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Faster and More Reliable Ovarian Cancer Diagnosis

It is crucial to differentiate between benign and malignant ovarian cysts and tumours in a fast and reliable manner. This improves the surgical management and prognosis of the patient. Research directed by Professor Dirk Timmerman, Clinical Head of Gynaecology at the University Hospitals Gasthuisberg Campus has validated that ultrasound-based simple rules may reliably distinguish between malignant and benign tumours.

Ovarian cancer -- a malignant tumour in the ovaries -- is the most deadly female malignancy because in many cases, the disease has few symptoms. Consequently, it is often only diagnosed once it has reached a very advanced stage. Treatment of ovarian cancer consists of laparotomy, possibly preceded by a course of chemotherapy. A laparotomy is an invasive open operation that involves making a large incision and removing all the tumour tissue. Most cysts in the ovaries are benign, however, and they may spontaneously disappear. In cases where an operation does prove necessary, laparoscopy -- or keyhole surgery -- offers many advantages. This involves removing only the cyst itself, via very small incisions.

The ultrasound examination -- imaging with ultrasound sound waves -- is crucial, Timmerman explains: "It is not always easy to characterise ovarian tumours, but a reliable preoperative diagnosis is very important. When operating on a malignant tumour, the cystic contents should not be spilled, because spread of the cancer cells in the abdomen clearly decreases the patient's chances of survival. Conversely, when it comes to benign tumours -- especially in younger women who wish to bear children -- it is important to avoid unnecessary operations that may reduce their fertility and may result in a large abdominal scar and a longer stay in hospital."

Dirk Timmerman is the co-ordinator of the International Ovarian Tumor Analysis Group (IOTA) -- an international co-operation between ultrasound centres in various countries with medical doctors and an interdisciplinary team of engineers and biostatisticians at the Department of Electrical Engineering, ESAT-SCD, of K.U. Leuven. Together with Dr. Lieveke Ameye and Professor Sabine Van Huffel of ESAT-SCD, Timmerman has developed a set of rules to distinguish between benign and malignant tumours with ultrasound examination. We needed a simple and reliable triage method, Timmerman explains. "Existing tests were either expensive and time-consuming, or unreliable. There are mathematical models you can use to distinguish between different types of tumours, but computers are not always available during the ultrasound examination, especially not in developing countries. Moreover, in many places, ultrasound examination of the ovaries is not performed by specialised medical doctors or very experienced examiners."

The simple ultrasound rules include external characteristics of the tumour: the irregular and solid form, diameter, papillations, internal cyst walls, blood flow and calcifications. If a cyst has one of the five features of a benign tumour or one of the five features of a malignant tumour, it is classified in one of the two respective categories. The procedure has been tested on almost 2,000 women who subsequently underwent surgery. In 77% of the cases, the rules proved applicable and research of the removed tumour demonstrated that the rules were very reliable for predicting whether the tumours were benign or malignant. In other cases -- if there are none of the above-mentioned features or if both benign and malignant features are present -- an examination by an experienced ultrasound examiner is the best method.

There are approximately 1,000 new diagnoses of ovarian cancer in Belgium every year, of which about 600 occur in Flanders. Hundreds of thousands of cases of ovarian cancer are diagnosed annually across the world. As the symptoms of ovarian cancer are not specific, it is important to plan a thorough examination if there are any symptoms, such as abdominal swelling, loss of appetite, pain or abnormal bleeding.

D. Timmerman, L. Ameye, D. Fischerova, E. Epstein, G. B. Melis, S. Guerriero, C. Van Holsbeke, L. Savelli, R. Fruscio, A. A. Lissoni, A. C. Testa, J. Veldman, I. Vergote, S. Van Huffel, T. Bourne, L. Valentin. Simple ultrasound rules to distinguish between benign and malignant adnexal masses before surgery: prospective validation by IOTA group. BMJ, 2010; 341 (dec14 1): c6839 DOI: 10.1136/bmj.c6839