Overview
Proton therapy is a powerful treatment tool for fighting gynecologic (GYN) malignancies, including Uterine/endometrial, vulvar, cervical and recurrent ovarian cancers, and it is now available to patients at the Maryland Proton Treatment Center (MPTC). Physicians at MPTC use the most advanced form of proton therapy, called pencil-beam scanning (PBS), or intensity modulated proton therapy (IMPT) to target tumors with unmatched precision, while minimizing damage to surrounding healthy tissue.

For GYN cancer patients, proton therapy has the potential to lead to fewer short- and long-term side effects, particularly to the small bowel, large bowel, bladder, kidneys, and pelvic bone marrow. Research studies from other disease sites indicate that proton therapy treatment may reduce the impact on urinary function and bowel function; fewer side effects during treatment may allow for increased compliance to treatment. Proton therapy is safe to deliver concurrently with chemotherapy agents.

Patients Who May Benefit from Proton Therapy
Not all women with GYN cancers will have a benefit from proton therapy; for some patients, photon therapy is sufficient. Other patients, however, can derive a significant benefit:

- **Patients with advanced endometrial and cervical cancer:** Women whose treatment plans include external beam radiation therapy to the pelvis and abdomen (para-aortic nodal chain) will likely benefit from this treatment due to significant dose-reduction to the bowel, kidneys and abdominal viscera as compared to intensity-modulated radiation therapy (IMRT). See figure on the right.

- **Patients who have had prior pelvic radiation therapy:** When any part of the body is radiated a second time, the risk of short- and long-term side effects increases. For this reason, patients who have previously received radiation to the pelvis from prior cancers are often good candidates for proton therapy’s precision targeting.

- **Patients with disease recurrence:** Patients who have a recurrence of their cancer can benefit from proton therapy in two ways. First, proton therapy can aim a higher dose of radiation at the site of the recurrence, potentially leading to improved outcomes. Second, proton therapy’s precision can reduce the radiation dose that surrounding normal tissue receive.

- **Adolescents & young adults:** While there is no threshold below which radiation is risk free, proton therapy can expose a smaller volume of tissue to radiation, offering a benefit for patients with long life expectancies.

Proton Therapy Versus Photon Therapy
Proton therapy allows for higher doses of radiation to be delivered to the tumor without damaging surrounding healthy tissues and organs. Because of the physics of proton particles, proton radiation goes to the site of the tumor and stops. The image below shows the areas surrounding the tumor exposed to radiation (dose delivered to tumor and surrounding tissue shown in color) during treatment. Proton therapy (left) delivers significantly less radiation to the surrounding areas than the photon treatment (right).

Proton therapy is given with the same logistical considerations as photon therapy. Patients undergo a CT simulation or planning session followed by treatment planning, then treatment delivery.

MPTC-Specific Clinical Trial Offerings
MPTC is dedicated to advancing scientific knowledge about the role of proton therapy in the treatment of gynecologic cancers. All patients treated at MPTC have access to a wide range of clinical trials available through the Maryland Proton Alliance. Plans are also underway at MPTC to open in-house clinical trials in addition to multi-institutional trials.
Current clinical trials at MPTC include:

- NCT01255748: Evaluation Tracking Project: A Prospective Chart Review of Patients Treated with Radiation Therapy

For more information on our currently available clinical trials, please call our research department at 410-369-5353.

Outcomes

Your patients may be hesitant to explore new treatment options for gynecologic cancers and may pose questions related to side effects and outcomes. Proton therapy is an effective, noninvasive, low-risk treatment option that can improve the quality of life for cancer patients and survivors. Studies are ongoing, and early results confirm this treatment’s power and precision.

In a 2012 study, researchers performed a dosimetric comparison of combined intensity-modulated radiotherapy (IMRT) and proton therapy versus IMRT alone for pelvic and para-aortic radiotherapy in gynecologic malignancies.1 Proton therapy delivered a significant decrease in dose to the small and large bowel and kidneys despite maintaining excellent dose-distribution to the target volume. Dosimetric/planning studies from other institutions confirm the significant reduction of dose to critical normal tissues like bladder, bowel, rectum and bone marrow.2,3

A 2016 study reported results for eleven women who had undergone hysterectomy for gynecological cancers and who were treated with pencil beam scanning proton therapy (PBS). In this study, dose to pelvic bone marrow, bladder, and small bowel was significantly lower with PBS than with IMRT. Only one patient developed grade 3 acute gastrointestinal toxicity; no patient developed grade ≥3 genitourinary toxicity.4

About the Maryland Proton Treatment Center

The Maryland Proton Treatment Center is affiliated with the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center, an NCI-designated comprehensive cancer center. MPTC is focused on clinical excellence, affordability, accessibility, as well as comfort and convenience for your patients. In addition, our team has initiated the Maryland Proton Alliance to bring the latest research and clinical trials to patients and physicians. We have taken a leadership role in the industry by offering proton therapy at the same cost as IMRT.

Contact Information

To refer a patient or to discuss treatment options with one of our physicians, please call 410-369-5200 or email us at info@mdproton.com.

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