PHILIPS

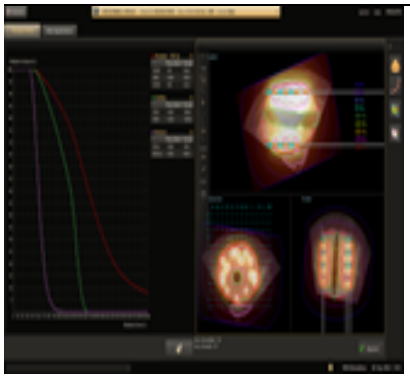
Inside Innovation

TARGETED THERAPY DELIVERY IN PROSTATE CANCER - PROTOTYPE

Towards more precise prostate cancer therapy

Providing guidance* to help surgeons during the delivery of focal brachytherapy for prostate cancer, designed to increase precision

* In development. Not currently available for sale



Focal brachytherapy is a minimally-invasive cancer treatment that uses implanted radioactive 'seeds' to kill prostate tumors. Without proper guidance, it is very difficult for clinicians to go to the right location inside the prostate when positioning these seeds with a needle. This potentially increases the risk of incorrect treatment delivery, which could lead to severe side effects such as incontinence and erectile dysfunction. We envision a GPS-like support tool that could help guide surgeons during focal brachytherapy delivery, with the aim to increase the chance of 'first-time-right' treatment.

What is it?

Focal brachytherapy is a minimally-invasive treatment for cancer that consists of bringing a radiation source – such as radioactive seeds – close to a tumor, instead of doing external beam radiation, or radical surgery to remove the tumor. The radiation only affects a very localized region, which reduces radiation exposure to healthy tissue at a distance.

In the case of prostate cancer, positioning the radioactive seeds at the right location, close to the prostate tumor, is very important, because incorrect treatment delivery could lead to severe side effects, such as incontinence and erectile dysfunction. However, during the intervention, which involves inserting the radioactive seeds with a needle, it is difficult for clinicians to see where they actually are when positioning them: each needle must be accurately inserted into the tissue following a particular path and reaching a specified depth.

We envision a support tool to help guide surgeons with adaptive therapy delivery. By combining live 3D ultrasound with pre-recorded magnetic resonance (MR) images, and using electromagnetic tracking of the needle, we aim at developing a GPS-like support tool that provides real-time visual feedback. This would help clinicians to make patient-specific decisions during the intervention.

What is innovative about it?

- **Designed to aid in accurate positioning:** electromagnetic fields are used to position the treatment needle while inside the body, and its position is overlaid on a pre-recorded magnetic resonance (MR) image. By seeing both the position of the tumor and the needle in real time, the system will be designed to aid in accurate positioning of the radioactive treatment. This technique could also enable clinicians to adapt the procedure to suit patient-specific objectives.
- **Potential for further targeted therapy and treatments:** accurate image-guided treatment minimizes damage to normal tissue. The envisioned support tool could also provide direct quality feedback during surgery, decreasing the chance of repeat procedures and unnecessary side effects.
- **Designed to improve clinical workflows:** providing guidance and a visualization of the position of the needle could make it easier for surgeons to perform focal brachytherapy procedures.

What is the benefit of this innovation to 'you'?

Focal brachytherapy is an approach to treat very local tumors in the prostate, in a focused way. The benefits of brachytherapy vary depending on the patient, their priorities, and preferences, though as a

minimally-invasive treatment method, the benefits of avoiding surgery are universal. These include a quicker recovery time, less time spent in the hospital, and a reduced risk of postoperative infections[1].

[1] *American Brachytherapy Society*

However, accurate performance of a focal brachytherapy procedure can be challenging. Knowing exactly where the suspicious regions are located, accurately placing the needle to position the radioactive seed, and making sure the correct level of radiation is applied are just some of the difficulties that clinicians could be confronted with.

With our approach, we envision that clinicians will be able to receive visual feedback in real time, so the needle can be placed exactly where required to position radioactive seeds close to a tumor. That would also mean that treatments could be adapted on the spot, and necessary precautions could be taken to reduce damage to surrounding tissue. Additionally, it would reduce the risk of treatment-induced side effects for patients, such as incontinence and erectile dysfunction, which could have a severe impact on the patient's quality of life.

How will we do this?

- A deep understanding of the challenges in the focal therapy process.
- Selecting the right clinical partners and key opinion leaders.
- High level of reuse of existing assets in Philips Research and Philips Healthcare, all based on available standard platforms used in clinical practice with a proven track record.
- Adopting an agile way of working with intense and early clinical feedback.
- Highly focused and dedicated team.

Did you know?

- We are currently developing a prototype support tool that is still in the research phase.
- In the near future, 60-70% of the prostate cancer patients will be eligible for focal brachytherapy.

Find out more

External links not available yet due to early stages of this work.

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