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Pre-operative evaluation in advanced ovarian cancer: is ultrasound ready to replace computed tomography?

Debora Verri

Department of Obstetrics and Gynecology, Presidio Ospedaliero Alessandro Manzoni, Lecco 23900, Italy

Correspondence to
Dr Debora Verri, Obstetrics and Gynecology, Presidio Ospedaliero Alessandro Manzoni, Lecco 23900, Italy; debora806@gmail.com

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The pre-operative evaluation of patients with advanced ovarian cancer has traditionally relied on physical examination, serum CA125, and computed tomography (CT). More recently, laparoscopic evaluation has been integrated in the standard evaluation in many centers.[1] Currently, there is increasing evidence that ultrasound may offer a valuable tool in assessing the extent of disease in patients with advanced ovarian cancer. However, there is a paucity of data on its integration in the evaluation of such patients.

Three studies have previously focused on ultrasound performance in defining intra-abdominal tumor spread.[2–4] Testa and colleagues[2] analyzed the ability of ultrasound to detect disease at specific intra-abdominal sites in advanced ovarian cancer patients. The overall accuracy was >91% in assessing pelvic involvement, parenchymal liver metastasis, ascites, peritoneal carcinomatosis, and omental infiltration. Fisherova and colleagues[3] published the largest prospective imaging study evaluating a total of 394 ovarian cancer patients. That study evaluated ultrasound accuracy in assessing pelvic and intra-abdominal spread of disease and described predictive power for detection of pelvic carcinomatosis (area under the curve (AUC) 0.892; sensitivity 81.4%; specificity 97%) and rectosigmoid wall infiltration (AUC 0.898; sensitivity 83.1%; specificity 96.6%). In contrast, the authors reported an ultrasound assessment sensitivity <50% for retroperitoneal adenopathy as well as for upper and mid abdominal carcinomatosis (with the exception of omental infiltration), highlighting the difficult detection of miliary spread (<3 mm) by transabdominal ultrasound. These results were consistent with those of the Radiological Diagnostic Oncology Group,[4] which compared ultrasound versus CT scan, showing the same limitations for both techniques. The low sensitivity in miliary carcinomatosis detection and retroperitoneal staging were found also for CT in a study by Michielsen and colleagues.[5]

Alcázar and colleagues[6] report a retrospective study that compared ultrasound and CT imaging in the pre-operative assessment of 93 patients with epithelial ovarian cancer. Patients suspected for malignancy underwent transvaginal and transabdominal ultrasound examination evaluating a total of 12 anatomical regions in the abdomen and pelvis, which was based on previously published methodology.[7] In addition, all patients underwent CT scan imaging. Laparoscopy was performed for assessment of resectability followed by primary cytoreduction in suitable patients. Fifty-six (60.2%) patients had advanced-stage ovarian cancer and 11.8% were not suitable for optimal debulking. Excluding stages I-IIA (n=30), 62.2% and 25.0% had complete (no macroscopic disease) and optimal cytoreduction (residual disease <1 cm), respectively. Overall sensitivity for ultrasound and CT scan in detecting disease was 70.3% and 60.1%, respectively, whereas specificity was 97.8% and 93.7%, respectively. The authors reported acceptable agreement between ultrasound (kappa (κ) index 0.69) and CT scan imaging (κ index 0.70). The overall ultrasound accuracy of 71% compared to 75% of CT. The authors concluded that ultrasound, in expert hands, may offer very similar accuracy compared with CT scan.

The authors ought to be commended for exploring alternatives to standard imaging for the evaluation of patients with advanced ovarian cancer. There are, however, several limitations of the study. First, the study is a retrospective analysis with a low number of advanced-stage patients, and many parameters such as root of mesentery and small bowel involvement, liver parenchyma disease, hepatic hilum or splenic infiltration were too rare to assess the accuracy of either ultrasound or CT in detecting them. Second, all ultrasounds were performed by a single experienced examiner; this represented a potential lack of reproducibility of results. Moreover, the expertise of the sonographer should be defined objectively, and terminology and methodology standardized to further multicenter interobserver agreement. Nevertheless, this study highlights that ultrasound may be considered a valuable tool in the assessment of patients with advanced ovarian cancer, noting the limitations and potential lack of accuracy in detecting disease in certain abdominal sites, such as retroperitoneal lymphadenopathy, as

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well as the need for additional imaging techniques to assess supradiaphragmatic spread.

There are numerable advantages to ultrasound when compared with other routine imaging in patients with advanced ovarian cancer such as CT or positron emission tomography/CT imaging. These include significantly lower cost, a wide availability in most countries, and absence of risks to the patient. In certain settings, ultrasound has already replaced CT scan in the pre-operative evaluation of pelvic and abdominal disease. Given these proposed benefits, this study adds to the importance of training and validation of ultrasound techniques and for an expansion in the number of experts in this modality so that broader options of information are available, not only to gynecologic oncologists, but also to patients. A multi-institutional prospective trial evaluating interobserver agreement and comparison to other imaging tools would be ideal so that we may potentially consider ultrasound as the new standard of care.

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