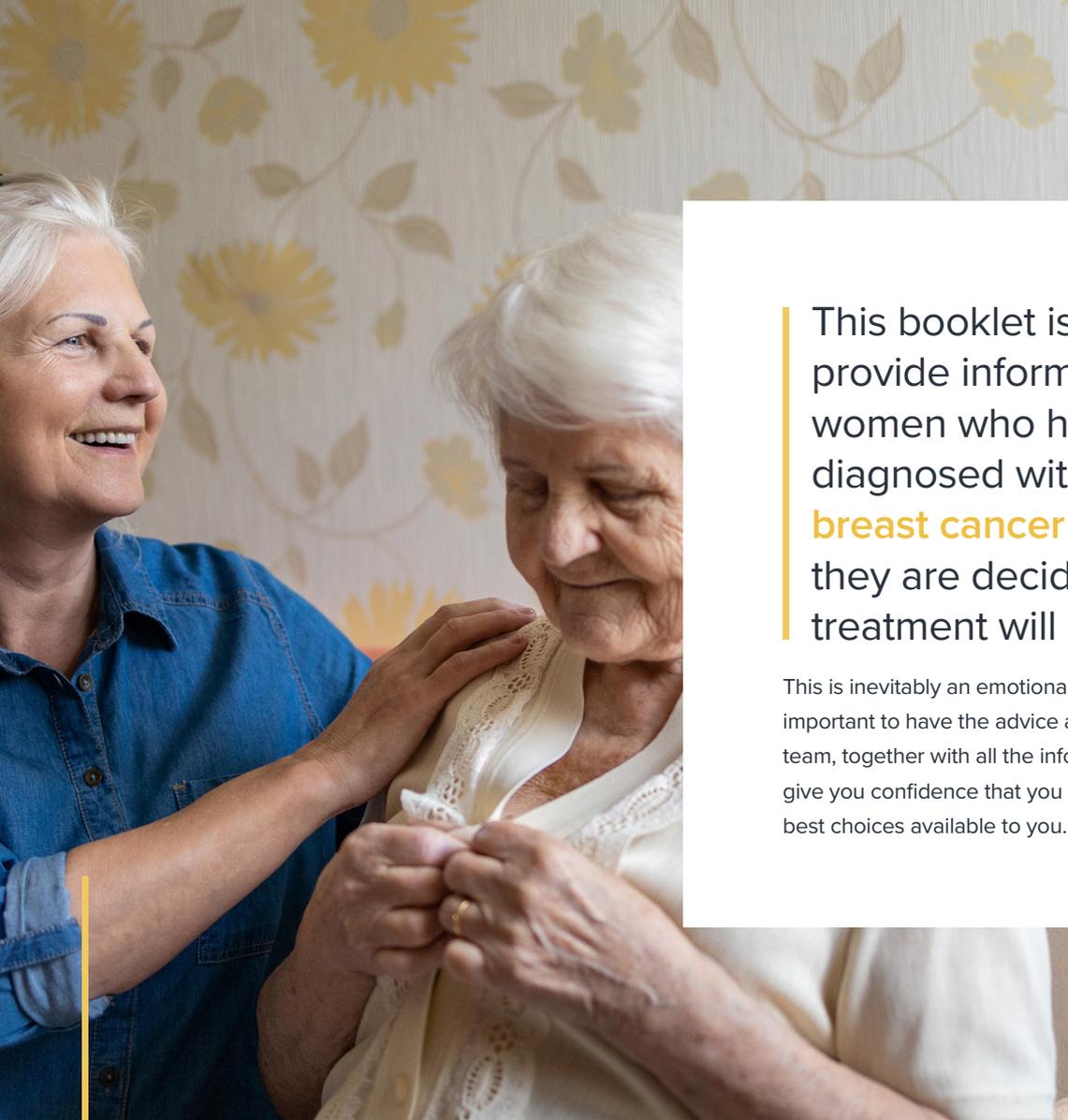




**BRACHYTHERAPY:**

**THE PRECISE ANSWER  
FOR TACKLING  
BREAST CANCER**





This booklet is designed to provide information to help women who have been diagnosed with **early stage breast cancer** at a time when they are deciding which type of treatment will be best for them.

This is inevitably an emotional and stressful time. It is important to have the advice and support of your healthcare team, together with all the information you require. This can give you confidence that you are in control and making the best choices available to you.

There are several ways that breast cancer can be treated. These include:<sup>1</sup>

- **Surgery**
- **Radiation therapy—including External beam radiation therapy (EBRT)—and Brachytherapy (interventional radiation therapy)**
- **Chemotherapy**
- **Hormone therapy**
- **Targeted therapy**

This booklet provides you with information about brachytherapy, also known as 'internal radiation therapy'.

The following pages explain:

- **The different treatment options available for early stage breast cancer**
- **Specific information on brachytherapy options for breast cancer—what they are, how they work, and their potential benefits and side effects**
- **Where to find further information**



**After discussing the different treatment options available to me with my doctor, I knew I wanted to try and keep my breast.**

However, I was concerned about the extended treatment time of radiation therapy following surgery and the possible cosmetic effects it may have on my breast. But then my doctor told me about brachytherapy, and that a shorter treatment course may be an option for me.

Brachytherapy was a good choice for me and I have been able to preserve my breast—which has made all the difference.”

**Testimonial from Brachytherapy patient**

# Treatment options

Patients typically receive a combination of treatments. Surgery is commonly used to first remove the tumor, after which radiation therapy is given to help prevent the cancer from returning.

If the cancer is advanced, chemotherapy or hormone treatments may be used to help shrink the size of the tumor before surgery. Hormone therapy and targeted therapy may also be used after surgery and radiation therapy to further help prevent the cancer from returning. The types of treatment you receive will depend on how far the cancer has progressed. The table below provides a broad overview of the different treatments.<sup>2</sup>



## Treatment

## Grade of cancer

### Surgery (lumpectomy or mastectomy)

Removal of the tumor and surrounding tissue (lumpectomy) or the whole breast tissue (mastectomy).

### External beam radiation therapy (EBRT)

The source of radiation is directed at the tumor from outside the body through the skin.

### Brachytherapy (interventional radiation therapy)

Works by precisely targeting the cancerous tumor. The source of radiation is placed directly next to the tumor location, inside the body.

### Chemotherapy

May be used before surgery to help shrink the tumor or to treat cancer that has spread beyond the breast. Several pharmaceutical products are effective. Your doctor will be able to advise the best one for you.

### Hormone therapy

A course of hormone therapy may be used to prevent the cancer from returning. (Note: this is different from hormone replacement therapy).

### Targeted therapy

Targeted therapy is a type of treatment that uses pharmaceutical products or other substances to identify and attack specific cancer cells. Can be used in combination with chemotherapy.

Carcinoma in situ	Early	Advanced
✓	✓	✓
✓	✓	✓
✓	✓	✓
	✓	✓
	✓	✓
	✓	✓

## Advantages and disadvantages of breast cancer treatments

Each treatment has advantages and disadvantages. These should be considered and discussed with your healthcare professional when choosing the most suitable treatment option for you.

Treatment	Advantages	Disadvantages
Surgery (lumpectomy or mastectomy)	<ul style="list-style-type: none"> <li>• Clinically proven to be highly effective.</li> <li>• In early breast cancer, lumpectomy with additional radiation therapy is a standard of care and avoids the need for removal of the whole breast (mastectomy).<sup>3</sup></li> <li>• One-time procedure.</li> <li>• Can be given in combination with other treatments.</li> </ul>	<ul style="list-style-type: none"> <li>• May require a hospital stay of up to 1 week.<sup>3</sup></li> <li>• Can cause scarring and discomfort.</li> </ul>
External beam radiation therapy (EBRT)	<ul style="list-style-type: none"> <li>• Clinically proven to be highly effective at preventing cancer from returning after surgery.<sup>4</sup></li> <li>• You can receive treatment on an outpatient basis.</li> <li>• Can be given in combination with other treatments.</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment course can be long (up to 5–6 weeks) and includes repeat visits to hospital on a daily basis. There are recent data reporting effectiveness of a 1-week course of EBRT after surgery for early breast cancer.<sup>4</sup></li> </ul>
Brachytherapy (interventional radiation therapy)	<ul style="list-style-type: none"> <li>• In early breast cancer, clinically proven to be highly effective at preventing cancer from returning after surgery.<sup>5-8</sup></li> <li>• Can be used after EBRT as an additional radiation therapy dose, or instead of EBRT (see radiation therapy treatment options below).</li> <li>• Short treatment times of 5–7 days when used as APBI (see below).</li> <li>• Typically performed on an outpatient basis.</li> </ul>	<ul style="list-style-type: none"> <li>• Not available at all hospitals.</li> <li>• May need to stay in hospital for treatment in some cases.</li> </ul>
Chemotherapy	<ul style="list-style-type: none"> <li>• Clinically proven to be highly effective.<sup>9</sup></li> <li>• Can be given in combination with other treatments.</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment course can be long (spread out over 4–6 months).</li> <li>• Some side effects including fatigue, hair loss, and an increased risk of acquiring infections.<sup>12</sup></li> </ul>
Hormone therapy	<ul style="list-style-type: none"> <li>• Clinically proven to be highly effective at preventing the cancer from returning if the cancer is responsive to hormone levels.<sup>10</sup></li> <li>• Can be given in combination with other treatments.</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment course can be long (spread out over 4–6 months).</li> <li>• Some side effects including fatigue, hair loss, and an increased risk of acquiring infections.<sup>12</sup></li> </ul>
Targeted therapy	<ul style="list-style-type: none"> <li>• Clinically proven to be highly effective.<sup>11</sup></li> <li>• Can be given in combination with other treatments.</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment course can be long (spread out over 1 year).</li> <li>• Some side effects including bleeding, pain in different parts of the body, and an increased risk of acquiring infections.<sup>11</sup></li> </ul>



## **Radiation therapy treatment options**

After surgery to remove the cancer, radiation therapy is commonly used to kill any cancerous cells that may be left in the surrounding tissues.

Using radiation therapy after surgery helps prevent the cancer from returning. There are two main radiation therapy approaches: whole breast irradiation (WBI) and accelerated partial breast irradiation (APBI).



## Whole breast irradiation (WBI)<sup>5</sup>

The whole breast is given a dose of radiation using external beam radiation therapy.

Treatment involves visiting the hospital for 5 days a week, for up to 5–6 weeks. At each treatment session, you will be positioned comfortably on a couch and rays of radiation will be directed at the affected breast from a special machine.

It is not painful, but you will need to lie still for a few minutes at each session while the radiation therapy is being given. After completion of the full treatment schedule, a further dose of radiation (known as a 'boost') may also be given to just the area where the cancer was located. The 'boost' can be given as external beam radiation therapy or brachytherapy.



## Accelerated partial breast irradiation (APBI)<sup>5</sup>

Only the region of the breast where the cancer was located is given a dose of radiation.

This can be performed using external beam radiation therapy or brachytherapy. Utilization of APBI increased over recent decades in the US, and the majority of APBI treatments were performed using brachytherapy.<sup>12</sup>

Treatment is short compared to WBI, as it only involves visiting a hospital for 5–7 days. The availability of APBI varies by country and hospital. Ask your doctor if APBI is available to you.

## What types of brachytherapy can be used for treatment of this cancer type?

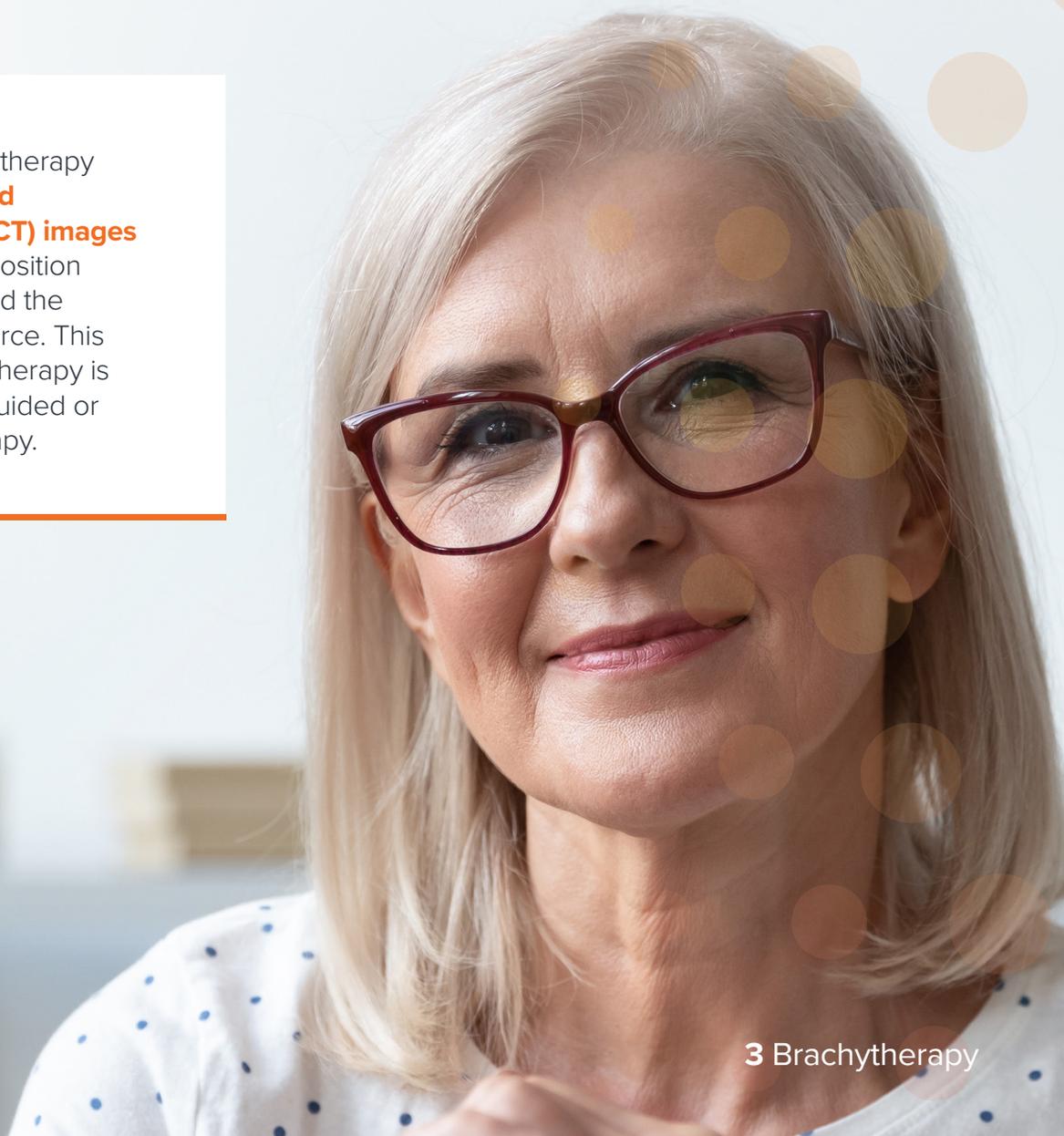
Brachytherapy is a type of radiation therapy to treat breast cancer. After surgery, brachytherapy is commonly used to kill any remaining cancer cells.<sup>1</sup>

High Dose Rate (HDR) brachytherapy can be given after the whole breast has been treated using external beam radiation therapy, known as whole breast irradiation (WBI). In this instance, brachytherapy provides a 'boost' of radiation just to the area where the tumor was.<sup>2</sup>

Alternatively, HDR brachytherapy can be used as the sole method of radiation therapy after surgery, known as accelerated partial breast irradiation (APBI). This provides targeted radiation to just the area around where the tumor was, and can be completed much more quickly than WBI.<sup>2</sup>

Depending on doctor preference, brachytherapy can be performed with balloon, hybrid device (SAVI), or using multicatheter interstitial technique.<sup>1</sup> The most-used APBI brachytherapy technique in clinical practice is multicatheter interstitial brachytherapy.

Modern brachytherapy uses **Computed Tomography (CT) images** to control the position of the tumor and the radioactive source. This type of brachytherapy is called Image-guided or 3D brachytherapy.

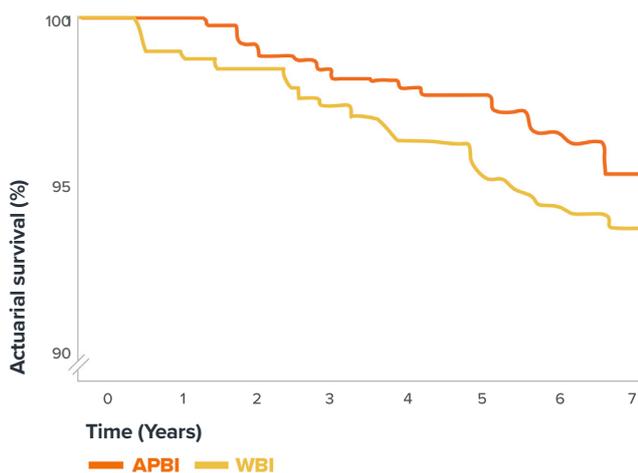




## How effective is brachytherapy?

The European multicenter randomized trial compared treatment outcome of patients with early breast cancer treated with WBI and APBI.

It showed similar results for both treatments after 5 years. Since with APBI only a small part of the breast is irradiated, APBI has advantages over WBI: less radiation dose to the heart (less risk of ischemic disease) and less radiation dose to the lungs (less risk for secondary lung cancer).<sup>3</sup>

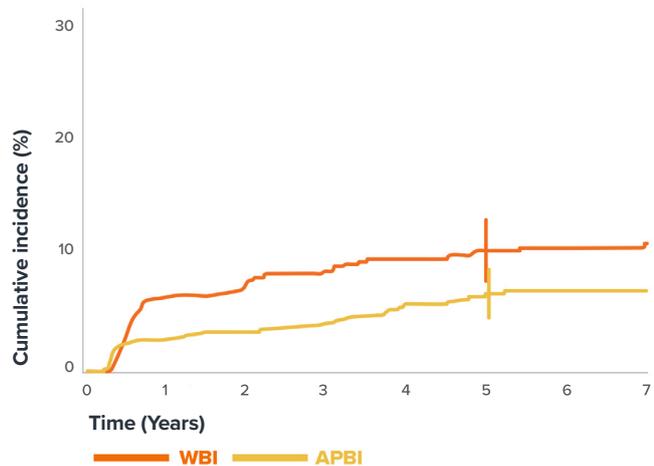


## Overall survival in patients with early breast cancer treated with WBI and APBI<sup>3</sup>

Another paper analyzed side-effects and cosmetic results in women who participated in the above-mentioned European multicenter trial. After five years, women treated with APBI had significantly less serious skin side effects (like hyperpigmentation, telangiectasia, fibrosis, necrosis) compared to WBI.<sup>4</sup>

## Cumulative incidence of serious skin side effects in patients with early breast cancer treated with WBI and APBI<sup>3</sup>

This clinical data supports the use of APBI with multicatheter interstitial brachytherapy as an alternative to whole breast irradiation.<sup>4</sup>



# Advantages of brachytherapy

Brachytherapy is a very effective and highly convenient treatment for early breast cancer.

**Highly effective in preventing breast cancer from**

**returning:** long-term studies following women after receiving brachytherapy (either as ‘boost’ treatment or as accelerated partial breast irradiation) show that the vast majority of patients continue to remain free of cancer after treatment.<sup>1-4</sup>

**Good-to-excellent cosmetic results:** using brachytherapy after surgical removal of the tumor (either as a ‘boost’ dose of radiation therapy after whole breast irradiation or as the sole method of radiation therapy) avoids the need to surgically remove the whole breast.<sup>3-5</sup> Therefore, the natural appearance of the breast can be maintained.

**Short treatment time and less recovery periods:** if brachytherapy is used as the sole method of radiation therapy after surgery (APBI), treatment can be completed in 1 week. This is a shorter treatment course than whole breast irradiation, which can take 5–7 weeks.<sup>2</sup>

**Highly targeted radiation therapy:** brachytherapy places the radiation directly at the treatment site. Compared to EBRT (where the radiation has to travel from outside the body), brachytherapy prevents surrounding healthy tissues from being exposed to unnecessary radiation.<sup>3-5</sup>

**Minimized side effects:** as brachytherapy is highly targeted to just the treatment site, most patients cope well with treatment and long-term side effects are uncommon.<sup>3-5</sup>

# Side effects of brachytherapy

## Radiation therapy is generally associated with side effects

These side effects are well known and most side effects are not dependent on the type of radiation therapy.

However, brachytherapy is associated with sparing the surrounding healthy tissue from unnecessary radiation, with the potential for fewer side effects than alternatives such as external beam radiation therapy.<sup>1-2</sup> People respond to treatments in different ways. Some side effects may appear in the short term (known as acute side effects), others may appear several months later (long-term side effects).

### Short-term (acute) side effects

As with all treatments, you may experience some side effects immediately after the procedure. After brachytherapy, you may experience some of the following:<sup>1</sup>

- **Early skin reaction (radiodermatitis)**
- **Hematoma**
- **Breast pain**
- **Infection following the placement of the applicators**

These short-term side effects are typically mild in nature and usually resolve soon after treatment.

### Long-term side effects

Brachytherapy, as with other treatments, may result in some long-term side effects. Long-term side effects that sometimes appear after brachytherapy include:<sup>2</sup>

- **Skin hyperpigmentation**
- **Telangiectasia**
- **Fibrosis**
- **Fat necrosis**

Discuss your treatment options and the relative risks of potential side effects with your healthcare professional.

## How effective is brachytherapy in treating breast cancer?

Brachytherapy is a very effective treatment option for early breast cancer. Long-term studies following women who have received brachytherapy (either as a 'boost' dose of radiation after whole breast irradiation or as accelerated partial breast irradiation) show that the vast majority of women continue to remain free of breast cancer many years after treatment.

## Will the brachytherapy procedure hurt?

If your brachytherapy involves the placement of needles or a balloon device within the breast, your treatment will be performed under a general anesthetic or in some cases local anesthetic +/- sedation, so it shouldn't hurt. You may feel a little bit of discomfort afterwards but this usually soon wears off.

## If I have brachytherapy, do I have to stay in hospital overnight?

This depends on how many doses (known as 'fractions') of brachytherapy you require, your physical status and the proximity of the hospital. You may need to stay in hospital for a few days.

## How will I know if brachytherapy has worked?

After your procedure, regular appointments will be scheduled to check that the tumor is responding to the treatment.

## What are the side effects of brachytherapy?

All treatments for breast cancer carry a risk of side effects. Short-term side effects of brachytherapy can include skin reaction, hematoma, breast pain. There is also a small risk of infection following the placement of the catheters. Late side effects are rare and can include skin hyperpigmentation, telangiectasia, fibrosis and fat necrosis.

## How soon can I get back to work after receiving brachytherapy?

The recovery time after brachytherapy is usually short. After 2–5 days most patients can get back to their everyday activities.

## Treatment options

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## Brachytherapy

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## Advantages of brachytherapy

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