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Information for Patients Undergoing Chemoembolization (TACE) Department of Radiology

What is Chemoembolization?

Chemoembolization is a combination of local delivery of chemotherapy and a procedure called embolization to treat cancer, most often of the liver.

In chemoembolization, anti-cancer drugs are injected directly into the blood vessel feeding a cancerous tumour. In addition, synthetic material called an embolic agent is placed inside the blood vessels that supply blood to the tumour, in effect trapping the chemotherapy in the tumour.

What are some common uses of the procedure?

Chemoembolization is most beneficial to patients whose disease is predominately limited to the liver, whether the tumour began in the liver or spread to the liver (metastasized) from another organ.

Cancers that may be treated by chemoembolization include:-

- Hepatoma or hepatocellular carcinoma (primary liver cancer)
- Metastasis (spread) to the liver from:-
 - colon cancer
 - breast cancer
 - carcinoid tumours and other neuroendocrine tumours
 - islet cell tumours of the pancreas
 - ocular melanoma
 - sarcomas
 - other vascular primary tumours in the body

Depending on the number and type of tumours, chemoembolization may be used as the sole treatment or may be combined with other treatment options such as surgery, chemotherapy, radiation therapy, or radiofrequency ablation.

How should I prepare?

Prior to the procedure, your blood may be tested to determine how well your liver and kidneys are functioning and whether your blood clots normally.

You must tell the doctor about:-

- All medication that you are taking
- Any allergies which you may have - especially to local anaesthetic, general anaesthetic or to contrast materials (x-ray dye).
- Women should always inform their doctor if there is any possibility that they are pregnant.

Your doctor may advise you to stop taking aspirin, non-steroidal anti-inflammatory drugs (NSAIDs) or a blood thinner for a specified period of time before your procedure.

If you are going to be given a sedative during the procedure, you may be asked not to eat or drink anything for four to eight hours before your examination.

You will need to stay overnight in hospital for one or more days. You will be given a gown to wear during the procedure.

What does the equipment look like?

The procedure is carried out in the x-ray department in an x-ray 'screening' room which is adapted for specialised procedures. A catheter and embolic agents are used.

A catheter is a long, thin plastic tube.

Various materials called embolic agents are used to occlude or block off blood vessels, but the most common are oil or plastic particles made from polyvinyl alcohol (PVA).

Other equipment that may be used during the procedure includes an intravenous line (IV) and equipment that monitors your heart beat and blood pressure.

How does the procedure work?

Chemoembolization attacks the cancer in two ways. First, it delivers a very high concentration of chemotherapy, or anti-cancer drugs, directly into the tumour, without exposing the entire body to the effects of those drugs.

Second, the procedure cuts off blood supply to the tumour, trapping the anti-cancer drugs at the site and depriving the tumour of the oxygen and nutrients it needs to grow.

The liver is unique because it has two blood supplies—an artery (the hepatic artery) and a large vein (the portal vein). The normal liver receives about 75 percent of its blood supply through the portal vein and only 25 percent through the hepatic artery. But when a tumour grows in the liver, it receives almost all of its blood supply from the hepatic artery.

Chemotherapy drugs injected into the hepatic artery reach the tumour very directly, sparing most of the healthy liver tissue. Then, when the artery is blocked, the blood is no longer supplied to the tumour, while the liver continues to be supplied by blood from the portal vein. This also permits a higher concentration of the anti-cancer drugs to be in contact with the tumour for a longer period of time.

How is the procedure performed?

Image-guided, minimally invasive procedures such as chemoembolization are most often performed by a specially trained interventional radiologist in an x-ray 'screening' room which has been adapted for specialised procedures.

X-ray images will be taken to map the path of the blood vessels feeding the tumour.

Medication may be given to help prevent nausea and pain, and antibiotics to help prevent infection.

You will be positioned on the x-ray table and connected to equipment to monitor your heart rate, blood pressure and pulse during the procedure.

A needle will be inserted into a vein in your hand or arm so that sedative medication can be given intravenously.

Using x-ray guidance, a thin catheter is inserted through the skin and into the femoral artery, a large groin vessel, and advanced into the liver. Then a contrast material is injected through the catheter and another series of x-rays will be taken.

Once the catheter is positioned in the branches of the artery that are feeding the tumour, the anti-cancer drugs and embolic agents are mixed together and injected.

Additional x-rays will be taken to confirm that the entire tumour has been treated.

At the end of the procedure, the catheter will be removed and pressure will be applied to stop any bleeding. The opening in the skin is then covered with a spray dressing. No sutures (stitches) are needed.

You can expect to stay in bed for six to eight hours following the procedure.

Chemoembolization is usually completed within approximately 90 minutes.

What will I experience during and after the procedure?

Devices to monitor your heart rate and blood pressure will be attached to your body.

You will feel a slight pin prick when the needle is inserted into your vein for the intravenous line (IV) and when the local anaesthetic is injected into your groin.

You may feel slight pressure when the catheter is inserted but no serious discomfort.

As the contrast (dye) passes through your body, you may get a warm feeling.

Most patients experience some side effects called post-embolization syndrome, including pain, nausea, vomiting and fever. Pain is the most common side effect that occurs because the blood supply to the treated area is cut off. It can readily be controlled by medications given by mouth or your IV.

You should be able to leave the hospital within 48 hours after the procedure, once your pain and nausea have subsided.

It is normal for you to have a fever for up to a week following the procedure. Fatigue and loss of appetite are also common and may last two weeks or longer. In general, these are all signs of a normal recuperation.

If your pain suddenly changes in degree or character, if your fever becomes suddenly higher or you notice any other unusual changes, you should contact your doctor.

You should be able to resume your normal activities within a week.

If there is a tumour on both sides of the liver, commonly only part of the liver will be treated at first and after one month, you will return to the hospital for additional chemoembolization.

CT or MRI scans will be performed regularly thereafter to determine how much the tumours ultimately shrink, and to see if and when any new tumours arise in the liver. Chemoembolization can be repeated many times over the course of many years, as long as it remains technically possible and you continue to be healthy enough to tolerate repeat procedures.

What are the benefits vs. risks?

Benefits

- In about two-thirds of cases treated, chemoembolization can stop liver tumours from growing or cause them to shrink. This benefit lasts for an average of 10 to 14 months, depending upon the type of tumour, and usually can be repeated if the cancer starts to grow again.
- Other types of therapy (tumour ablation, chemotherapy, radiation) may be used in combination with chemoembolization to control the tumour.
- When cancer is confined to the liver, most deaths that occur are due to liver failure caused by the growing tumour, not due to the spread of cancer throughout the body. Chemoembolization can help prevent this growth of the tumour, potentially preserving liver function and a relatively normal quality of life.

Risks

- Any procedure where the skin is penetrated carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.
- Any procedure that involves placement of a catheter inside a blood vessel carries certain risks. These risks include damage to the blood vessel, bruising or bleeding at the puncture site, and infection.
- There is always a chance that embolization material can lodge in the wrong place and deprive normal tissue of its blood supply.
- There is a risk of infection after embolization, even if an antibiotic has been given.
- Because angiography is part of the procedure, there is a risk of an allergic reaction to the contrast material.

- Because angiography is part of the procedure, there is a risk of kidney damage in patients with diabetes or other pre-existing kidney disease.
- Reactions to chemotherapy may include nausea, a decrease in white blood cells, a decrease in platelets and anaemia. Because chemoembolization traps most of the chemotherapy drugs in the liver, these reactions are usually mild.
- Serious complications from chemoembolization occur after about one in 20 procedures. Most major complications involve either infection in the liver or damage to the liver. Reporting indicates that approximately one in 100 procedures result in death, usually due to liver failure.

What are the limitations of Chemoembolization?

Chemoembolization is not recommended in cases where severe liver or kidney dysfunction, abnormal blood clotting or a blockage of the bile ducts. In some cases—despite liver dysfunction—chemoembolization may be done in small amounts and in several procedures to try and minimize the effect on the normal liver.

Chemoembolization is a treatment, not a cure. Approximately 70 percent of the patients will see improvement in the liver and, depending on the type of liver cancer, it may improve survival rates.

For further information contact:-

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British Society of Interventional Radiology (BSIR) and the Clinical Radiology Patients' Liaison Group (CRPLG) of the Royal College of Radiologists.

Radiology Info.org - a link from the BSIR website.