Medical education

General and Digestive Surgery Department

Hepatobiliopancreatic and spleen surgery area

Hepatic metastases

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HEPATIC METASTASES

1. Definition

Metastasis means the spread of cancer. Cancerous cells can separate from the primary tumor and enter the bloodstream or the lymphatic system (the one that produces, stores, and transports the cells that fight against infections). This is how the cancerous cells spread to other parts of the body and form another tumor in a different organ. The new one is called metastatic tumor. When observed with a microscope, the cancerous metastatic cells look the same as the ones in the primary tumor.

The liver is one of the most common organs for the metastases to occur, especially those that are originated in the digestive tract.

We can state 3 types of metastases depending on their treatment options:

a) Hepatic metastases from colorectal cancer: colorectal carcinoma is the most frequent digestive tumor. About 10-20% of the patients show hepatic metastasis when diagnosed, and about 40-50% of the operated patients present it at some stage. These are the type of conditions this document is aimed for.

b) Hepatic metastases from neuroendocrine tumors (carcinoid tumors and pancreatic islets): they have a very peculiar presentation and behaviour.

c) Hepatic metastases from neither colorectal nor neuroendocrine tumors: gastrointestinal stromal tumors, renal carcinomas, germinal tumors, breast carcinomas, or melanomas. Thanks to the safety of the surgical technique, the removal of the tumor is more widespread than before, although the results are still controversial. This is why each case must be considered individually.

3. Symptoms

Some people who suffer from metastasis do not present any symptoms. When these symptoms arise, their type and frequency depend on the size and location of the metastasis. Some of these can indicate the presence of hepatic metastasis:

- Tiredness, loss of appetite, and unjustified weight loss.
- Pain: normally located in the upper and right area of the abdomen. It is normally a late symptom.
- Increase of liver size and the feeling of a mass in the upper right quadrant of the abdomen.
- Jaundice: the yellow pigmentation of the skin or the eyes with darker urines and light-colored faeces. It is caused by the accumulation in blood of a pigment called
bilirubin which is normally eliminated with the bile, going from the liver to the intestines through the bile duct. A tumor located in the liver can block the normal bile flux.

- Itching: due to the accumulation of substances in the skin that are normally eliminated with the bile. It is normally associated to a yellowish colour of the skin.

Sometimes we discover that someone suffers from a primary tumor after the metastatic tumor presents its symptoms.

4. Diagnosis

Normally, hepatic metastases are diagnosed when the patient takes certain tests in order to stage their primary condition, this is, to determine how advanced the tumor is.

Among all these tests, we include:

- **Complete blood analysis, including "oncogene markers", in other words, the level of certain substances in blood that determine the presence of hepatic metastasis.**

- **Abdominal ultrasonography**: sound waves form echoes. These create an image that is sent to the monitor. This painless technique allows the expert to obtain very important information on the liver.

- **Intraoperative ultrasonography**: this is done during the intervention. It is essential for hepatic metastases surgery. It permits evaluating their number and location, as well as ensuring a safe resecting margin.

- **CT (computed tomography)**: this procedure obtains high resolution images from different slices of the body and permit the two or three dimensional reconstruction of any part of the body. CT can also help guiding a needle if the doctor wants to take a small tissue sample (biopsy) from a suspicious area and analyze it through the microscope.

- **MRI (magnetic resonance imaging)**: this technique uses magnetic fields and radio frequency waves to obtain detailed images of the different parts of the body. Similarly to CT, we can inject contrasts intravenously in order to obtain a clearer image of certain organs when proceeding with a MRI.

CT and MRI are the main tests for the diagnosis of hepatic metastases and give the exact location of the injury and its relation with vascular structures (arteries and veins).

- **PET (positron emission tomography)**: a substance derived from glucose in injected in vein and is marked with a radioisotope. The device rotates around the body and takes photographs of the areas of the body that use more glucose. Tumor cells are more active and consume more glucose, so they are highlighted in the images.
-**PET-CT**: it is a state-of-the-art technology that combines both techniques and allows an exact location of the original tumor and the distant metastasis.

-**Laparoscopy**: this test is done in the operating room and is done under general anesthesia. The surgeon performs a 1-2 cm incision in the abdominal wall, introduces an optic device that is connected to a camera and obtains a magnified image of the inner organs of the patient. A small ultrasound scan can also be introduced (laparoscopic ultrasonography) and located on the liver surface to do a more thorough study of it and the surrounding organs. It allows detecting small injuries that would pass unnoticed, and even take samples of the tissue from the suspicious areas that are later examined with the microscope (biopsy). Besides, we can rule out or confirm if the tumor has spread to other organs apart from the liver.

**How does the doctor know if the liver injury is a primary or metastatic tumor?**

All these tests together confirm most of the times if the tumor is primary or metastatic. In case there is still any doubt, it will be necessary to take a sample (biopsy) that the pathologist will examine under the microscope. Normally, cancerous cells look like abnormal version of the cells from the tissue where the cancer began. Hepatic metastases can be found before, at the same time or even months or years after the diagnosis of the primary tumor. If a hepatic injury is found during the monitoring of a patient that has been treated from a previous cancer, we are normally facing metastasis, not a primary tumor.

**Is it possible to have a metastatic tumor in the liver without finding the primary tumor?**

Yes it is. A metastatic tumor always has its origin in the cancerous cells located in other part of the body. In most cases, when a metastatic tumor is located first, it is possible to find the primary tumor. The search for the primary tumor includes all the tests already mentioned. However, in certain cases a metastatic tumor can be diagnosed but the primary tumor cannot be found in spite of the performance of very comprehensive tests. With a biopsy we can know it is a metastatic tumor because the cells are different to those of the organ where the tumor is located. In such case, we call it carcinoma of unknown primary.

**5. Treatment**

Once the tests are evaluated, we can plan the most suitable strategy depending on the type of primary tumor, the size and location of the metastases, and the hepatic function of the patient. There are different treatments, although in many cases
it may be necessary to combine them in order to approach multiple injuries.

The participation of a multidisciplinary team including surgeons, oncologists, radiologists, and pathologists, is the key for a successful treatment.

1. SURGERY: liver resection (hepatectomy)

It is used if the tumor can be removed (curative surgery). It is an aggressive and complex surgery that must be carried out only by surgeons specifically trained in the field.

The type of surgery will be determined by the location of the tumor, the portion of the liver that will remain after the intervention, and the hepatic functional reserve of the patient.

Removing all the injuries sometimes requires more complex techniques like sequential hepatic resection (in two times), portal embolization (obstruction of the blood flow in the affected part of the liver so that the healthy part can grow), extracorporeal hepatic resection, or the hepatic autotransplant.

After this type of intervention, the patient may need to stay 24-48 hours in ICU (intensive care unit) and in hospital for approximately 1-2 weeks. The recovery at home depends on each case, but it normally takes 1-2 months to have a normal activity.

2. TUMOR ABLATION

Several methods are carried out in order to destroy the tumor locally without removing it. Among these methods, we can mention:

- **Radiofrequency ablation**: a thin probe is introduced in the injury under CT scan or ultrasound guidance. The high frequency alternating current passing through the probe destroys the tumor cells with the "heat". The patient is sedated during the intervention and the radiofrequency ablation is delivered percutaneously (it is not necessary to operate on the patient) or during open or laparoscopic surgery.

- **Percutaneous ethanol injection**: the substance is injected in the tumor and provokes the destruction of the cancerous cells. The procedure is similar to radiofrequency.

- **Cryosurgery**: the tumor is destroyed with extreme cold introducing in the injury a device connected to a system that provides it with liquid nitrogen.

3. CHEMOTHERAPY

We must take into account that chemotherapy has not demonstrated it can cure patients with hepatic metastases. That is why all patients must be examined by a team of expert surgeons and they will indicate or rule out any surgical option.
Chemotherapy can be used to rescue patients that were not candidates for surgery in the first place.

Medicines are used in order to destroy cancerous cells and therefore avoid their growth. There are two forms of applying chemotherapy:

- Systemic chemotherapy: the medicines are administered orally or intravenously.

- Regional chemotherapy: it requires a small operation in order to locate the artery that takes blood to the liver so as to place a catheter that is external to the patient. The medicines can be administered directly on the tumor through this catheter, which decreases the effects on the rest of the organism.

6. Hepatic transplant

It is one of the possible treatments for patients with hepatic metastases with neuroendocrine origin. However, the experience is very small and the survival results are lower than those obtained in other transplant indications.

Prognosis

The prognosis (life expectancy) after the treatment for hepatic metastases depends on the following facts:

- The nature of the primary tumor (the one that originated the metastases).
- The possibility of a total removal with surgery.
- Health condition of the patient.
- The existence of recurrences (reappearance of the illness in the surgical area or in distant organs).

8. Checkup

Once the patient is discharged, the medical team must schedule a series of checkups that will need complete analysis and normally one or two imaging tests (CT, NMRI or PET-CT) in order to know the evolution of the condition.

9. Adapting to living with hepatic metastases

This condition changes the life of the patient and their relatives. Many questions will rise in terms on the treatment, secondary effects, quality of life, evolution... The professional team that sees each case is the most adequate to answer these questions, and they can suggest and find help groups, psychological aid, and any other related resources.
A new lifestyle must be assumed:

- Avoiding tobacco and alcohol.
- Moderate physical exercise 3 days a week: it will improve their cardiovascular state, reduce fatigue, and reduce anxiety levels.
- As long as it is possible, return to their normal work or at least to the tasks that are more enjoyable to them.
- Following an adequate diet: after the intervention and during the radio or chemotherapy it is very frequent to suffer nausea, loss of appetite, and loss of weigh. It will be very helpful to eat less amount of food but more often (5 times a day) with a diet rich in fruit, vegetables and carbohydrates, and avoiding fats. Nobody can change the fact that the patient suffers this illness, but how we face it is at least possible. This recommendation can make the patient feel better physically and emotionally.
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