

CYTODIAGNOSIS OF ASCITIC FLUID IN OVARIAN TUMOUR: A NARRATIVE REVIEW

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Abstract

It has been well documented regarding the use of cytological examination of ascitic fluid. It helps with malignant disease staging and prognosis, as well as providing information on inflammatory lesions. In ordinary practice, differentiating reactive mesothelial cells from malignant cells using cytology smears (CS) is difficult. The cell block (CB) technique improves cytodiagnosis efficacy by providing superior architectural patterns and morphological features. Based on our findings, we believe that combining routinely stained CS with a modified CB technique of ascitic fluid would be highly precise for malignant ovarian tumours, particularly in latent phases of malignancy. It aids in tumour identification, prognosis, and risk of recurrence, allowing patients to make more informed decisions.

Keywords: Ascites, Cytology Smears, Modified Cell Block Technique, Ovarian Cancer

Introduction: Ascites is a condition in which a huge volume of fluid builds up in the abdomen. In normal circumstances, it is efficiently absorbed rather than accumulating. Only ten percent of all individuals with ascites have a malignant aetiology [1]. Liver and heart disorders are the most common causes of non-malignant aetiology ascites. Malignant ascites is most commonly found in gynaecological, gastrointestinal, and breast carcinomas. There is a mix of malignant ascites and peritoneal carcinomatosis in 15–30% of individuals [2]. Ascites is the frequent symptom of advanced ovarian cancer and is associated with a bad prognosis. Exudative and transudative ascites are two types of ascites.

Exudative and transudative ascites are two types of ascites. Non-malignant aetiologies account for 90% of ascitic fluids, which are caused by transudates. The fluid is transparent, with a low quantity of albumin and a limited number of cells. Exudates are frequently cancerous, hazy, and contain a higher amount of cells and proteins than transudates [3]. The most important pathogenetic mechanisms in the development of malignant ascites are assumed to be increased vascular permeability, lymphatic drainage blockage, increased hydrostatic pressure differential, and decreased oncotic pressure difference. [4]

Primary ovarian carcinoma (POC) shows no symptoms in the early stages. Pelvic bulk and/or fullness, on the other hand, is a common symptom in women with cancer when the tumour grows larger. Ovarian cancer can easily extend into the peritoneal cavity in clinical practice, demonstrating the ovary's status as an intra-abdominal organ. As a result, at the time of diagnosis, the majority of this tumour is in advanced stage due to which curative and complete surgical resection is not a possibility for the majority of patients. [5] In secondary localised cancers, the development of malignant ascites is a worse prognostic indicator than ovarian carcinoma, with a survival span of 7–13 weeks from the time of diagnosis [6, 7].

Due to a dearth of literature in the Indian community, the current study was conducted to evaluate a combined strategy in routinely stained CS and a modified CB technique with histological correlation in ovarian malignancies.

Histogenesis of Ovarian cancer: Ovarian cancer is caused by a cell that is a source of debate. It's hypothesised that the ability of the surface mesothelial epithelium to metaplasia into müllerian epithelium plays a role in ovarian carcinogenesis. According to popular perception, ovarian cancer is caused by the surface (coelomic) epithelium [8].

Ovarian Cancer is caused by somatic growth factors. According to the "incessant ovulation" theory, repeated ovulation confines mesothelium in the ovary, resulting in inclusion cysts.

Ovarian cancers have histomorphologic characteristics that are similar to müllerian tumours. As a result, one alternative explanation of ovarian cancer histogenesis proposes that these malignancies are caused by a secondary müllerian system. The secondary müllerian system is found in the ovarian hilum, adnexa, and pelvis and is made up of embryological remnants of proximal müllerian ducts [9].

A diagnostic problem is detecting malignant or reactive mesothelial cells using a standard cytology smear. The CB technique, which is also more sensitive than a standard CS, is better at recognising cellularity and morphology.[10] In examining ascitic fluid for ovarian cancer diagnosis, a cell block strategy paired with a standard cytology smear procedure is regarded to be more effective. Tumors can arise as metastatic lesions from non-ovarian organs in many cancers, and the ovary is the most common site of metastasis. As a result, the histological findings in these patients can help discriminate among OC & other metastatic lesions. [11]

The following are some of the drawbacks of conventional smears: [12]

1. Indistinct morphological details
2. Overcrowding or overlapping cells
3. Proliferation of inflammatory cells
4. Loss or alteration of cells by delivering superior architectural and morphological details, the cell-block approach overcomes these restrictions.

Benefits of a CB

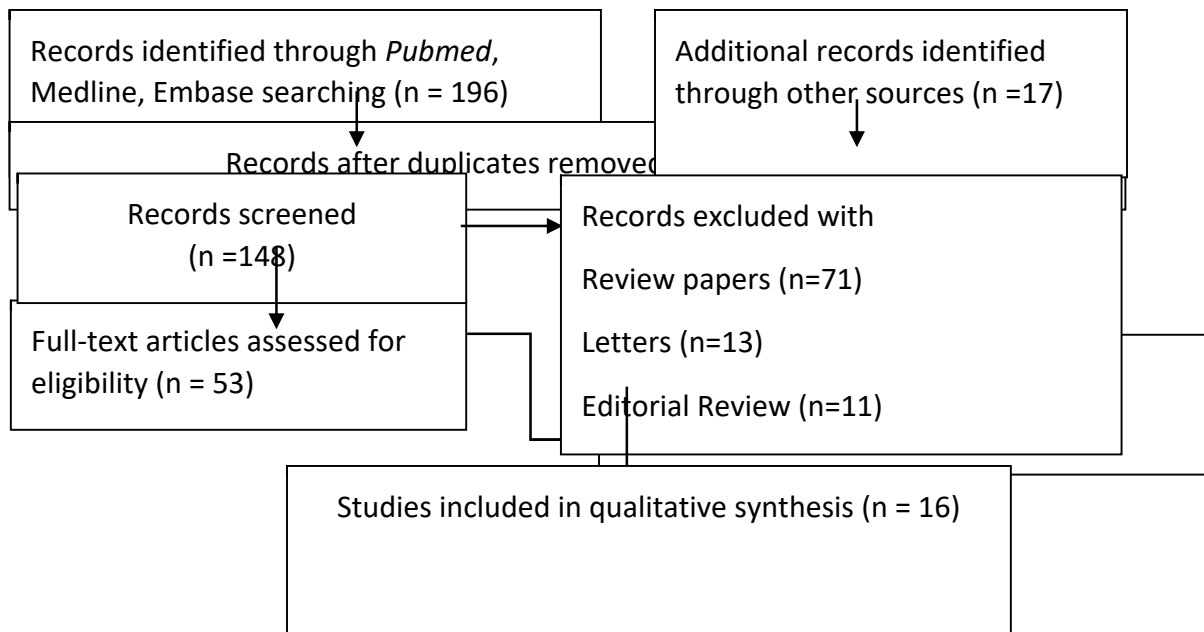
1. Cellular material can be concentrated in a small area and analysed simultaneously in a microscope.
2. Architectural patterns such as papillae, clusters, and cell balls are retained.

Maseki et al[11] discovered that the histologic type could be accurately diagnosed using the CB technique, and that this was consistent with clinical diagnosis and final pathologic diagnosis. According to a recent research [13], the cell block technique confirmed 20% of suspected cancer cases found by standard smear. The cell block technique had an 88.88 percent sensitivity and specificity, while the standard smear method had 86.98 percent sensitivity and specificity. As a result, the cell block approach was substantially better at detecting malignant lesions. Another study[10] found that Cellularity, morphology, cytoplasmic, and nuclear features were discovered in both the classic smear methodology and the cell block method, but the cell block method was more appreciative of all of these results. The cell block approach increased the identification of malignancy by 13.63 percent. According to another study[14], the cytological test's sensitivity and specificity were 90 percent and 96.5 percent, respectively. As a result, they concluded that ovarian tumour peritoneal cytology is extremely specific and sensitive for ovarian malignancies identification.

Methods: The following goals are being pursued with this review: To test a combination strategy in ovarian tumours using routinely dyed CS & modified CB technique with histological association.

Electronic databases PubMed, Medline, Embase, and Google were used to conduct a literature search in English. The terms Ascites OR Ovarian Cancer OR Cytology Smears OR Modified Cell Block Technique were used in the search (Figure 1). The writers' personal knowledge and experience in the topic aided in the archiving of pertinent publications. The present review includes articles that meet the following criteria: 1. Studies published in the last ten years are also included. 2. Studies that are solely focused on ovarian cancer are included.

Figure 1: PRISMA flowchart of included studies



Discussion: The cell block experiments have always piqued scientists' interest. Cell block studies have been a common diagnostic technique throughout time. It was developed as an alternative or supplementary diagnostic tool in cytopathology laboratories because of its benefits. Its employment in fluid cytology assessment, particularly in cases of equivocal malignant cell presence, was prompted by several advantages, including the ability to provide cytoarchitect and cell detail at microscopy. Because of the lack of symptomatology and screening, more instances are detected later, when they present with ascites. As a result, ascitic fluid cytology has proven to be particularly useful in detecting ovarian cancer. The following paragraphs present a review of the literature in relation to cell block studies of ascitic fluid in ovarian carcinoma, with the goal of distinguishing the conditions of overlapping cytomorphology of reactive atypical benign mesothelial cells and malignant cells, in light of the study's objectives.

For the detection of cancer in severe effusion, Dey and colleagues[13] compared the use of the cell block technique to the standard smear technique. It was a one-year institutional-based study with approximately 50 patients, the majority of whom were between the ages of 61 and 70. It was discovered that 20% of suspicious cancer cases found by conventional smear were confirmed using the cell block approach. The cell block technique had an 88.88 % sensitivity and specificity, while the standard smear method had 86.98% sensitivity and specificity. As a result, the cell block approach was substantially better at detecting malignant lesions.

The role of the cell block technique in the identification of malignant ascetic fluid effusion was studied by Udasimath et al[10]. 44 samples of peritoneal fluid were obtained over the period of 20 months from people ranging in age from 21 to 80, with the age group 51 to 60 being the most commonly affected. Cellularity, morphology, cytoplasmic, and nuclear features were discovered in both the classic smear methodology and the cell block method, but the cell block method was more appreciative of all of these results. The cell block method enhanced the rate of malignancy detection by 13.63 %.

In the year 2017, Atla et al[14] conducted a 6-month cytological investigation on ovarian cancers of ascitic fluid. The researchers collected 106 samples from patients with ovarian tumours who had ascites, with 88 benign ovarian tumours (83 %) being the most prevalent among those aged 21 to 40, and 18 malignant tumours being the

least common (17%). The goal of the study was to see if ascitic fluid cytology could be used to diagnose malignancy in ovarian tumours and if peritoneal cytology could be used to assess the histological type of ovarian tumours. The cytological test had 90 % sensitivity and 96.5% specificity, respectively. As a result, they came to the conclusion that ovarian tumour peritoneal cytology is highly specific and sensitive for detecting ovarian cancers.

Kulkarni et al.[15] conducted a study in 2009 to assess the cell block feasibility of the thromboplastin method, concluding that the cell block approach condensed cellular material in a single field and allowed the architectural pattern to be viewed. The cell block technique, according to Thapar et al[16], not only raised positive malignancy results, but also displayed a better architectural pattern and aided in the identification of the major location. Different approaches to cytodagnosis have been investigated [17-20]. Laishram et al. [21] evaluated the efficiency of the proliferative marker Ki-67 in surface epithelial ovarian cancer. Only a few similar studies were looked at [22,23].

Conclusion: Based on our findings, we believe that combining routinely stained CS with a modified CB technique of ascitic fluid would be a highly precise and responsive test for malignant ovarian tumours, especially in the advanced stages of malignancy that the majority of our patients at our hospital have. It considerably aids in diagnosis, prognosis estimation, and recurrence risk, allowing patients to be treated more efficiently.

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