frequently develops (Papageorgiou et al., 2025). Consequently, advanced ovarian cancer often evolves into a chronic, relapsing disease state characterized by alternating periods of remission and recurrence, with significant impacts on quality of life and healthcare burden (Tavares et al., 2024).

These limitations of conventional cytotoxic and targeted therapies underscore an urgent need for novel treatment paradigms capable of inducing more durable disease control and potentially long-lasting remission. Immunotherapy, which harnesses or augments the host immune system to recognize and eradicate malignant cells, has revolutionized the management of several solid tumors and is increasingly being investigated in ovarian cancer. Epithelial ovarian cancer is an immunogenic tumor: tumor-reactive T cells and antibodies can be detected in blood, tumor tissue, and ascites, and higher densities of CD8+tumor-infiltrating lymphocytes correlate with improved survival, suggesting that effective antitumor immunity can modify disease course. Multiple immunotherapeutic modalities are under active exploration, including immune checkpoint inhibitors targeting CTLA-4 and PD-1/PD-L1, cancer vaccines, adoptive cell therapies such as CAR-T and TCR-engineered T cells, oncolytic viruses, and cytokine-based strategies (Papageorgiou et al., 2025). However, single-agent checkpoint inhibitors have generally yielded modest response rates in unselected ovarian cancer populations, highlighting the role of an immunosuppressive tumor microenvironment and the need for rational combination approaches and biomarker-guided patient selection.

This study aims to explore the current treatment status and limitations of advanced ovarian cancer. For several decades, its cornerstone has been maximal cytoreductive surgery combined with platinum-based chemotherapy, typically with taxanes, delivered either as primary debulking followed by adjuvant therapy or as neoadjuvant chemotherapy followed by interval debulking. Although these approaches achieve high initial response and complete remission rates, particularly when no visible residual disease is achieved, the majority of patients ultimately relapse, and recurrent disease is generally incurable. Real-world data indicate that only about 45%-50% of patients with stage III–IV disease remain alive at 5 years, and many undergo multiple lines of chemotherapy with progressively shorter response durations and accumulating toxicity. Targeted agents such as bevacizumab and poly (ADP-ribose) polymerase (PARP) inhibitors have improved progression-free survival in selected subgroups, particularly those with BRCA mutations or homologous recombination deficiency, but their impact on long-term cure rates is limited and resistance frequently develops. Consequently, advanced ovarian cancer often evolves into a chronic, relapsing disease characterized by alternating periods of remission and recurrence, imposing a significant burden on both patient quality of life and healthcare systems.

2 Current Treatment Status of Advanced Ovarian Cancer

2.1 Standard therapeutic modalities: surgery and chemotherapy

For most patients with advanced epithelial ovarian cancer, the current standard of care remains a combination of cytoreductive surgery and platinum-based chemotherapy, usually with carboplatin and paclitaxel. Primary debulking surgery aims to achieve complete macroscopic tumor resection, as the extent of residual disease is one of the strongest prognostic factors for overall survival. For patients with high perioperative risk or low likelihood of optimal primary cytoreduction, neoadjuvant chemotherapy followed by interval debulking surgery offers a validated alternative with comparable survival and lower postoperative morbidity (Shawky et al., 2025). International guidelines now emphasize multidisciplinary evaluation by gynecologic oncologists, imaging-based assessment of resectability, and integration of germline and somatic testing at diagnosis to guide both surgical strategy and systemic therapy selection (Gaillard et al., 2025; Papageorgiou et al., 2025).

Despite refinements in surgical techniques, perioperative care, and chemotherapy scheduling, outcomes remain suboptimal, with the majority of women ultimately relapsing after an initial response to first-line therapy. Randomized trials and meta-analyses comparing primary surgery to neoadjuvant chemotherapy consistently show similar overall and progression-free survival, underscoring that cytotoxic chemotherapy plus surgery, regardless of sequence, has reached a therapeutic plateau in many patients. Dose-dense regimens, intraperitoneal chemotherapy, and hyperthermic intraperitoneal chemotherapy (HIPEC) have been explored to enhance first-line efficacy, but toxicity, logistical complexity, and inconsistent phase III data have limited their widespread adoption (Gaillard et