INTERVENTIONAL RADIOLOGY IN ONCOLOGY FROM DIAGNOSIS TO TREATMENT

BAU TIP | MEDICALPARK Göztepe

UNIVERSITY HOSPITAL

INTERVENTIONAL RADIOLOGY FROM DIAGNOSIS TO TREATMENT IN CANCER

Interventional radiology works in close cooperation with the Oncology Department from the diagnosis stage to the treatment process. When a disease occupying an organ (mass = tumor = cancer) is detected with imaging methods, interventional radiologists provide a diagnosis by taking a piece of tissue with ultrasonography or computed tomography (CT).

In order to be able to administer chemotherapy for treatment to the diagnosed patient; ports, and temporary or permanent catheters are placed under the skin in interventional radiology units. In the treatment phase of tumors, interventional radiology makes a significant contribution to oncology. In patients with limited chemotherapy efficacy, interventional procedures are applied for therapeutic purposes. As interventional oncology treatment methods;

• Burning by direct insertion into the tumor with various needles; radiofrequency (RF) ablation, microwave ablation, cryoablation (freezing),

• Administration of chemotherapeutic drugs for the tumor directly by entering through the artery feeding the tumor in liver tumors (chemoembolization), and

• Radioembolization methods by injecting radioactive material directly into the tumor through the arteries are applied.

DIAGNOSIS IN CANCER, BIOPSY WITH IMAGING

It is the taking of a piece from the tissue-mass with the disease in order to make the definitive diagnosis of diseases. In order for the treatment to be applied, it is necessary to understand what this foreign tissue is, in other words, make a diagnosis. While taking a cell-shaped sample from the diseased organ is fine needle aspiration biopsy, the method of taking a larger tissue is tru-cut or surgical biopsy.

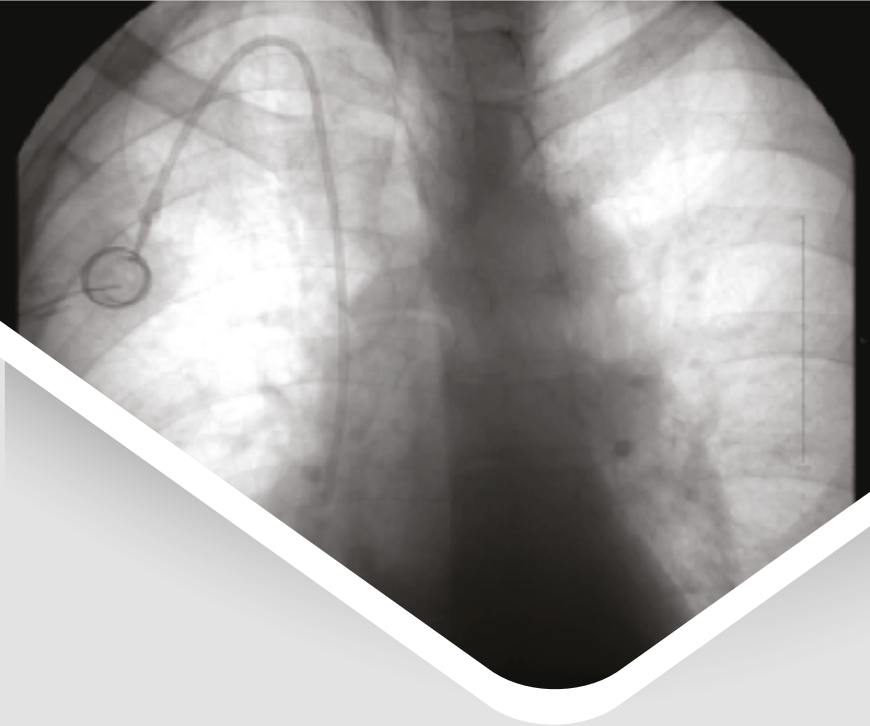
Preparation for the Procedure

Blood tests must be done. After determining the most suitable entry site for the lesion, sterile conditions and skin and subcutaneous local anesthesia are applied. Biopsy contrast-enhanced computed tomography (CT) is used for masses that cannot be seen by ultrasonography.

Bleeding, infection, and injuries in the adjacent organs related to the procedure may occur. These risks can be significantly reduced if blood tests are done before the procedure, it is questioned whether the patient is using medication, compliance with sterile conditions and careful approach to the entrance site is provided.

PORT PLACEMENT

Chemotherapy drugs cause damage in the veins in the arms from the moment they are first administered. These veins become unusable in subsequent treatments. Finding veins in the arms becomes troublesome in order to give chemotherapy drugs.



It is the placement of thin catheters to extend to the great venous junction under ultrasonography-guided angiography in interventional radiology units.

Port placement is performed under sterile conditions and local anesthesia. After the catheter entry is made through the veins in the neck neck, the stage of creating a port pocket starts. The port is embedded under the skin and the skin is sutured. Since the port is placed under the skin, there is no part outside. In this respect, it does not impair the patient's quality of life. The port is easily handled under the skin. Chemotherapy drugs are given through the port by placing special needles in it. After the needle is removed, blood does not leak out of the port due to the special substance inside. The port should only be used with its special needle. After use, it should be washed with blood thinners and protected from clogging. After 1 week, the stitches of the port are removed. There is no harm for patients who have a port placed in to take a shower after the stitches are removed.

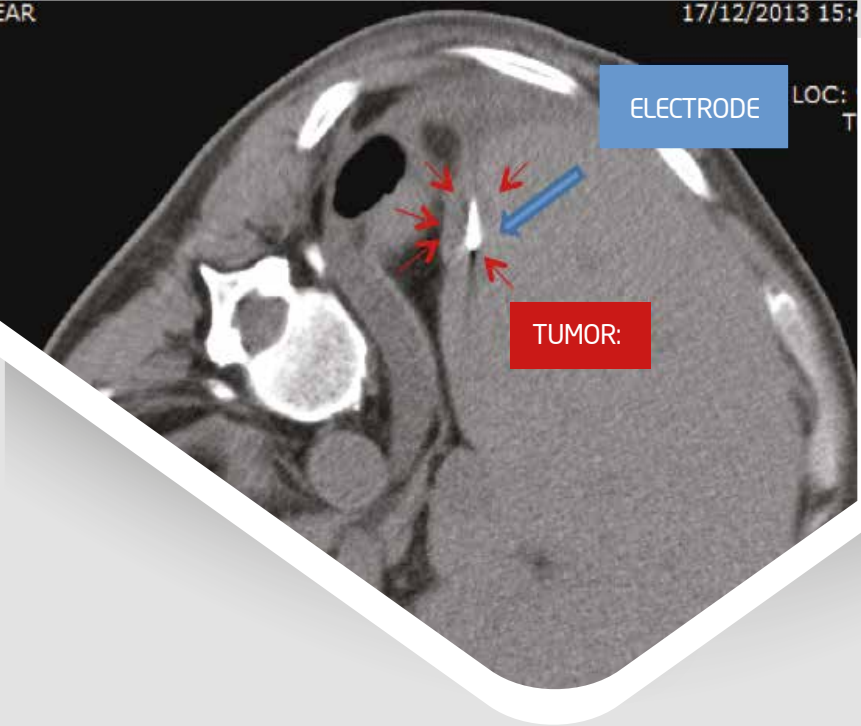
LOCAL TREATMENTS IN LIVER CANCERS

"Ablation" Treatment in Cancer

Various treatment methods are used in tumors. These methods can be listed as "surgery, chemotherapy and radiotherapy" applications. Nowadays, when these treatment methods are not effective enough, alternative treatment methods are needed. Although the classical treatments for lung, liver and kidney tumors are surgery, most patients miss the chance of surgery because they cannot be caught at an early stage. In this case, ablation techniques gain importance. "Tumor ablation" is the application of chemicals or heat to remove a tumor or cause specific damage to it...

Ablation Therapy in Liver Tumors

By the time of diagnosis of tumor, 85% of cases lost the chance of operation in cancers originating from the liver (Hepatocellular carcinoma = HCC) or tumors that spread from other organs (metastases) to the liver. In addition, surgical treatment may not be appropriate due to some risks in liver tumors.

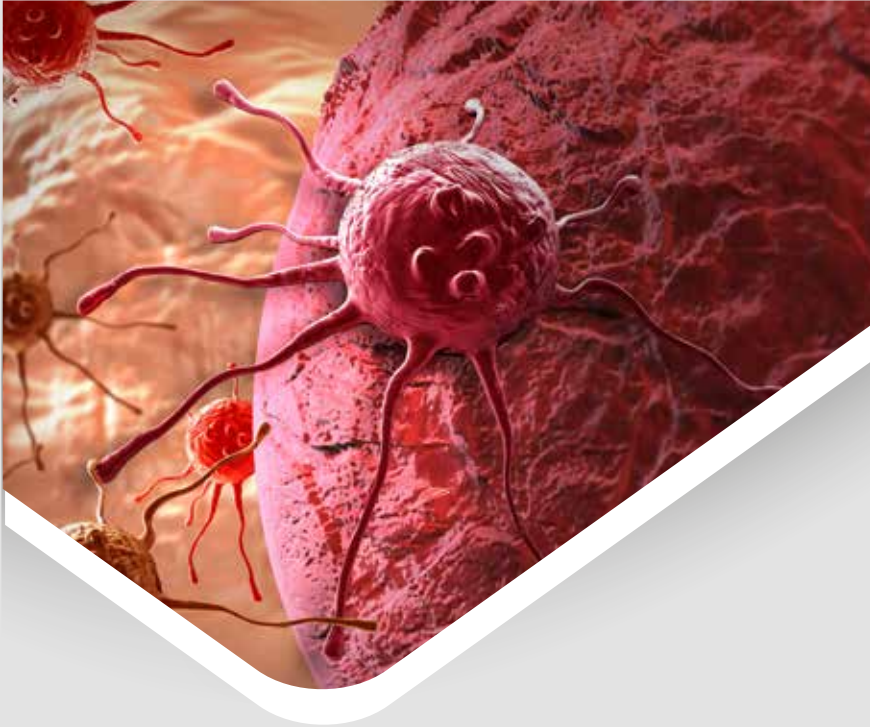


These can be listed as insufficient liver reserve, and tumor or tumors being located in an area that is not suitable for intervention. Ablation therapy is a curative (definitive) treatment for tumors smaller than 3 cm, and it prevents tumor recurrence, prolongs the life span, and reduces tumor margins in medium-sized HCC in the 3-5 cm range.

Radiofrequency Ablation

Radiofrequency (RF) ablation technique is to provide tumor-cell death by converting the radiofrequency current into heat energy around an electrode placed inside the tumor. With this treatment, the 5-year survival rate in liver cancer (HCC) cases is 40-58%. In small and medium sized HCCs, its efficiency can be around 80% in a single application.

Although the majority of ablation occurs through thermal conduction, this conduction may be limited by drying and burning of tissues. The presence of vessels in the area close to the lesion decreases the effectiveness of ablation and may prolong the procedure time. Grounding pads are required, and occasionally RFA can cause skin burns.

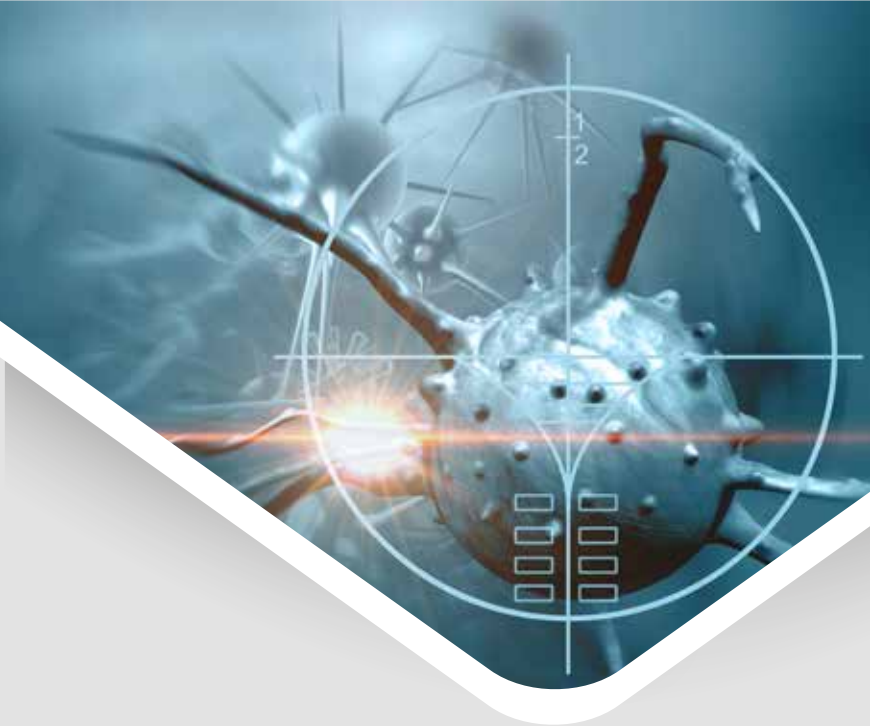


Microwave Ablation (MW)

MWA method is a thermal treatment method and is widely used especially in liver tumors. The MWA system can be used directly on the skin (percutaneous) and laparoscopically, as well as in open surgery operations. The system is based on the principle that the water molecules in the tissue are accelerated by the applied energy and the kinetic energy formed as a result of collision with each other is transformed into heat energy. MWA technique has some advantages over RF ablation, which is that it can create a larger ablation area and is more effective in ablation of tumors located close to vessels.

Other Ablation Techniques

Cryoablation (CRYO), Irreversible Electroporation, High Intensity Focused Ultrasound Ablation, Laser Ablation and Ethanol Ablation treatments are also performed in liver cancer.



How is Treatment Applied?

After the evaluation of blood tests, the location of the lesions is shown with ultrasonography, computed tomography and magnetic resonance imaging methods, and the location and number of interventions are determined. The ablation procedure is mostly applied directly from the skin and usually with ultrasonography or computed tomography device.

Other Cancers Where Ablation Therapy is Used

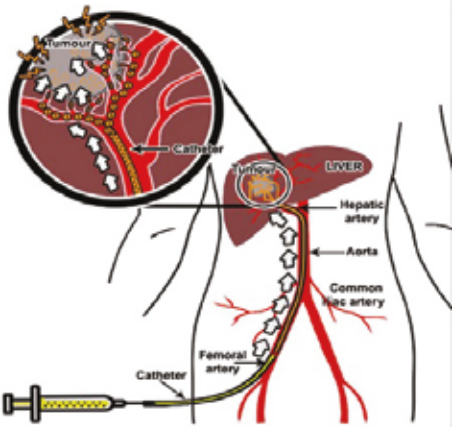
In addition to neuroendocrine tumors, ablation treatments are effective in cases where surgery cannot be performed, in the spread of breast, ovarian (ovarian) cancers to the liver.

In other organ tumors other than liver; ablation techniques are also important treatment methods in lung, kidney cancers and bone metastases. Especially in lung cancers, in cases where lung reserve does not allow surgical approach, ablation techniques can contribute to their lifespan. In painful bone tumor spread (metastasis), it can be an alternative treatment for pain relief.

CHEMOEMBOLIZATION

Chemoembolization is the method of administering chemotherapy drugs directly into the tumor by entering the inguinal vein and reaching the veins in the liver. Thus;

- High doses of chemotherapy drugs are loaded into the cancer tissue, and
- blood supply from the artery, which is necessary for the growth of the tumor, is also prevented.
- Side effects arising from systemically administered chemotherapy drugs do not occur or side effects only limited to the liver can be seen, since the drug does not enter the systemic circulation.
- In this way, all tumors located in the liver are treated.

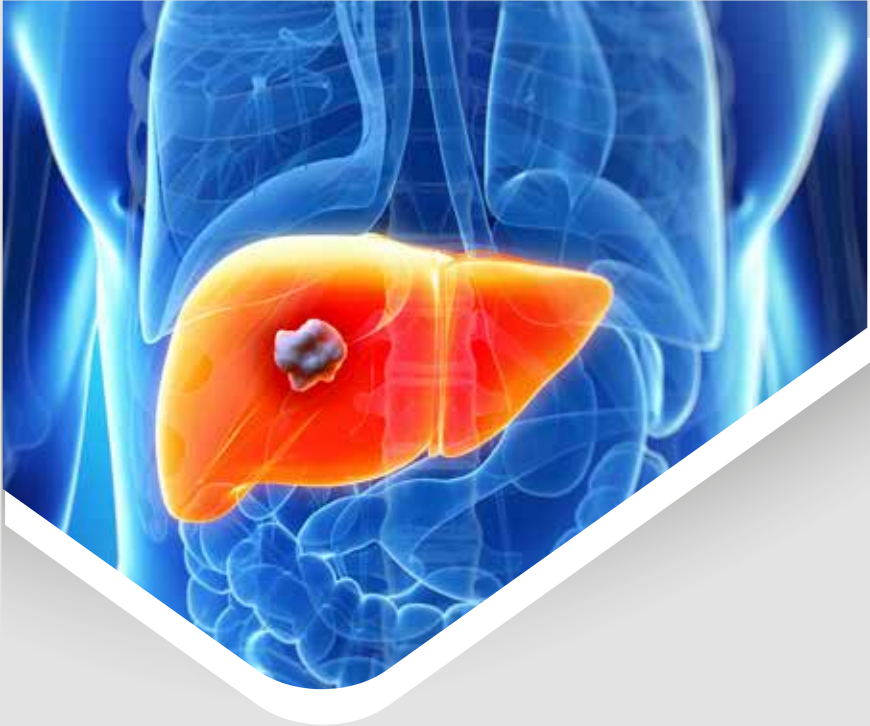


When can chemoembolization be performed

Chemoembolization can be applied in patients with liver cancers or metastases coming from other organs to the liver who do not respond to systemic chemotherapy and whose general condition is not impaired. For this,

- Tumor volume should be less than 50% of the entire volume of the liver.
- According to blood tests, albumin, total bilirubin, AST, ALT, LDH values are normal or slightly above normal
- Evaluation of other organ involvement other than the liver and absence of advanced or widespread cancer involvement in these organs, and
- The vein feeding the liver must be open.

Depending on the prevalence of the tumors located in the liver, treatment can be performed in one or several sessions.



RADIOEMBOLIZATION

Radioembolization is an effective treatment method that has started to be used in recent years. Its basic logic is that the radioactive material (Yttrium 90) is entered through the inguinal vein and applied directly to the tumor via the liver artery. Radiotherapy applied externally to normal liver tissue at a dose that will kill the tumor also damages normal liver tissue. For this reason, radioembolization, which is a safer method, has become the main treatment method that can be applied in patients who develop resistance to chemotherapy.

In which situations can radioembolization be applied?

- HCC (hepatocellular carcinoma), which is a type of cancer that develops primarily in the liver
- Metastases to the liver from colon, breast cancer, and neuroendocrine tumors

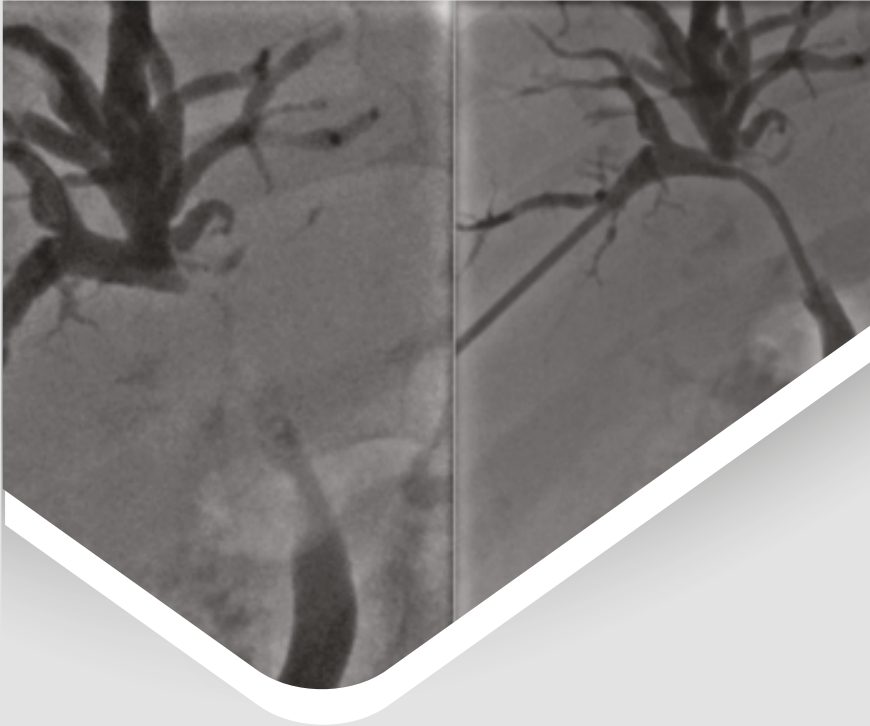
- It can also be used as an alternative treatment in biliary tract cancers that do not have the chance of surgery.
- In case of occlusion of the liver veins, radioembolization can also be performed if chemoembolization cannot be applied.

How is radioembolization treatment performed?

In this practice, which is carried out with the Nuclear Medicine unit, the treatment is performed in 2 separate sessions in the angiography unit.

1. The session is made for the vascular structure of the tumor and the calculation of the dose.

2. Session angiography is applied approximately 1 or 2 weeks later. The quantified Yitrium 90 is applied directly to the targeted tumor. Depending on the extent of the tumor, it can be applied to the right lobe or left lobe or both liver lobes and the treatment can be repeated. After the treatment, the patient is discharged 1 day later.



What are the side effects (complications) in radioembolization?

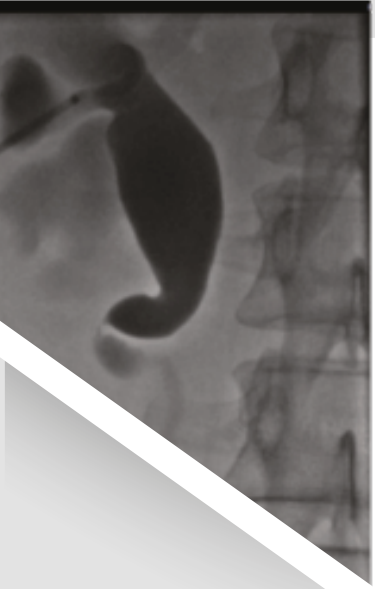
After the treatment, complaints of nausea, vomiting and fever lasting about 1 day may occur. Radiation-induced liver disease can occur 50% of the time, leading to an increase in blood tests and can last for 2 weeks. Radiation pneumonitis is a rare condition that may occur in cases with high lung leakage. Ulcer development in the stomach and intestines, inflammation of the pancreas, inflammation of the gallbladder are rare side effects.

OTHER SUPPORTING INTERVENTIONAL METHODS IN ONCOLOGY

Drainage of Bile and Urinary Tract Obstructions

When jaundice due to cancer occurs, bile must be delivered to the intestine or taken out in order to eliminate the life-threatening condition for the patient and to increase the quality of life during the remaining lifetime.

The ERCP (endoscopic retrograde cholangiopancreatography) technique, which is performed through the mouth, which is easier to apply, is used in the elimination of biliary tract obstruction.



In interventional radiology, where the ERCP technique has been unsuccessful due to reasons such as gastric and intestinal surgery, technical reasons and obstruction, the treatment of strictures and obstructions in the biliary tract is performed directly through the skin (percutaneous).

When urine cannot reach the bladder due to obstruction in the urinary tract, enlargement of the urinary tract develops in the kidney. Stones, inflammatory diseases, tumors and ureter injuries due to previous surgeries are common causes for this. When urine cannot reach the bladder, kidney functions are impaired. In cases of obstructions of the urinary tract, treatment is applied according to the cause. In cases where surgical methods are not successful or cannot be applied, a percutaneous catheter is inserted directly through the skin, and urine accumulates in a bag.

Intestine and Esophagus Obstructions

In order to increase the quality of the remaining life for the patient in advanced tumors of the intestine and esophagus, metallic cages called stents are placed in order to provide passage in cases of lumen obstruction. Inflammatory or fluid collections are drained with interventional techniques without the need for surgery and treatment is provided.

BAU TIP
BAHÇEŞEHİR UNIVERSITY SCHOOL OF MEDICINE

MEDICALPARK
Göztepe

UNIVERSITY HOSPITAL

444 44 84

medicalpark.com.tr
MedicalParkHG MedicalParkHG