# Streszczenie w języku angielskim

# Advanced Imaging Techniques in the Diagnosis of Ovarian Cancer Recurrence: The Role of Magnetic Resonance Imaging in the Assessment of Peritoneal Implants and Tumor-Related Fistula


**Introduction**

The recurrence of serous ovarian cancer is a serious diagnostic challenge due to its high frequency and heterogeneous clinical and radiological presentation. Magnetic resonance imaging plays a crucial role in detecting relapse, including their rare forms. The two analyzed articles in the doctoral dissertation focus on optimizing the diagnosis of ovarian cancer recurrence in the form of tumor-related fistulas and peritoneal implants using advanced MR imaging techniques, which may contribute to more personalized treatment.

**Publication No. 1 included in the doctoral dissertation cycle**

**Jankowska-Lombarska M., Grabowska-Derlatka L., and Derlatka P. "Tumor-Bowel Fistula as a Rare Form of Recurrent Ovarian Cancer—Imaging and Treatment: Preliminary Report"** ***Current Oncology*** **30.1 (2022): 506-517.**

The first article of the cycle is an original work aimed at evaluating the usefulness of imaging techniques: computed tomography and magnetic resonance imaging in diagnosing a rare type of recurrence of ovarian cancer. The recurrence took the form of a fistula between the tumor and the intestine. Additionally, we evaluated the outcomes of treatment for the recurrent disease.

The study included eight patients who had undergone cytoreductive surgery, completed first-line systemic treatment (paclitaxel + carboplatin) with complete remission (CR) which lasted at least six months. The suspicion of recurrence was based on clinical presentation (symptoms of gastrointestinal obstruction, lower gastrointestinal bleeding, abdominal pain), at least twofold increase in CA-125 levels compared to the lowest value, and abnormal transvaginal ultrasound

(TVS) findings.

All patients underwent CT before and after contrast administration, as well as MRI before and after contrast administration. The imaging was assessed by two independent radiologists. In all patients, features of a fistula between the tumor and the large intestine were found. In CT, only indirect signs of a fistula were observed, such as tumor infiltration of the intestine (obliteration of fatty tissue between the tumor and intestinal wall, discontinuity of the intestinal wall, or gas within the tumor). In MRI direct visualization the fistulas was achieved. All patients were qualified for secondary cytoreductive surgery.

Intraoperatively the presence of fistulas and tumor recurrence was confirmed. In seven patients, no macroscopic residual tumor was left after surgery (R0 resection), while in one patient, residual implants in the mesentery of the ileum with diameters of 1–2 mm were left. Seven bowel anastomoses and one colostomy were performed. In one patient, a portion of the bladder and ureter infiltrated by the tumor was also resected. Postoperative recovery in all patients was uneventful.

Six patients had another recurrence. In two patients, no recurrence was observed during 36 and 28 months of follow-up and one patient died. The median progression-free survival after the second line of treatment was 13.4 months (8.4–22.6).

Based on the analyzed data, CT was found to be insufficient to definitively confirm the presence of a fistula within the tumor. MRI effectively visualized the fistula and allowed precise localization. Bowel resection with simultaneous anastomosis proved to be a good and safe treatment option for this group of patients.

**Publication No. 2 included in the doctoral dissertation cycle**

**Jankowska-Lombarska M., Grabowska-Derlatka L., Kraj L. & Derlatka P. „Dynamic Contrast-Enhanced and Diffusion-Weighted Imaging in Magnetic Resonance in the Assessment of Peritoneal Recurrence of Ovarian Cancer in Patients with or Without BRCA Mutation" *Cancers*, 2024, 16.22: 3738.**

The second article is an original study aimed at comparative evaluation of diffusion parameters (using ADC maps) and selected parameters used in dynamic contrast-enhanced imaging in peritoneal implants in patients with and without BRCA1/2 gene mutations, experiencing recurrence of high-grade serous ovarian cancer. The study includes an extensive literature review and thoroughly discusses radiological differences between the two patient groups.

The study group consisted of MR examinations in patients with clinically suspected ovarian cancer recurrence based on CA-125 results and/or CT imaging. A total of 43 patients were included, 18 of whom had confirmed BRCA1/2 gene mutations and underwent 1.5T MRI with and without contrast

administration due to suspected recurrence following first-line treatment. All patients, aged 21–76 years, had undergone primary cytoreductive surgery for platinum-sensitive ovarian cancer. The MR scans were evaluated by two independent researchers for quantitative measurements in ADC maps and for TTP and Perf. Max. En. in the DCE study.

For the assessment of implant location, the abdomen and pelvis were divided into regions according to the PCI index. Each region was analyzed for the presence of the implants. Then, each researcher selected the implant with the highest qualitative diffusion restriction for measurement in each region. These implants were then also evaluated using perfusion parameters. The implants were also categorized in the groups according to size.

Statistical analysis revealed significant differences in ADC, TTP, and Perf. Max. En. parameters between the groups with and without mutations. TTP values were statistically higher in patients without mutations (256.3 vs. 160.6), while Perf. Max. En. values were higher in patients with mutations (233.6 vs. 148.6). No differences were observed between perfusion parameters and implant size.

ADC values were statistically higher in patients with mutations (977.3 vs. 788.7). Furthermore, differences in ADC values were found across implant size groups, with the lowest values observed in the group of medium-sized implants (1–2 cm).

This study confirmed differences in the radiological appearance of peritoneal implants on ADC maps and DCE MRI between patients with and without BRCA1/2 mutations. Based on our study, we believe that adding perfusion parameters to the MRI protocol is a valuable diagnostic component in suspected ovarian cancer recurrence.

**Summary**

The presented articles concern diagnostics using advanced MRI imaging techniques in specific forms of recurrent ovarian cancer. The first study describes a cohort of eight patients with a rare form of recurrence—tumor-bowel fistulas—where MRI, particularly T2-weighted and contrast-enhanced T1-weighted sequences, proved most effective in detecting fistulas. Diffusion sequences provided limited diagnostic value, except in cases of coexisting inflammation.

The second study analyzes correlations between MRI parameters (DWI and DCE) and BRCA1/2 mutation status in 43 patients with recurrent HGSOC. Significant differences were found between the two groups in both diffusion and perfusion sequences. These results may have clinical significance in treatment planning.