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Which imaging technique should we use in the follow up of gynaecological cancer?

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Follow-up routines after gynaecological cancer vary. The optimal approach is unknown, and no randomised-controlled trials comparing surveillance protocols have been published. In this chapter, we summarise the diagnostic performance of ultrasound, computed tomography, and magnetic resonance imaging in the follow up of women treated for ovarian or uterine cancers. Computed tomography is today the standard imaging method for the follow up of women treated for endometrial, cervical, or ovarian cancer. Six-monthly or annual follow-up examinations have not been shown to positively affect survival. Instead, a combination of transvaginal and transabdominal ultrasound examination with clinical examination might be a more cost-effective strategy for early detection of recurrence. Positron-emission tomography might play a role in women with clinical or serological suspicion of recurrence but without evidence of disease at conventional diagnostic imaging. To create guidelines, more studies, preferably randomised-controlled trials, on follow-up strategies are needed.

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Introduction

Despite continuing advances in surgical and non-surgical therapeutic strategies, gynaecological malignancies have a high probability (30–75%) of developing relapse and distant metastases after initial treatment [1]. In view of the low survival rate of women with recurrent disease, surveillance programmes mainly aim at early detection of recurrence, the rationale for this being that earlier diagnosis of relapse could be associated with lower morbidity and mortality rates. Other objectives of routine follow up are the identification of treatment complications and detection of second tumours associated with primary gynaecological cancer. How to best follow up women with gynaecological cancers is still unclear [2]. Published data indicate that 41–100% of all recurrences are detected through symptoms alone (i.e. the recurrence would have been detected regardless of follow-up strategy) [3,4].

The methods usually used for postoperative surveillance of women with gynaecological cancer include clinical history, pelvic examination, visual vaginal inspection with vaginal cytology, and serum tumour markers. Computed tomography, magnetic resonance imaging (MRI) and positron emission tomography (PET) are also important tools in the follow up of gynaecological relapses [5,6]. Tumour markers have a limited role, because both benign gynaecological conditions and malignant non-gynaecological conditions may be associated with elevated levels of tumour markers. Moreover, elevated levels of tumour marker do not provide any information about the location of recurrence [7]. Computed tomography, MRI, and positron emission tomography combined with computed tomography are too expensive to be proposed as first-line methods to detect recurrence, and they have a poor ability to detect small lesions [8,9]. Surprisingly, scant data are available on the utility of transabdominal and transvaginal ultrasound examination in the follow up of women with gynaecological cancer. The wide availability and the low cost of ultrasound, as well as the rapidity of the examination procedure and the possibility of bed-side use of ultrasound, would justify its use for surveillance of women treated for gynaecological cancer, provided that adequate diagnostic performance could be demonstrated.

The most appropriate follow-up strategy for each type of gynaecological cancer is likely to depend on the natural history of the disease, the risk of recurrence, the most frequent site of relapse, and the appearance of the recurrent tumour at imaging (i.e. discrete solid or cystic lesions or diffuse carcinomatosis).

Ovarian cancer

Epithelial ovarian cancer is the most common cause of mortality among gynaecologic malignancies [10]. At diagnosis, most (75%) epithelial ovarian cancers have progressed to stage III or IV [11,12], and in women with this type of cancer, the 5-year survival rate is 15–20% [13]. Many factors are associated with poor prognosis (e.g. age at diagnosis younger than 50 years or 50 years or older), International Federation of Gynaecology and Obstetrics (FIGO) stage, grade, histotype (serous or not serous), tumour size, and CA125 levels at diagnosis [14]. The major determinants of outcome of these women are residual tumour after the first cytoreductive surgery and platinum sensitivity [15].

Recurrent ovarian malignancy usually appears as a pelvic mass at the site of surgery or as diffuse peritoneal carcinomatosis, pleuropulmonary lesions, lymph node, or liver metastases. Frequently, relapses of ovarian cancer are associated with ascites or pleural effusion, and sometimes these are the first manifestations of recurrence. Pelvic relapse may involve the vaginal cuff, the parametria, the bladder, the ureters, bowel loops, or the rectum [16]. Ferrandina et al. [12] reported that diffuse abdominal carcinomatosis was the most common presentation of recurrence (62.1%). A single tumour nodule or multiple tumour nodules were the first manifestation of recurrence in 9.9% and 26.7% of women, respectively [12]. Ureteral obstruction may be caused by direct encasement of the ureter or by tumour infiltration of the bladder wall, which results in ureteral obstruction and hydronephrosis. Pelvic and para-aortic lymph nodes are also common sites of recurrence. Unusual sites of recurrence are the spleen, gastrointestinal tract, skeleton musculo-cutaneous tissue, and central nervous system.