute. After the duration of 5 minutes, discard the supernate, keep the precipitate to make the slice, and make sure the slice even. To help the cell adhere to the slide better during the cell slicing, firstly blend one drop of serum with two drops of sediment cell suspension uniformly for slicing. After the slicing is complete dry, dyeing treatment is taken mainly by applying Wright's stain for observation under low power lens firstly and transformation to high power lens and oil immersion lens. Then use flow cytometry device to detect DNA heteroploid.

It is considered to be negative if there are only degenerated or normal inflammatory cells and mesothelial cells on the slicing, questionable if there existing a small amount of non-typical malignant cells or heterocysts, and positive if malignant tumor cells on the slicing. It is

considered as positive if the DNA heteroploid is not less than 10%[3-5].

SPSS20.0 is mainly applied in the statistical treatment of data in this group with n (%) as the enumeration data for chi-square test among the group. The difference has statistical significance when $P<0.05$.

III. RESULT

Comparison between hydrothorax and ascites cytology with DNA detection accuracy rate Diagnosis of malignant tumor in 21 patients have been confirmed after pathological examination, as a standard to judge DNA and cytological detection accuracy rate as shown in table 2.

Classification of 21 cases of malignant tumor, tumor classification and names of definite diseases are shown in table 3 and table 4 classification of hydrothorax and ascites malignant cell is shown in table 4. 2.4 false positive and negative results of tumor patients are shown in table 5.

TABLE2 COMPARISON ON DETECTION ACCURACY RATE BETWEEN TWO GROUPS [N(%)](P>0.05)

detection method	Negative	Questionable	Positive	Accuracy rate
hydrothorax and ascites cytology（n=76）	55（72.4）	3（3.9）	18（23.7）	85.7
DNA heteroploid（n=76）	55（72.4）	1（1.3）	20（26.3）	95.2
X2	0.04	0.72	1.34	2.41

TABLE3 CLASSIFICATION OF 21 SAMPLES OF MALIGNANT TUMOR [n(%)]

tumor classification	cases number
digestive system neoplasm	12（57.1）
respiratory system neoplasms	5（23.8）
urologic neoplasms	2（9.5）
hematological malignancy	1（4.8）
others	1（4.8）

TABLE 4. CLASSIFICATION OF HYDROTHORAX AND ASCITES MALIGNANT CELL [N(%)]

malignant cell classification	ascites s（n=42）	hydrothorax（n=34）	total
adenocarcinoma	33	30	63（82.9）
squamous carcinoma	5	0	5（6.6）
undifferentiated carcinoma	2	2	4（5.3）
malignant mesothelioma	0	1	3（3.9）
malignant lymphoma	2	1	1（1.3）
total	42	34	76（100.0）

TABLE 5 FALSE POSITIVE AND NEGATIVE RESULTS OF TUMOR PATIENTS [N(%)]

Gender	false negative	false positive
male（n=15）	2	1
female（n=6）	1	0
total	3（14.3）	1（4.8）

IV. DISCUSSION

Dropsy of serous cavity is a highly frequent clinical symptom so that the accurate judgement on the nature of hydrops is helpful for clinical diagnosis and treatment of diseases. The nature of hydrops, especially malignant hydrops is hard to be reflected in common routine examination, so the key is to discover malignant tumor cells during the diagnosis of malignant hydrops. The major characteristic of tumor cell is DNA damaged and gene mutation. Major manifestation is the abnormal increase of DNA cells with structural abnormality. So DNA structural and ploidy abnormality can accurately reflect the cell heteromorphism with the accuracy in this group is 95.2%. 72.4% of results in hydrothorax and ascites cytological examination are negative, 3.9% are questionable, and 23.7% are positive. The accuracy of hydrothorax and ascites cytological examination after the verification of pathological examination is 85.7%, close to the report [6]. This shows that hydrothorax and ascites cytological examination can effectively diagnose malignant tumor. But many other factors will influence the diagnosis effect so that there will be false negative or positive results. The false negative rate in this group is 14.3% and false positive rate is 4.8%. Thus, it has important clinical significance to improve the accuracy rate of hydrothorax and ascites cytological diagnosis and reduce the misdiagnosis and diagnostic errors. A correct understanding of benign and malignant cytological feature is required to ensure the accuracy of clinical diagnosis, and positive rate of hydrothorax and ascites cytological examination is also closely related with procedures of material sampling, submission and inspection, and dyeing, etc.

The correct recognition on characteristics of malignant tumor cell is required to make sure the positive rate of hydrothorax and ascites cytological inspection can be improved. The typical characteristic of cancer cell is that the volume is big. It is reported that[7-9] the average diameter of hydrothorax and ascites cytological cancer cell is 18.5 μm. There are different classifications of tumor cells with different cell arrangement and type. For example, most of the adenocarcinoma cells have a uniform type of concrete clustering with the arrangement mode of plum blossom shape, glandular cavity form, and papilla form, with mixed cytoplasm and cell nucleus tightly overlapped in different size. There are various types of squamous cancer cell, most of which are in tadpole shape, round, and irregular shape. They are random loose arranged when clustering with thick and solid plasma and many chromatin but no obvious nucleolus. Undifferentiated cancer cell, clustered and inlaid each other, has smaller volume with little plasma and botryoidal shape. Malignant lymphoma is mainly shown as that the lymphocyte is immature with the arrangement of diffuse type. They have comparatively accordant cell size but in different forms with the nucleus distorted and divided and nuclear membranes lack of smoothness. Meanwhile, scientific identification of degenerated, hyperplastic cancer cell and mesenchymal cell is also required so as to reduce false positive cases. When stimulated by inflammation, hydrothorax and ascites cast-off cells are inclined to bring about mesothelial cells degeneration or hyperplasia so that it will be misdiagnosed as cancer. Mesothelial cells will cluster together after hyperplasia in the arrangement of plum blossom form or glandular cavity form appearing to not overlap but tile. The nucleoplasm will increase but the proportion never go up. The volume of mesothelial cell will increase obviously but nucleus chromatin and cell membrane, and nucleus membrane is not clear, with intra-nuclear appearance of mesh shape and mist trait within. There is only one false positive case and the cause is that the cancer gland cell is mistaken as mesothelial cell hyperplasia.

In addition, we still need to focus on the specimen sampling, inspection and dyeing and other steps. Because long time in vitro will lead to the degradation or self - digestion gradually, and also destroy the arrangement structure of cell, hydrothorax and ascites samples collected from patients should be sent to inspect within 30 minutes. If the specimen cannot be processed in a timely manner after collection, samples can be placed in the refrigerator and the temperature must be around 4℃. Centrifugal processing should be made in time once specimen is collected and then fixed dyeing. If the samples are blood smear, clear on top and white at bottom of the thin film is supposed to be selected, so that more cellular component can be used in diagnostic.2 suspicious cases of specimens in this group are difficult to diagnose as a result of degeneration phenomenon of cell and false negative in 3 cases because there is no cell smear for diagnosis. Smear should be put under the low-magnification microscope to observe in advance, then turn to high-magnification microscope when cell mass pile up or single cell become larger. Pay more attention on the chromatin nucleoplasm ratio, abnormal nucleus, irregular cytoplasm shape and vacuole[10] cause there are more likely to be malignant cells.

V. CONCLUSION

To sum up, hydrothorax and ascites cytology can be an effective method which has a high positive rate in the diagnosis of tumor patients and worth promoting. However, due to the less samples we select, it is still need to carry out a large number of sample clinical experiment to confirm the clinical value of hydrothorax and ascites cytology in the future. In addition, more attention should be paid to every aspects to avoid the phenomenon of false positive or false negative results result from the influence factors of different diagnosis way. With the future development of medical technology, more and more important role can be played by hydrothorax and ascites cytology examination in differential diagnosis of tumor.

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