How to catch ovarian cancer earlier

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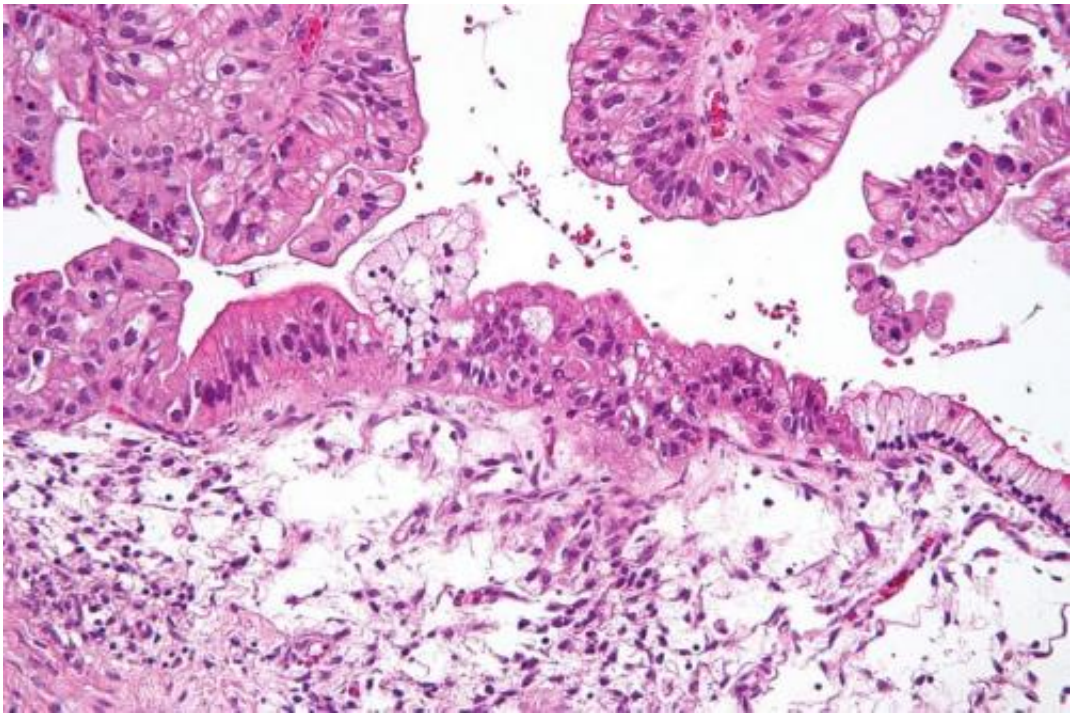

Intermediate magnification micrograph of a low malignant potential (LMP) mucinous ovarian tumour. H&E stain. The micrograph shows: Simple mucinous epithelium (right) and mucinous epithelium that pseudo-stratifies (left - diagnostic of a LMP tumour). Epithelium in a frond-like architecture is seen at the top of image. Credit: Nephron /Wikipedia. CC BY-SA 3.0

Fewer than half of ovarian cancer patients survive until five years after diagnosis. According to the American Cancer Society, this is because only about one-fifth of ovarian cancer cases are detected early, when the chances of successful treatment and recovery are highest.

"If we could change this reality by detecting (ovarian cancer) at a curable stage, we could save many lives," said Keren Levanon, a physician-researcher at Chaim Sheba Medical Center in Israel.

In the journal *Molecular & Cellular Proteomics*, researchers led by Levanon and Tamar Geiger of Tel Aviv University report a new test for ovarian cancer that outperforms previous tests. They hope it will help screen women who are genetically predisposed to the disease.

The researchers used proteomics to search for signatures of cancer in uterine fluid. They compared samples from women with ovarian cancer having surgery in the course of treatment and from volunteers who had gynecological surgery for reasons unrelated to cancer, such as uterine fibroids or excessive bleeding.

Bodily fluids contain many proteins. Strong signals from the most common proteins can mask signals from smaller amounts of cancer-linked proteins that might also be present. To overcome that difficulty, researchers isolated microvesicles from the uterine fluid. Because microvesicles are shed from cells, they contain almost none of the signal-masking plasma proteins.

Using proteomics, the researchers compared thousands of proteins in uterine microvesicles from 12 healthy volunteers and 12 cancer patients. Then they used machine learning algorithms to search for patterns that could distinguish between the samples.

"We developed a diagnostic set of nine proteins that distinguishes women with ovarian cancer from healthy women with greater sensitivity and specificity than reported before," Levanon said.

The researchers then tested the set's accuracy in a cohort of 152 women, 37 of whom were known to have ovarian cancer. The test had 70 percent

diagnostic sensitivity, meaning that it correctly detected cancer 25 of the 37 study participants who truly had cancer; and 76 percent specificity, meaning that it correctly identified about three out of every four healthy volunteers as healthy. It outperformed previous proteomics-based tests, which had less than 60 percent sensitivity.

The authors propose that their test may be useful for young women whose risk of developing ovarian cancer is known to be high. They also believe that the method of isolating microvesicles from bodily fluids to detect fainter cancer signals shows promise for other difficult-to-detect types of cancer.

More information: Georgina D Barnabas et al, Microvesicle Proteomic profiling of Uterine Liquid Biopsy for Ovarian Cancer Early Detection, *Molecular & Cellular Proteomics* (2019). DOI: 10.1074/mcp.RA119.001362

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