How valuable is ascitic cytology in the detection and management of malignancy?

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Introduction: Ascitic cytology is often requested in the early stages of ascitic assessment. A review of this practice in a major English teaching hospital is presented.

Method: Patients were retrospectively identified using the histopathology and patient administration system between January 1999 and May 2001.

Results: Of 276 samples sent for assessment 35 cases were found to be negative when on further review an intra-abdominal malignancy was present. The malignancy was diagnosed using a radiological modality. The sensitivity of ascitic cytology was found to be 60% with 100% specificity. A delay of up to five days could be incurred awaiting the cytology results before further radiological examinations were undertaken.

Conclusion: Too much hope is placed on ascitic cytology to provide the diagnosis at the expense of other investigations. It is recommended that the initial assessment should concentrate on history, examination, and basic tests on ascitic fluid to assess the serum-ascites albumin gradient. Ovarian malignancy is the only tumour type yielding a significant rate of detection from cytology with some prognostic impact. Results should not be awaited before abdominal ultrasound is undertaken. This more directed practice would help reduce unnecessary workload for the pathologist and has resource implications.

Scites refers to an increased volume of fluid collecting within the peritoneal cavity. It has been traditionally classified into a transudate or exudate depending on the protein content of the fluid. This has now been superseded by the serum-ascites albumin gradient (SAAG), which is calculated by subtracting the ascitic fluid albumin content from that of the serum albumin. A gradient greater than 11 g/l can be caused by portal hypertension, heart failure, cirrhosis, hepatitis, massive metastatic disease, or Budd-Chiari syndrome. A gradient less than 11 g/l is commonly associated with carcinomatosis, pancreatic ascites, tuberculosis, and nephrotic syndrome.

It was noted in our experience that although a number of patients with significant ascites were found to have an intra-abdominal malignancy, not one of these patients had their malignancy diagnosed by ascitic cytology. This anecdotal finding prompted a literature search and retrospective audit of ascitic cytology to determine its usefulness in managing patients with ascites.

PATIENTS AND METHODS
From January 1999 to May 2001, all ascitic fluid samples sent for cytology were identified using the Histopathology APEX computer system. Each report was reviewed and the number of pathology specimens (not just ascites) for each individual patient noted. Each patient’s electronic record was also reviewed via the patient administration system and their clinical diagnosis, investigations, operations, along with the consultant in charge of their care recorded. Those who were found to have an intra-abdominal malignancy by using these two methods but with a negative result on paracentesis cytology were further investigated by case note review and by the computerised radiology reporting system.

RESULTS
Over the 28 month period reviewed, 276 specimens of ascitic fluid from 239 different patients (87 male, 152 female) were analysed by a university teaching hospital in the UK. Of these 276 ascitic cytology specimens 48 (17%) were found to contain malignant cells. Malignant cells that were ovarian in origin were found in 41 (85%) patients of the positive samples analysed. The remaining positive specimens showed that three patients had lymphoma, one breast metastasis, one carcinoid, and two had an unknown primary. These 48 positive specimens were collected from 48 different patients, three of whom were male and 45 female.

Of the remaining 228 specimens from 192 patients (of which 84 were male, 108 female), 220 were reported as having no evidence of malignancy and another eight to be inadequate samples. However it was found that the results of 35 patients (19%) from this group were false negatives and they did indeed have intra-abdominal cancer detected by some other modality.

Three sets of notes were unobtainable and therefore excluded from further statistical analysis, leaving 32 patients, nine male, 23 female. Thirteen of these patients had colorectal cancer, 10 gynaecological malignancies, eight liver metastases, and one lymphoma (fig 1). Of these 32 patients, nine samples of ascitic fluid were sent at the time of surgery, the operative notes clearly stating that signs of carcinoma were present. In all these cases the diagnosis had been made before surgery using radiological imaging. The sensitivity and specificity of ascitic fluid cytology is illustrated in table 1.

In five of the false negative cases the initial investigation after presentation was an ascitic fluid aspiration. In three of these cases an ultrasound had been performed just before or at the same time as aspiration; however, it had been deemed to be non-diagnostic and there was a delay of four days on average incurred before computed tomography. In the other two patients delays of three and four days were incurred while awaiting the cytology result before an ultrasound was performed, at the request of the radiologist.

Table 2 shows the specialty requesting the investigation. A total of 75 out of 77 samples (97.5%) sent from the physicians for cytology showed that no malignant cells were present (the
usually due to malignant causes. Of these patients will have underlying cirrhosis, while 10% are medical specialties. In the developed world approximately 80% DISCUSSION

cal patients.

gin. All the false negatives came from surgical or gynaecologi-
in origin. The general surgeons found malignant cells in 21% and in each case the malignancy proved to be gynaecological remaining 2.5% showing ovarian malignancy). Specimens from gynaecology patients showed a 25% positive return rate and in each case the malignancy proved to be gynaecological in origin. The general surgeons found malignant cells in 21% of the samples sent, 89% of which were gynaecological in origin. All the false negatives came from surgical or gynaecologi-
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The role of ultrasound has been found to have an important role in the investigation of potentially malignant ascites. In 19 of the 32 patients with false negative results, the provisional diagnosis was made on ultrasound. We found that the hope placed in cytology providing the diagnosis caused a delay of up to five days before radiological imaging was performed.

From the results of our study we would recommend the following as a protocol on patients requiring investigation of ascites:

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We have a protocol for the management of patients with suspected malignant ascites. It involves:

- Firstly, send cytology samples only on women, as this is the only group that showed a significant detection rate and a positive result that could alter management.
- Secondly, measure ascitic and serum albumin in the initial paracentesis to aid diagnosis if the history and examination are not conclusive, or suspicious of malignancy, rather than sending “routine” cytology.
- Thirdly, proceed to early ultrasound in suspected malignant ascites rather than awaiting cytology (fig 2).

As well as the economic benefits, this protocol could potentially have a significant clinical impact on the speed and accuracy of diagnosing the underlying cause of ascites.

**Figure 2** Diagnostic methods for false negative ascitic cytology

**REFERENCES**


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