Irreversible electroporation (NanoKnife) for pancreatic cancer

This fact sheet is for anyone who wants to find out about a new treatment for pancreatic cancer called irreversible electroporation. You may also hear this called NanoKnife®, which is the brand name for the machine used to deliver the treatment. We explain who can have this treatment, what it involves, and the possible side effects.

If you have any questions about irreversible electroporation, speak to our specialist nurses on our Support Line. You can call them free on 0808 801 0707, or email support@pancreaticcancer.org.uk

What is irreversible electroporation (IRE) and how does it work?
Irreversible electroporation (IRE) is a treatment that involves inserting needles into and around the cancer. High voltage electrical currents are passed between the needles. These currents damage and destroy the cancer cells.

IRE aims to shrink and try to destroy the cancer. This can help to control symptoms, such as pain. It also aims to help people live longer. For a small number of people, it may shrink the cancer enough for surgery to be possible – although we need more research into this.

It’s important to remember that there has not been much research into IRE for people with pancreatic cancer. There have only been a few small studies, which means that we don’t know enough about how effective it is, and who it is most suitable for. The National Institute for Health and Care Excellence (NICE) has said that at the moment IRE should only be used in research studies looking at how well it controls pancreatic cancer.

Who can have IRE?
Nanoknife is usually used for people who have already had chemotherapy, and also sometimes radiotherapy.
It may be suitable for some people with locally advanced inoperable pancreatic cancer. This is cancer that can’t be removed by surgery and has spread to nearby structures such as blood vessels around the pancreas.

Sometimes, IRE might be used for people with cancer that has spread to some places outside the pancreas, for example if it is close to the bile ducts. Some hospitals may offer IRE for people with pancreatic cancer that has spread to the liver (liver metastases).

Whether it's suitable for you may depend on your own situation. For example, you will need to be fit enough to have a general anaesthetic. It may also depend on what other treatments you’ve already had, or how big the tumour is. IRE is only suitable if the tumour is less than 4cm long. This is because it can be difficult to put in enough needles to treat larger tumours, so some of the tumour may not be treated.

Speak to your doctor if you have had a metal stent fitted. These are used to treat a blocked duodenum (first part of the small intestines) or bile duct. It may still be possible to have IRE if you have a metal stent – but there may be a higher risk of problems or side effects, and the treatment may not work so well. Plastic stents don’t cause problems with IRE.

IRE is not recommended if you have an irregular heartbeat (atrial fibrillation), and you won’t be able to have IRE if you have a pacemaker. This is because the electrical currents can affect the heartbeat.

Speak to your doctor about whether IRE might be an option for you.

**How can I have IRE?**
In the UK, Nanoknife is only available in a few NHS hospitals. It may also be available privately.

Talk to your doctor about whether IRE might be suitable for you, and whether you might be able to get it. If it is suitable for you, but isn't available at your hospital, your doctor may be able to refer you to a hospital that does IRE. Or speak to our specialist nurses on our Support Line for more information about this treatment, where it is available, and how to access it.

**Having IRE treatment**
This is general information about what Nanoknife involves. Treatment may vary in different hospitals, and may depend on your own situation. Your doctor
should explain the treatment and the risk of any side effects before you agree to have IRE.

**What happens during treatment?**
You will be given a general anaesthetic (so that you are asleep and can’t feel anything), and a drug to relax your muscles. Doctors then insert needles through the skin of the abdomen (tummy area) and into and around the tumour. They use CT or ultrasound scans to guide the needles into place.

Short pulses of electricity are then fired between the needles. The needles may then be moved and the process repeated until the whole tumour and some of the surrounding area has been treated.

The electrical pulses can affect the heartbeat. To prevent this happening, your heart will be monitored during the treatment. Doctors use ECG (electrocardiography) monitoring so that the electrical pulses are delivered between heartbeats, when the heart is least affected by the electrical currents.

**Will I have to stay in hospital?**
You will have to stay in hospital overnight, to make sure that you have recovered from the general anaesthetic and aren’t in any pain or discomfort.

Any pain you do have can usually be controlled with painkillers such as paracetamol. Sometimes, in the first few hours after the treatment people may need stronger painkillers called opiates, such as fentanyl.

**What are the side effects?**
IRE doesn’t produce significant heat, which may help to reduce the damage to surrounding organs such as nearby major blood vessels and bile ducts. But we need more research into the side effects of Nanoknife for pancreatic cancer. Early studies have found some of the following side effects.

- You may have some pain.
- Some people get pancreatitis, which is inflammation of the pancreas. This is often mild, and can usually be managed with pain relief or antibiotics if necessary.
- A small number of people get a blood clot in a vein, bleeding or an infection.
- A small number of people have bile leakage or leaking from the bowel. This may happen if the bowel is damaged by the needles.
Speak to your doctor about the side effects of IRE.

If you are having chemotherapy, you may also get side effects from the chemotherapy.

“I had some stomach discomfort on the evening of the procedure, but was given painkillers which worked well. The following morning, I was discharged with no pain or after-effects other than a bruise on my abdomen.”

**Check-ups after treatment**

You will usually have a CT or PET scan a couple of months after the IRE treatment, to check how well it has worked. You may also have a blood test to check for tumour markers at this time. These are substances in the blood produced by the cancer, and can be used to help monitor the tumour.

If you also had chemotherapy, you will usually have a CT or MRI scan every three months. If you are still having chemotherapy, speak to your oncology team about what check-ups you will have.

**Further information and support**

**Other organisations**

**Cancer Research UK**
www.cancerresearchuk.org
Helpline: 0808 800 4040 (Mon-Fri 9am-5pm)
Information for patients from Cancer Research UK

**Macmillan Cancer Support**
www.macmillan.org.uk
Support Line: 0808 808 00 00 (Mon-Fri 9am-8pm)
Provides practical, medical and financial support for anyone affected by cancer.

**Maggie’s Centres**
www.maggiescentres.org
Centres around the UK, and online. Offer free, comprehensive support for anyone affected by cancer.
Support and information from Pancreatic Cancer UK

Pancreatic Cancer UK is the only national charity fighting pancreatic cancer on all fronts: Support, Information, Campaigning and Research. We are striving for a long and good life for everyone diagnosed with pancreatic cancer.

Support Line
We run a confidential Support Line for anyone affected by pancreatic cancer. Our pancreatic cancer specialist nurses can provide individual specialist information about pancreatic cancer, treatment options and managing symptoms and side effects. They have time to listen, answer your questions and provide support.

Freephone: 0808 801 0707 (Monday to Friday, 10am-4pm)
Email support@pancreaticcancer.org.uk

Information
We provide information about pancreatic cancer, treatment options, side effects and living with pancreatic cancer. All our information is based on the latest evidence, and reviewed by health professionals and people affected by pancreatic cancer.

Go to www.pancreaticcancer.org.uk
Download and order publications at www.pancreaticcancer.org/publications

Support groups
There are pancreatic cancer support groups across the UK, where you can meet other people affected by pancreatic cancer, share experiences and find support.

Find your nearest support group on our website at www.pancreaticcancer.org.uk/supportgroups

Discussion forum
Join our online discussion forum to talk to others affected by pancreatic cancer. Members include people with pancreatic cancer as well as family and friends. They share their experiences and tips, and support each other.

Sign up on our website at www.pancreaticcancer.org.uk
This fact sheet has been produced by the Support and Information Team at Pancreatic Cancer UK. It has been reviewed by healthcare professionals and people affected by pancreatic cancer.

References to the sources of information used to write this fact sheet and an acknowledgement of the health professionals who reviewed the booklet are available on our website – www.pancreaticcancer.org.uk/information-and-support/treatments-for-pancreatic-cancer/irreversible-electroporation-nanoknife/

Pancreatic Cancer UK makes every effort to make sure that its services provide up-to-date, unbiased and accurate information about pancreatic cancer. We hope that this information will add to the medical advice you have received and help you to take part in decisions related to your treatment and care. Please do continue to talk to your doctor, specialist nurse or other members of your care team if you are worried about any medical issues.

Give us your feedback We hope you have found this information helpful. If you have any comments or suggestions about this fact sheet or any of our other publications, you can email publications@pancreaticcancer.org.uk or write to the Information Manager at the address below.

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