

Scientists reveal best imaging technique for ovarian cancer

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Cancer Research UK-funded scientists have determined that a magnetic resonance imaging (MRI) technique, which measures the movement of water molecules within the tumour, may be the best way to monitor how women with late-stage ovarian cancer are responding to treatment. The study is published in the journal *Radiology* today.

Researchers from Cancer Research UK's Cambridge Experimental Cancer Medicine Centre at the University of Cambridge compared three different MRI techniques and showed that a type called 'diffusion-weighted MRI' is the most effective at indicating response to treatment and also at distinguishing when tumours that had spread from the ovaries into surrounding tissues were not responding.

CT scans are routinely used to help assess whether [ovarian cancer](#) patients should continue having chemotherapy after their first round of treatment, but can only detect differences in the size of the [tumour](#) as opposed to a change in its structure.

Study leader Dr Evis Sala from the University of Cambridge, said: "At the moment we rely on CT scans and blood tests to tell us what's going on inside a patient's tumour. But it's difficult to judge how effective treatment has been from these alone, particularly when the cancer has spread to other tissues where it may behave differently to the primary tumour.

"We've shown that diffusion-weighted MRI can give a much better idea

of the density of tumours, in addition to their size, making it easier to determine which patients are benefitting most from the treatment. We are now collaborating on a nationwide study to see if this type of imaging could be an effective way of predicting treatment response in a much larger group of patients with advanced ovarian cancer.”

Daphne Tustian, is one of 21 women who took part in the study. She was diagnosed with advanced ovarian cancer in May 2009. Her participation in the study meant that various MRI techniques were used to monitor her throughout her chemotherapy to help inform doctors how her treatment was going. Her cancer went into remission in November 2009, but returned just over a year later.

She said: “I know that at present doctors are trying to prolong my life – they are unable to cure the cancer in my body, but if they can give me more time with my family I am very happy with that.

“When I enrolled on the trial nurses explained to me that it may not benefit me directly but certainly would help others in the future. I do feel that I have benefitted from the trial, however, as I was closely monitored and knew at each stage how my cancer was responding to treatment. It saved me from having unnecessary chemotherapy and it can save others too. If someone is on chemotherapy and it’s not working it’s a waste of their time, of drugs, of money and a waste of life.”

Each patient underwent an MRI of the abdomen and pelvis, including three additional MRI techniques on top of the standard scans. The different imaging techniques were compared using various parameters - one which was called the Apparent Diffusion Coefficient (ADC), which measures the movement of [water molecules](#) in tumours.

The researchers compared the ADC measurements in the primary tumour and in cancer cells that had spread from the ovaries into lining of

the abdomen. They found there was a larger increase in the ADC of the primary tumour among those who responded to treatment compared to those who didn't, while in the sites of cancer spread there was no change.

Senior author Dr James Brenton from Cancer Research UK's Cambridge Research Institute, added: "The increase in ADC seen in the primary tumour in patients who responded to treatment is due to the chemotherapy killing some of the cancer cells, which in turn increases the amount of space inside the tumour allowing water molecules to flow more easily. The fact that there was little change in sites of cancer spread suggests that these cells may be more resistant and so need to be targeted with a different treatment to the primary tumour."

Dr Joanna Reynolds, Cancer Research UK's director of centres, said: "A important aim of Cancer Research UK's Experimental Cancer Medicine Network is to support the development of tests that can help doctors to quickly spot treatment resistant cells in the tumour, so therapy can be tailored appropriately. Advanced ovarian cancer can be very difficult to treat, meaning it's vital that patients are monitored closely to ensure they are benefiting from treatment. We're excited to be funding the next stage of this research, which will look at the potential benefits of this test in a much larger group of patients. "

More information: Sala, E., Kataoka, M., Priest, A., Gill, A., McLean, M., Joubert, I., Graves, M., Crawford, R., Jimenez-Linan, M., Earl, H., Hodgkin, C., Griffiths, J., Lomas, D., & Brenton, J. (2012). Advanced Ovarian Cancer: Multiparametric MR Imaging Demonstrates Response- and Metastasis-specific Effects *Radiology* [DOI: 10.1148/radiol.11110175](https://doi.org/10.1148/radiol.11110175)

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