

**COMBINED USE OF THE PERITONEAL CANCER INDEX AND
LAPAROSCOPIC PREDICTIVE SCORES FOR TREATMENT
STRATIFICATION**

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Background

Advanced epithelial ovarian cancer is frequently diagnosed at FIGO stage III–IV, when extensive intraperitoneal dissemination significantly complicates the selection of optimal treatment. The cornerstone of therapy remains complete cytoreductive surgery (CC-0), as numerous studies have demonstrated that the absence of macroscopic residual disease is the strongest independent predictor of progression-free and overall survival. However, complete cytoreduction cannot be achieved in every patient, particularly in cases of diffuse peritoneal carcinomatosis, extensive diaphragmatic involvement, mesenteric infiltration, or invasion of the small bowel serosa.

Selecting the most appropriate initial treatment strategy—primary debulking surgery (PDS), neoadjuvant chemotherapy (NACT) followed by interval debulking surgery, or palliative systemic treatment—remains one of the greatest challenges in gynecologic oncology. Inappropriate selection may expose patients with unresectable disease to unnecessary extensive surgery, increased perioperative morbidity, delayed chemotherapy, prolonged hospitalization, and reduced quality of life.

Several objective methods have been proposed to improve patient stratification. The Peritoneal Cancer Index (PCI) quantitatively evaluates the extent and distribution of peritoneal carcinomatosis across 13 abdominopelvic regions and has shown strong correlation with surgical complexity and the probability of complete cytoreduction. Meanwhile, the Fagotti Predictive Index Value (PIV), obtained during diagnostic laparoscopy, assesses key anatomical sites associated with unresectability, including diaphragmatic disease, mesenteric involvement, bowel infiltration, stomach invasion, liver surface metastases, and omental cake. A Fagotti score ≥ 8 has consistently been associated with a low likelihood of optimal primary debulking.

Although both PCI and laparoscopic predictive scores independently predict surgical outcomes, each has important limitations. PCI primarily reflects disease burden but does not evaluate technical resectability of specific lesions, whereas



the Fagotti score provides qualitative assessment without fully quantifying tumor distribution. Furthermore, neither system incorporates biological tumor characteristics reflected by serum biomarkers such as CA-125, HE4, or nutritional indicators like serum albumin.

Emerging evidence suggests that combining anatomical tumor burden, laparoscopic assessment, and biochemical markers may provide superior prediction of surgical feasibility and facilitate individualized treatment planning. Developing a comprehensive preoperative stratification algorithm could improve patient selection, reduce unnecessary laparotomies, optimize timing of systemic therapy, and ultimately improve oncological outcomes.

Aim

To evaluate the clinical effectiveness of an integrated treatment stratification algorithm combining the Peritoneal Cancer Index (PCI), laparoscopic predictive scores (Fagotti Predictive Index Value), and serum tumor biomarkers for selecting the optimal initial treatment strategy in patients with advanced epithelial ovarian cancer.

Materials and Methods

Patients with suspected advanced ovarian cancer underwent diagnostic laparoscopy with PCI and Fagotti score assessment alongside preoperative CA-125 measurement. Treatment pathway assignment based on the combined algorithm was compared with actual surgical and oncological outcomes.

Results

The integrated PCI–laparoscopic score–biomarker algorithm improved the accuracy of treatment pathway allocation compared with the use of any single scoring system, correctly identifying a greater proportion of patients suitable for primary debulking surgery.

Conclusion

The combined use of the Peritoneal Cancer Index (PCI), laparoscopic predictive scores (Fagotti Predictive Index Value), and serum tumor biomarkers provides a highly accurate and clinically practical framework for treatment stratification in advanced ovarian cancer.

The integrated algorithm significantly outperforms individual predictive tools by increasing the accuracy of identifying patients suitable for primary debulking surgery, reducing unnecessary exploratory laparotomies, and facilitating timely selection of neoadjuvant chemotherapy or palliative treatment when appropriate.





These findings support the incorporation of multimodal preoperative assessment into routine clinical practice and provide a strong foundation for personalized surgical decision-making in advanced ovarian cancer.

