

What is
**Biliary Tract
Cancer*?**

Let us answer some
of your questions.

*
Cholangiocarcinoma
(bile duct cancer)

*
Gallbladder cancer

*
Ampullary cancer

Biliary tract cancer*

An ESMO guide for patients

Patient information based on ESMO Clinical Practice Guidelines

This guide has been prepared to help you, as well as your friends, family and caregivers, better understand biliary tract cancer and its treatment. It contains information on the causes of the disease and how it is diagnosed, up-to-date guidance on the types of treatments that may be available and any possible side effects of treatment.

The medical information described in this document is based on the ESMO Clinical Practice Guideline for biliary tract cancer, which is designed to help clinicians with the diagnosis and management of biliary tract cancer. All ESMO Clinical Practice Guidelines are prepared and reviewed by leading experts using evidence gained from the latest clinical trials, research and expert opinion.

The information included in this guide is not intended as a replacement for your doctor's advice. Your doctor knows your full medical history and will help guide you regarding the best treatment for you.

*Cholangiocarcinoma (bile duct cancer), gallbladder cancer and ampullary cancer.

Words highlighted in **colour** are defined in the glossary at the end of the document.

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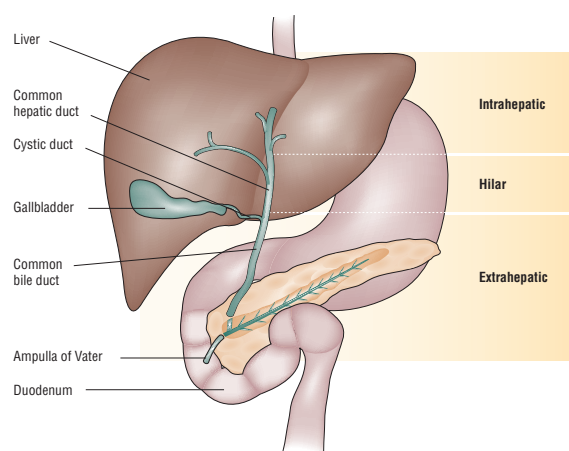
Biliary tract cancer: A summary of key information

This summary is an overview of the key information provided within the **biliary tract cancer** guide.

The following information will be discussed in detail in the main pages of the guide.

Introduction to biliary tract cancer

- **Biliary tract cancer** includes **bile duct** cancer, **gallbladder** cancer and **ampullary** cancer.
- Cancer of the **bile ducts** is called **cholangiocarcinoma (CCA)** and is classified depending on which part of the **bile duct** the cancer develops in:
 - **Intrahepatic** – affects **bile ducts** within the liver
 - **Hilar** – occurs at the junction of the left and right hepatic ducts
 - **Extrahepatic** – affects the common **bile duct** outside the liver



*Anatomy of liver and **bile ducts** showing the classification of **intrahepatic**, **hilar** and **extrahepatic CCA** (Blechacz et al., 2011). Reprinted by permission from Springer Nature: Nature Reviews Gastroenterology & Hepatology, Clinical diagnosis and staging of **cholangiocarcinoma**, Blechacz B, et al. COPYRIGHT 2011.*

- **Gallbladder** cancer originates in the cells of the **gallbladder**.
- **Ampullary** cancer develops in the **ampulla of Vater**, where **bile ducts** from the liver and **pancreas** join and enter the **duodenum**.
- **Biliary tract cancer** is uncommon and accounts for less than 1% of all human cancers. There are some known **risk factors** for **biliary tract cancer**, but the exact causes are not known, and it often has no symptoms in its early stages.

Diagnosis of biliary tract cancer

- A diagnosis of **biliary tract cancer** is usually based on the results of clinical examination of the abdomen, imaging scans using **ultrasound**, **magnetic resonance imaging (MRI)** or **computed tomography (CT)**, and a **biopsy**.
- Further investigations can help to determine how advanced the cancer is (the 'stage'). For example, **MRI** of the biliary tract, a **CT** scan of the chest and an **ultrasound** scan of the **lymph nodes** are commonly used to see how far the cancer has spread.
- **Biliary tract cancer** is staged according to **tumour** size, whether it has spread to the **lymph nodes** and whether it has spread into the liver, lungs or other parts of the body. This information is used to help decide the best treatment.

Treatment options for biliary tract cancer

- Treatment for **biliary tract cancer** depends on the size, location and stage of the **tumour**.
- Patients should be fully informed and involved in decisions about treatment options.

Surgery

- Potentially **curative** surgery is usually only offered to patients with early-stage (**localised**) disease, when there is a good chance of complete **resection**. The surgery depends on the type of cancer:
 - Surgery for **intrahepatic CCA** (within the liver) involves removal of part of the liver as well as nearby **lymph nodes**.
 - Surgery for **hilar CCA** (just outside the liver) typically involves removal of the affected **bile duct**, the common **bile duct**, part of the liver, the **gallbladder** and nearby **lymph nodes**.
 - Surgery for **extrahepatic CCA** (further away from the liver) requires removal of the affected **bile duct**, nearby **lymph nodes**, part of the **pancreas** and part of the **duodenum**.
 - Surgery for **gallbladder** cancer may involve removal of the **gallbladder** alone (if the **tumour** is superficial in **gallbladder**) or the **gallbladder** plus part of the liver and nearby **lymph nodes** (if the cancer is deeper in the **gallbladder** wall).
 - Surgery for **ampullary** cancer typically involves removal of part of the **pancreas**, part of the **duodenum**, the **gallbladder** and part of the **bile duct**.
- Other, non-**curative**, types of surgery may be offered to patients with **unresectable biliary tract cancer** to relieve certain cancer-related symptoms. For example, patients with **tumours** causing a blockage in the **bile duct** or the **duodenum** may be offered surgery to bypass the blockage.

Chemotherapy

- Following surgery to remove **biliary tract cancer**, most patients will be offered **adjuvant chemotherapy** with a drug called **capecitabine** to reduce the risk of the cancer **recurring**, providing they have made a good recovery from the operation.
- Patients with **unresectable biliary tract cancer** are usually treated with **chemotherapy**. Patients in good general health typically receive a combination of **cisplatin** and **gemcitabine**. Patients in poorer health might be offered treatment with a single **chemotherapy** drug, such as **gemcitabine**, **fluorouracil (5-FU)** or **capecitabine**.

Radiotherapy and radioembolisation

- **Radiotherapy** or **radioembolisation** may be considered for certain patients in some regions. However, there is limited clinical evidence for the effectiveness of these approaches in **biliary tract cancer**, therefore they are not currently commonly used in Europe outside of **clinical trials**.

Follow-up during/after treatment

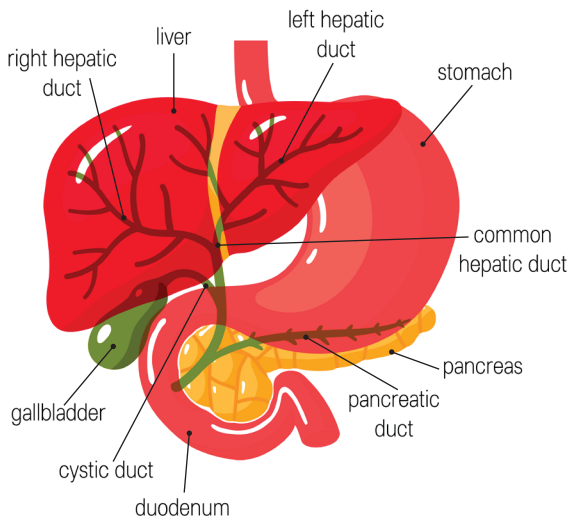
- The timings of follow-up appointments vary between regions and practices. Typical follow-up appointments after **curative** surgery may include a clinical examination, blood tests and a **CT** scan of the chest, abdomen and pelvis.
- The treatments for **biliary tract cancer** can have long-term side effects that may impact the patient's life for years after diagnosis.
- Support groups can help patients and their families to better understand **biliary tract cancer**, and to learn how to cope with all aspects of the disease, from diagnosis to long-term physical and emotional effects.

What is the biliary tract?

The biliary tract is part of the digestive system and includes the **gallbladder** and **bile ducts**.

The **gallbladder** is a small, pear-shaped pouch in the upper abdomen that stores **bile**, which is made in the liver. **Bile** is a fluid that helps to digest food, and the **gallbladder** releases it when we eat.

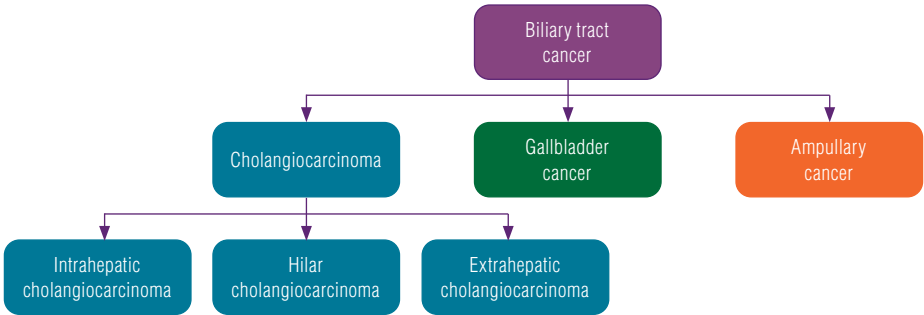
Bile ducts are tubes that carry **bile** from the liver and **gallbladder** to the small intestine. The right and left hepatic ducts begin in the liver and join outside the liver to form the common hepatic duct. This then joins with the cystic duct (from the **gallbladder**) to form the common **bile duct**, which passes behind the **pancreas** and joins with the pancreatic duct at the **ampulla of Vater** before opening into the **duodenum** (the first part of the small intestine).



*Anatomy of the abdomen showing the position of the **biliary ducts** and **gallbladder** in green.*

What is biliary tract cancer?

Biliary tract cancer is a cancer that forms in the cells of the **bile ducts**, **gallbladder** or **ampulla of Vater**. **Biliary tract cancer** is commonly classified according to the origins of the cancer in the biliary tract.



Classifications of biliary tract cancer.

What is cholangiocarcinoma?

Cholangiocarcinoma (CCA) is the medical term for cancer that develops in the **bile ducts**. **CCA** is categorised depending on which part of the **bile duct** the cancer develops in:

- **Intrahepatic CCA** originates in the **bile ducts** within the liver and accounts for 10%–20% of **CCA** cases.
- **Hilar CCA** originates just outside the liver, where the left and right hepatic ducts join together – these are the most common type of **CCA**, accounting for 50% of cases.
- **Extrahepatic CCA** originates in **bile ducts** further away from the liver, including the **bile ducts** running through the **pancreas** to the small intestine, and accounts for 30%–40% of **CCAs**.

Cholangiocarcinoma is categorised according to the origin of the cancer within the bile ducts

What is gallbladder cancer?

Gallbladder cancer originates in the cells of the **gallbladder**. Most **gallbladder** cancers are **adenocarcinomas**, which begin in the gland cells of the **gallbladder** lining.

What is ampullary cancer?

Ampullary cancer originates in the area where the common **bile duct** meets the pancreatic duct, which is called the **ampulla of Vater**.

What are the symptoms of biliary tract cancer?

There are often no symptoms of **biliary tract cancer**, particularly in the early stages. However, if there are symptoms, depending on where the cancer is, they may include:

- Yellowing of the skin (**jaundice**).
- Excessively dark urine and pale stools.
- Weight loss.
- Stomach pain.
- Sickness.
- Fever.



These symptoms can be experienced with all types of **biliary tract cancer**. You should see your doctor if you experience any of these symptoms. However, it is important to remember that these symptoms can also occur in people who do not have **biliary tract cancer**; they may also be caused by other conditions.

Biliary tract cancer often has no symptoms in the early stages

How common is biliary tract cancer?

Biliary tract cancer is most common between the ages of 60 and 70

Biliary tract cancer is relatively uncommon, accounting for less than 1% of all human cancers. It is most commonly diagnosed in people between the ages of 60 and 70 years and affects slightly more men than women (Valle *et al.*, 2016).

The incidence of CCA varies widely between countries, reflecting exposure to different **risk factors** (Banales *et al.* 2016). Incidence is low in Europe, the USA and Australasia, with an annual rate of only 0.3–3.5 cases per 100,000 people. However, **CCA** rates are much higher in countries where **liver fluke** infection is common – for example, Northeast Thailand has an annual incidence rate of 90 cases per 100,000 people (Valle *et al.*, 2016).

Gallbladder cancer also has a low annual incidence rate in Western Europe and the USA (1.6–2 per 100,000) but rates are much higher in other parts of the world, including Chile where annual incidence rates are 24.3 per 100,000 in women and 8.6 per 100,000 in men (Valle *et al.*, 2016).

Ampullary cancer is extremely rare, with annual incidence rates of 0.2–0.6 per 100,000 people (Rostain *et al.*, 2014).

What causes biliary tract cancer?

The causes of **biliary tract cancer** are not known, but several **risk factors** for developing the different types of this cancer have been identified, including conditions that cause long-term inflammation of the **bile ducts** or **gallbladder**.

In the Western world, most cases of **biliary tract cancer** are 'sporadic', that is, they occur with no known cause.

It is important to remember that having a **risk factor** increases the risk of cancer developing but it does not mean that you will definitely get cancer. Likewise, not having a **risk factor** does not mean that you definitely won't get cancer.



The precise causes of biliary tract cancer are not known

FACTORS THAT MAY INCREASE RISK		
Cholangiocarcinoma	Gallbladder cancer	Ampullary cancer
Primary sclerosing cholangitis	Primary sclerosing cholangitis	Cholecystectomy
Ulcerative colitis	Family history of gallbladder cancer	Familial adenomatous polyposis
Choledochal cysts	Inflammation of the gallbladder , gallstones or gallbladder polyps	Smoking
Liver fluke infection*	Porcelain gallbladder	Being overweight
Bile duct stones	Abnormalities of the pancreas and bile duct	
Liver cirrhosis	Diabetes	
Hepatitis B or C virus infection	Smoking and excessive alcohol	
	Being overweight	

There are various **risk factors** associated with developing **biliary tract cancer** although each factor may not apply to everyone who develops the disease. ***Liver fluke** infection is unlikely to occur outside of South East Asia.

Screening for biliary tract cancer

There is no routine screening programme for **biliary tract cancer**; however, patients with certain conditions that place them at a higher risk of developing the disease may be closely monitored. For example, patients with **primary sclerosing cholangitis** (inflammation of the **bile ducts**) undergo regular screening for the development of **hilar CCA**, and **gallbladder polyps** are monitored and removed if they become enlarged (*Valle et al., 2016*).

Patients with certain risk factors are monitored for the development of biliary tract cancer

How is biliary tract cancer diagnosed?

A diagnosis of **biliary tract cancer** is based on the results of the following examinations and tests:

Clinical examination

If you have symptoms of **biliary tract cancer**, your doctor may carry out a general clinical examination to feel any areas of your abdomen that are swollen or painful.

Biomarker blood test

Your doctor may recommend that you have a blood test to check the levels of a **tumour biomarker** called **cancer antigen 19-9 (CA 19-9)**. People with **biliary tract cancer** might have raised levels of **CA 19-9** in their blood. However, it is important to understand that some people with **biliary tract cancer** don't have raised levels of **CA 19-9**, and that raised **CA 19-9** levels can also occur in other conditions (including non-cancerous conditions). For these reasons, a blood test alone cannot provide a diagnosis.



Clinical examination and a blood test can indicate if further tests are needed

Imaging

Your doctor may recommend that you have an **ultrasound** scan to look at your **bile ducts, gallbladder** and the surrounding organs for signs of cancer (Valle et al., 2016). A handheld **ultrasound** scanner is placed onto the abdomen and produces sound waves to create a picture of the internal organs.

Magnetic resonance imaging (MRI) scans are widely used to diagnose **biliary tract cancer** (Valle et al., 2016). **MRI** uses magnetic fields and radio waves to produce detailed images of the inside of the body. A particular type of **MRI** scan called a **magnetic resonance cholangiopancreatography (MRCP)** may be used to give a very detailed picture of the **bile ducts, gallbladder, pancreas** and any **tumours**. An **MRI** scan may also be used to look at the liver in more detail.

Computed tomography (CT) is a type of **x-ray** technique that lets doctors see your internal organs in cross-section. **CT** scans may be used in the diagnosis of **biliary tract cancer**, but are more often used to evaluate the extent of the cancer elsewhere in the body.

Biliary tract cancer is usually diagnosed using imaging tests

Biopsy

If the imaging tests find a **tumour**, your doctor may wish to take a **biopsy**. This involves taking samples of tissue from the biliary tract to look for cancer cells.

Endoscopic retrograde cholangiopancreatography (ERCP)-guided biopsies are commonly used in patients with **biliary tract cancer** (Valle *et al.*, 2016). During an **ERCP**, a long flexible tube with a small camera and light at the end (**endoscope**) is passed down the throat to take **x-rays** of the **bile ducts**, **gallbladder** and **pancreas**. This allows the doctor to see the location and size of the **tumour**, and **biopsies** can be taken at the same time.

If **ERCP**-guided **biopsies** are inconclusive, then a procedure called **endoscopic ultrasound (EUS)**-guided fine needle aspiration or **biopsy** can be used to obtain small samples (Valle *et al.*, 2016). This involves the use of an **endoscope** with an **ultrasound** probe at the end, which creates images of the **bile ducts**, **gallbladder** and **pancreas** from inside the body. A very thin needle is then used to take some fluid and cells from abnormal areas.



Incidental gallbladder cancer

Gallbladder cancer is increasingly discovered by chance when patients undergo procedures for other, less serious **gallbladder** conditions (for example **gallbladder** surgery for gallstones). In these cases, the cancer is diagnosed through **pathology** tests on the removed tissue. As **gallbladder** cancer often causes no symptoms in its early stages, incidental diagnosis provides an opportunity for earlier diagnosis and treatment, which may include a further operation to ensure all of the cancer is removed as well as **adjuvant chemotherapy**.

How will my treatment be determined?

Your treatment will depend on the staging of your cancer and risk assessment.

Staging

Staging is used to describe the extent of the cancer overall; this includes its size and position and whether it has spread from where it started. For **biliary tract cancer**, staging is usually based on **MRI** of the biliary tract and **CT** scans of the chest (Valle et al., 2016).



After diagnosis, imaging scans can show if the cancer has spread to other parts of the body

Staging to determine the size and spread of the cancer is described using a sequence of letters and numbers. For **biliary tract cancer**, there are four stages designated with Roman numerals I to IV. Generally, the lower the stage, the better the outcome (or **prognosis**) for the patient. The TNM staging system for **biliary tract cancer** considers:

- How far the **tumour** has spread into nearby tissues and blood vessels (T).
- Whether the cancer has spread to **lymph nodes** (N).
- Whether it has spread to distant sites, or **metastases** (M).

Staging helps to determine the most appropriate treatment for biliary tract cancer

In addition to the TNM staging system, **hilar CCA tumours** may be staged using the Bismuth-Corlette classification, which categorises **hilar CCAs** as types I–IV according to which ducts are affected by the **tumour** (Valle et al., 2016). These staging systems may seem complicated but your doctor will be able to explain which stage corresponds to your cancer.

Treatment decisions

Your treatment will depend upon the size, location and stage of the **tumour**, as well as your general health and level of fitness. The choice of treatments will be discussed with you and your preferences will be taken into account. Your treatment will be discussed by a **multidisciplinary team**, which means that experts in different areas of cancer treatment (e.g. surgeons, gastroenterologists, radiologists, oncologists and nurses) come together to share their expertise in order to provide the best patient care.



It is important that patients are fully involved in the treatment decision-making – when there are several treatments available, doctors should involve patients in making decisions about their care so that they can choose the care that meets their needs and reflects what is important to them. This is called 'shared decision-making'.

It is important that patients are fully involved in discussions and decisions about their treatment

Your doctor will be happy to answer any questions you have about your treatment. Four simple questions that may be helpful when talking with your doctor or any healthcare professional involved in your care are:

- What treatment options do I have?
- Are there any **clinical trial** options?
- What are the possible advantages and disadvantages of these options?
- How likely am I to experience these advantages and disadvantages?

What are the treatment options for biliary tract?

Your doctor may recommend one or more of the following approaches for treating **biliary tract cancer**:

Surgery

Surgery to remove the **tumour (resection)** is the only potentially **curative** treatment for **biliary tract cancer**. The aim of **resection** is to remove the cancer along with a healthy **margin** of tissue to help stop it from coming back. **Curative** surgery is usually only offered to patients with early-stage (**localised**) disease, when there is a good chance of complete **resection**. The type of surgery will depend on the subtype of **biliary tract cancer**.



Surgical removal of the tumour offers the best chance of cure for biliary tract cancer

Surgery for intrahepatic cholangiocarcinoma

To remove an **intrahepatic CCA**, the surgeon must remove part of the liver. They will also remove nearby **lymph nodes**, which can be examined after the operation to see if the cancer has spread. The surgery may leave only a small amount of healthy liver, therefore a procedure called **portal vein embolisation (PVE)** might be used before surgery to reduce the risk of liver failure after **resection** (Valle *et al.*, 2016). In **PVE**, blood flow to the area of liver containing the cancer is partially blocked off. This increases the size of the healthy part of the liver that will remain after surgery, by encouraging it to grow.

Surgery for hilar cholangiocarcinoma

Resection of a **hilar CCA** involves removal of the **bile duct** containing the **tumour** as well as the common **bile duct**, part of the liver, the **gallbladder** and nearby **lymph nodes**. Part of the **pancreas** and **duodenum** might also be removed. The remaining **bile ducts** are re-joined to the intestine, and blood vessels that supply the liver might also have to be reconnected. **PVE** may be offered to patients before **resection**.

Surgery for extrahepatic cholangiocarcinoma

Surgery for **extrahepatic CCA** requires removal of the **bile duct** containing the **tumour**, nearby **lymph nodes**, part of the **pancreas** and part of the **duodenum**. The remaining **pancreas** and stomach are then reconstructed.

Surgery for gallbladder cancer

The extent of surgery required to remove **tumours** of the **gallbladder** depends on the location of the cancer within the **gallbladder** and how far it has spread. **Tumours** that are confined to one part of the **gallbladder** may be removed by **resection** of the **gallbladder** alone (called a **simple cholecystectomy**). If the cancer has spread throughout the **gallbladder**, the surgeon may remove the **gallbladder**, some nearby liver tissue and all of the **lymph nodes** around the **gallbladder**. When incidental **gallbladder** cancer is discovered after a routine non-cancer operation (e.g. **cholecystectomy** for gallstones), a second operation may be offered to clear the area around the **tumour**, including part of the liver and the **lymph nodes**.

Surgery for ampullary cancer

Ampullary cancer is typically removed by a type of surgery called **pancreatoduodenectomy** (also known as **Whipple's procedure**). This involves removal of the head of the **pancreas**, part of the small intestine, the **gallbladder** and part of the **bile duct**.

Other types of surgery

In some patients with early-stage **hilar CCA** that is not suitable for **resection**, liver transplant may be considered. However, it is important to understand that this approach is not commonly used in Europe.

Surgery can also be used to relieve some symptoms of **biliary tract cancer**. For example, **tumours** can block the **bile ducts** and lead to a build-up of **bile** in the blood, causing **jaundice**, nausea and discomfort. These blockages are commonly relieved by inserting a small tube (called a **stent**) into the **bile duct** to hold the duct open (see section '*Stenting*' for more information). If insertion of a **stent** is not possible then surgery may be carried out to bypass the area of the blockage.



Chemotherapy

Chemotherapy destroys cancer cells and is widely used in the treatment of **biliary tract cancer**. **Chemotherapy** agents used in the treatment of **biliary tract cancer** include (Valle *et al.*, 2016):

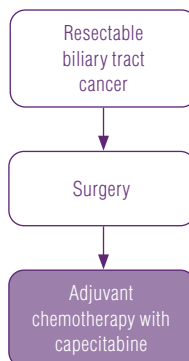
- **Capecitabine**
- **Cisplatin**
- **Gemcitabine**
- **Oxaliplatin**
- **Fluorouracil (5-FU)**

Chemotherapy is widely used in the treatment of biliary cancer

Adjuvant chemotherapy for resectable biliary tract cancer

Following surgical **resection of biliary tract cancer**, most patients will be offered **adjuvant chemotherapy** with **capecitabine** to reduce the risk of **recurrence** after surgery. This is because a study recently showed that **adjuvant capecitabine** improved outcomes in patients with resected **biliary tract cancer** compared with no **adjuvant** treatment (Primrose *et al.*, 2019). **Capecitabine** tablets are taken orally twice every day for 2 weeks of a 3-week treatment cycle, and treatment usually continues for 6 months (8 cycles).

Adjuvant treatment with capecitabine is typically offered to patients after resection of biliary tract cancer



*Typical treatment for **resectable biliary tract cancer**.*

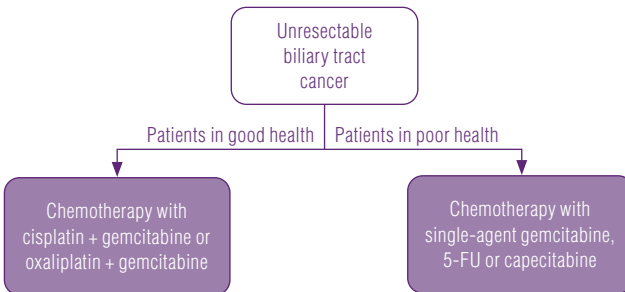
Chemotherapy for unresectable biliary tract cancer

Chemotherapy is typically used in the **first-line** treatment of **biliary tract cancer** that can't be surgically removed.

Patients with **unresectable biliary tract cancer** and who are in good general health, are typically offered **chemotherapy** with a combination of **cisplatin** and **gemcitabine** (Valle et al., 2016). In some patients, **oxaliplatin** might be given instead of **cisplatin**, especially if there are any concerns over kidney function. Patients with poorer overall health might be offered single-agent **chemotherapy** with **gemcitabine**, **5-FU** or **capecitabine** alone.



Patients with advanced biliary cancer are usually treated with chemotherapy



Treatment options for **unresectable biliary tract cancer**.

Patients who experience cancer progression following **first-line** treatment can be offered further **chemotherapy** or may be encouraged to take part in a **clinical trial**. A recent study showed that the combination of **oxaliplatin**, **5-FU** and **folinic acid** (**mFOLFOX**) improved survival in patients with advanced **biliary tract cancer** who had previously been treated with **first-line cisplatin** and **gemcitabine** (Lamarca et al., 2019). Therefore, **mFOLFOX** is likely to become a common **second-line** treatment in this setting.

Radiotherapy

Radiotherapy uses **ionising radiation** to damage the deoxyribose nucleic acid (**DNA**) of cancerous cells, causing them to die. **Radiotherapy** is not commonly used in the treatment of **biliary tract cancer** but may be considered for some patients.

Adjuvant radiotherapy

In some countries, **radiotherapy** is offered following surgical **resection** of **biliary tract cancer** to reduce the risk of **recurrence**. However, there is currently no robust clinical evidence for the effectiveness of this approach. As such, **adjuvant radiotherapy** is not commonly used in Europe outside **clinical trials**.

Radiotherapy for unresectable biliary tract cancer

Radiotherapy can be used to relieve some symptoms of **biliary tract cancer**. For example, if a **tumour** can't be removed, **radiotherapy** can help to relieve pain and other symptoms by shrinking **tumours** that block blood vessels or **bile ducts**, or press on nerves.

Radiotherapy is not commonly used in the treatment of biliary tract cancer, but might be considered for some patients

Radioembolisation

In some patients with **unresectable intrahepatic CCA**, a procedure called **radioembolisation** may be offered following **first-line chemotherapy**. **Radioembolisation** involves the injection of tiny beads containing a radioactive substance called **yttrium-90** into the main blood vessel that carries blood to the liver. The beads collect in the **tumour** and in blood vessels close to the **tumour**, giving off radiation. This may destroy the blood vessels that the **tumour** needs to grow and kill the cancer cells. It's important to understand that there is limited evidence for the effectiveness of **radioembolisation** in this setting and it is not commonly offered in Europe outside **clinical trials**.

Intrahepatic cholangiocarcinoma in younger patients

The incidence of **intrahepatic CCA** in young patients is increasing. Patients under the age of 50 years with **resectable intrahepatic CCA** have a better **prognosis** than older patients (*Wang and Qin, 2017*). This means that if you are a younger patient, survivorship issues such as long-term nutritional and emotional support are particularly important (see section ‘*Survivorship care*’ for more information). In younger patients, treatment for **biliary tract cancer** can reduce fertility. Before starting treatment, your doctor will discuss all possible fertility issues with you and will give you information about any suitable fertility-preservation options available to you. As some forms of cancer treatment can be harmful to unborn babies, especially in the first trimester, you should avoid pregnancy during treatment.



Younger patients with intrahepatic CCA generally have a better prognosis than older patients

Clinical trials

Your doctor may ask whether you would like to take part in a **clinical trial**. This is a research study conducted with patients in order to *(ClinicalTrials.gov, 2019)*:

- Test new treatments.
- Look at new combinations of existing treatments or change the way they are given to make them more effective or reduce side effects.
- Compare the effectiveness of drugs used to control symptoms.



Clinical trials help to improve knowledge about cancer and develop new treatments, and there can be many benefits to taking part. You will have to undergo various tests before entering a trial, and be carefully monitored during and after the study. Although the new treatment may offer benefits over existing therapies, it's important to bear in mind that some new treatments are found not to be as good as existing treatments or to have side effects that outweigh the benefits *(ClinicalTrials.gov, 2019)*.

Clinical trials help to improve knowledge about diseases and develop new treatments – there can be many benefits to taking part

You have the right to accept or refuse participation in a **clinical trial** without any consequences for the quality of your treatment. If your doctor does not ask you about taking part in a **clinical trial** and you want to find out more about this option, you can ask your doctor if there is a trial for your type of cancer taking place nearby *(ClinicalTrials.gov, 2019)*.

Molecular profiling

No two **tumours** are exactly the same. The genetic characteristics of a cancer will vary from one patient to the next, which means that even patients with the same type of cancer may respond differently to the same treatment. We are now learning that **molecular profiling** may allow patients to benefit from more 'personalised' treatments.

Molecular profiling is the classification of samples (e.g. **tumour** tissue) based on **gene** expression. **Biopsy** samples are sent to a laboratory where they undergo tests to analyse **tumour DNA** and proteins – the results of these tests provide information about the **molecular profile** of the **tumour** and can be used to help decide which treatments the cancer is likely to respond to.

In recent research, **molecular profiling** has identified differences between types of **biliary tract cancer**, and it is hoped that a better understanding of the molecular **pathology** of **biliary tract cancer** might one day help with the development of new therapies (*Valle et al., 2016*).

For example, **mutations** in certain **genes**, including **genes** called IDH1 and FGFR2, are each found in 10–15% of **intrahepatic CCAs**, and drugs that target these alterations are currently in clinical development (*Mertens et al., 2018*). An inhibitor of IDH1 called ivosidenib has recently been shown to improve outcomes when compared with placebo in patients with previously-treated CCA (*Abou-Alfa et al., 2019*). It is likely that, in the future, **molecular profiling** of **biliary tract cancer** will be essential to ensure that treatment is tailored for each patient.

Molecular profiling can identify differences between types of biliary tract cancer and may help to develop new treatments

Additional interventions

Patients may find that supplementary care helps them to cope with their diagnosis, treatment and the long-term effects of treatment for biliary tract cancer

During the course of your disease, anti-cancer treatments should be supplemented with interventions that aim to prevent the complications of disease and treatment, and to maximise your quality of life. These interventions may include supportive, **palliative**, survivorship and end-of-life care, which should all be coordinated by a **multidisciplinary team** (Jordan et al., 2018). Ask your doctor or nurse about which additional interventions are available; you and your family may receive support from several sources, such as a **dietician**, social worker, priest or other spiritual advisor, physiotherapist or occupational therapist.

Supportive care

Supportive care involves the management of cancer symptoms and the side effects of therapy.

Many patients with **biliary tract cancer** lose their appetite and lose weight. You may require nutritional supplements to increase your calorie intake, and if you have **jaundice**, you might be advised to avoid fatty foods until the **jaundice** is treated. Surgery to remove **biliary tract cancer** may also result in nutritional problems. Depending on the extent of surgery, or the location of your cancer, you may need to take supplements to replace the natural **digestive enzymes** that allow you to absorb nutrients. Following surgery to remove **biliary tract cancer**, some patients can suffer from **bile acid malabsorption**, which results in increased **bile** in the large intestine and chronic diarrhoea. The effects of **bile acid malabsorption** can be reduced by a low fat diet and the use of medications that bind **bile** acid to prevent irritation of the large intestine.

Stenting

If a **tumour** is blocking a **bile duct**, it can lead to **jaundice**, nausea, loss of appetite and serious problems such as infection and liver failure. Blockages are commonly relieved by inserting a small metal or plastic tube (**stent**) to hold the **bile duct** open and allow **bile** to flow freely again. **Stents** are inserted into the blocked **bile duct** during **ERCP**, or through the skin by a procedure called **percutaneous transhepatic cholangiography**, in which a long thin needle is passed through the skin and liver into the **bile duct**. **Ultrasound** or **x-ray** is used to help guide the needle to the blockage, then a wire is passed down the needle into the **bile duct** to guide the **stent** into place.

Stents can themselves get blocked, usually due to a build-up of **bile** in the **stent**. If this happens, another **stent** can be inserted. There is also a risk of infection with **stents**, which is usually caused by the **stent** getting blocked. This can lead to biliary sepsis, which is a potentially life-threatening condition, so infection must be treated quickly. It is important that you report any signs of infection (e.g. abdominal pain, aching muscles, high temperature or shivering) to your doctor or nurse immediately. The infection can be treated with antibiotics and the **stent** can be replaced.

Palliative care

Palliative care is a term used to describe care interventions in advanced disease, including the management of symptoms as well as support for coping with **prognosis**, making difficult decisions and preparation for end-of-life care. **Palliative** care in patients with **biliary tract cancer** may include treatment for pain, poor appetite, feeling or being sick, nutritional problems and prevention or management of bedsores.

Survivorship care

Support for patients surviving cancer includes social support, education about the disease and rehabilitation. For example, psychological support can help you to cope with any worries or fears.

Psychosocial problems impacting on your quality of life may include concerns about body image, nutritional problems and the long-term effects of your treatment. Patients often find that social support is essential for coping with the cancer diagnosis, treatment and the emotional consequences. A survivorship care plan can help you to recover wellbeing in your personal, professional and social life. For further information and advice on survivorship, see ESMO's patient guide on survivorship (<http://www.esmo.org/Patients/Patient-Guides/Patient-Guide-on-Survivorship>).



End-of-life care

End-of-life care for patients with incurable cancer primarily focusses on making the patient comfortable and providing adequate relief of physical and psychological symptoms, for example **palliative** sedation to induce unconsciousness can relieve severe pain, breathlessness (**dyspnoea**), or delirium (*Cherny, 2014*). Discussions about end-of-life care can be upsetting, but support should always be available to you and your family at this time. Your doctor or nurse will help to guide you through the options available.

What are the possible side effects of treatment?

As with any medical treatment, you may experience side effects from your anti-cancer treatment. The most common side effects for each type of treatment are highlighted below, along with some information on how they can be managed. You may experience side effects other than those discussed here. It is important to talk to your doctor about any potential side effects that are worrying you.

Doctors classify side effects from any cancer therapy by assigning each event a 'grade', on a scale of 1–4, by increasing severity. In general, grade 1 side effects are considered to be mild, grade 2 moderate, grade 3 severe and grade 4 very severe. However, the precise criteria used to assign a grade to a specific side effect varies depending on which side effect is being considered. The aim is always to identify and address any side effect before it becomes severe, so you should always report any worrying symptoms to your doctor as soon as possible.



It is important to talk to your doctor about any treatment-related side effects that are worrying you

Fatigue is very common in patients undergoing cancer treatment and can result from either the cancer itself or the treatments. Your doctor can provide you with strategies to limit the impact of **fatigue**, including getting enough sleep, eating healthily and staying active (*Cancer.Net, 2018*). Loss of appetite and weight loss can also arise due to the cancer itself or the treatments. Significant weight loss, involving loss of both fat and muscle tissue, can lead to weakness, reduced mobility and loss of independence, as well as anxiety and depression (*Escamilla and Jarrett, 2016*). Your doctor may refer you to a **dietician** who can look at your nutritional needs and advise you on your diet and any supplements that you might need.

Surgery

Surgery for **biliary tract cancer** is a major operation and it will take some time to recover – you may have to stay in hospital for a couple of weeks. It is normal to experience pain for the first week or so and your doctor or nurse will be able to give you painkillers to help keep you feeling comfortable. Following surgery for **biliary tract cancer**, your bowel may stop working for a while. Your doctor or nurse will help you to start drinking and eating as soon as your bowel can cope – this usually begins with sips of water and increases gradually until you can eat a light diet.

You will be encouraged to move around as soon as possible after your operation to speed up your recovery; however, it is normal to feel tired for several weeks after surgery.

Depending on the extent of surgery, you may have trouble absorbing nutrients from food after your operation. Nutritional supplements and **digestive enzyme** replacement can help to ensure you get the nutrition you need. Some patients may suffer from **bile acid malabsorption** after surgery, which results in chronic diarrhoea (see section 'Supportive care' for more information).

Surgery for biliary tract cancer is a major operation and may have long-term health implications

Chemotherapy

Side effects from **chemotherapy** vary depending upon the drugs and the doses used – you may get some of those listed below but you are very unlikely to get all of them. You may also experience some side effects that are not listed below. The main areas of the body affected by **chemotherapy** are those where new cells are being quickly made and replaced (**bone marrow**, the **gastrointestinal system**, the lining of your mouth). Some patients find that their sense of taste is affected – changes in **enzymes** in your mouth can lead to a metallic taste and blisters. Reductions in your levels of **neutrophils** (a type of white blood cell) can lead to **neutropenia**, which can make you more susceptible to infections. Most side effects of **chemotherapy** are temporary and can be controlled with drugs or lifestyle changes – your doctor or nurse will help you to manage them (*Macmillan, 2018*).

Chemotherapy drugs used in the treatment of **biliary tract cancer** commonly affect the **gastrointestinal system**, leading to nausea, vomiting, diarrhoea, loss of appetite and weight loss. These side effects can also result in feelings of weakness (**asthenia**) and **fatigue**. You should try to eat a healthy, balanced diet and drink plenty of fluids. Your doctor may also give you some medications to help prevent or manage these side effects.

The table below lists the most important specific side effects of **chemotherapy** drugs used in the treatment of **biliary tract cancer**.

CHEMOTHERAPY DRUG	POSSIBLE SIDE EFFECT	HOW THE SIDE EFFECTS MAY BE MANAGED
5-fluorouracil (5-FU) <i>(Fluorouracil SPC, 2017)</i>	<ul style="list-style-type: none"> • Agranulocytosis • Anaemia • Bronchospasm • Cardiac effects • Decreased fertility in men • Diarrhoea • Hand-foot syndrome • Immunosuppression • Leukopenia • Mucositis • Neutropenia • Nose bleeds • Pancytopenia • Thrombocytopenia 	<ul style="list-style-type: none"> • Your blood cell counts will be monitored by frequent blood tests throughout your treatment in order to detect any neutropenia, anaemia, leukopenia, thrombocytopenia or pancytopenia – your doctor may adjust your treatment according to test results and will advise you on how to prevent infections • Diarrhoea may be a temporary, mild side effect, but if it is severe then your doctor may be able to prescribe anti-diarrhoea medicine • To prevent and treat hand-foot syndrome, you can try keeping hands and feet cool by exposing them to cool water (soaks, baths or swimming), avoiding excessive heat/hot water and keeping them unrestricted (no socks, gloves or shoes that are tight fitting). Your treatment schedule may need to be adjusted if you experience severe hand-foot syndrome but in most cases, symptoms will be mild and treatable with creams and ointments and will subside once you have finished treatment • If there are any concerns about your heart function, it will be monitored to minimise the risk of cardiac impairment • Treatment can cause reduced/abnormal sperm production, which can result in irreversible infertility in some patients, although this is uncommon. Advice on sperm banking should be provided by your doctor prior to starting treatment • Let your doctor know if you experience nose bleeds or breathlessness, so that they can decide how to manage these

CHEMOTHERAPY DRUG	POSSIBLE SIDE EFFECT	HOW THE SIDE EFFECTS MAY BE MANAGED
<p>Capecitabine (<i>Xeloda SPC, 2018</i>)</p>	<ul style="list-style-type: none"> Abdominal pain Anaemia Diarrhoea Hand-foot syndrome Neutropenia Stomatitis 	<ul style="list-style-type: none"> Your blood cell counts will be monitored by frequent blood tests throughout your treatment in order to detect any neutropenia or anaemia – your doctor may adjust your treatment according to test results and will advise you on how to prevent infections Diarrhoea may be a temporary, mild side effect, but if it is severe then your doctor may be able to prescribe anti-diarrhoea medicine. To prevent and treat stomatitis, you can maintain good oral hygiene using a steroid mouthwash and mild toothpaste. Steroid dental paste can be used to treat developing ulcerations. For more severe (grade 2 and above) stomatitis, your doctor may suggest lowering the dose of treatment, or delaying therapy until the stomatitis resolves, but in most cases, symptoms will be mild and will subside once you have finished treatment To prevent and treat hand-foot syndrome, you can try keeping hands and feet cool by exposing them to cool water (soaks, baths or swimming), avoiding excessive heat/hot water and keeping them unrestricted (no socks, gloves or shoes that are tight fitting). Your treatment schedule may need to be adjusted if you experience severe hand-foot syndrome but in most cases, symptoms will be mild and treatable with creams and ointments and will subside once you have finished treatment
<p>Cisplatin (<i>Cisplatin SPC, 2015</i>)</p>	<ul style="list-style-type: none"> Anaemia Decreased fertility in men Hyponatraemia Kidney disorders: kidney failure, nephrotoxicity Leukopenia Peripheral neuropathy Thrombocytopenia Tinnitus / changes in hearing 	<ul style="list-style-type: none"> Your blood cell counts will be monitored by frequent blood tests throughout your treatment in order to detect any leukopenia, anaemia or thrombocytopenia – your doctor may adjust your treatment according to test results, and will advise you on how to prevent infections Report any signs of peripheral neuropathy (tingling or numbness in your hands or feet) to your doctor, who will help you to manage this side effect You will have tests before and during treatment to check how well your kidneys are functioning. You will be asked to drink plenty of fluids to prevent your kidneys from becoming damaged Tell your doctor if you notice any changes in your hearing or experience ringing in your ears (tinnitus). Changes in hearing are usually temporary but can occasionally be permanent Treatment can cause reduced/abnormal sperm production, which can result in irreversible infertility in some patients, although this is uncommon. Advice on sperm banking should be provided by your doctor prior to starting treatment Hyponatraemia may occur as a result of changes in kidney function or diarrhoea. It is important to drink plenty of fluids and tell your doctor if you experience any lethargy or confusion (symptoms of hyponatraemia)

continued overleaf

CHEMOTHERAPY DRUG	POSSIBLE SIDE EFFECT	HOW THE SIDE EFFECTS MAY BE MANAGED
Gemcitabine <i>(Gemcitabine SPC, 2017)</i>	<ul style="list-style-type: none"> • Anaemia • Blood in urine • Decreased fertility in men • Dyspnoea • Flu-like symptoms • Increased liver enzymes • Leukopenia • Oedema • Protein in urine • Rash • Thrombocytopenia 	<ul style="list-style-type: none"> • Your blood cell counts will be monitored by frequent blood tests throughout your treatment in order to detect any anaemia, leukopenia or thrombocytopenia – your doctor may adjust your treatment according to test results and will advise you on how to prevent infections • Dyspnoea is usually mild and passes rapidly without treatment • Treatment can cause reduced/abnormal sperm production, which can result in irreversible infertility in some patients, although this is uncommon. Advice on sperm banking should be provided by your doctor prior to starting treatment • Your liver and kidney function will be monitored during treatment • Let your doctor know if you experience swelling, rash or flu-like symptoms, so that they can decide how to manage these
Oxaliplatin <i>(Oxaliplatin SPC, 2017)</i>	<ul style="list-style-type: none"> • Abdominal pain • Allergic reaction • Anaemia • Back pain • Cough • Decreased fertility in men • Dysaesthesia • Dyspnoea • Fever • Headache • High blood glucose and sodium • Increased infections • Increased liver enzymes • Injection site reactions • Leukopenia • Low blood potassium levels • Lymphopenia • Neutropenia • Nose bleeds • Skin disorders • Stomatitis • Taste changes • Thrombocytopenia 	<ul style="list-style-type: none"> • Your blood cell counts will be monitored by frequent blood tests throughout your treatment in order to detect any anaemia, neutropenia, leukopenia, lymphopenia or thrombocytopenia – your doctor may adjust your treatment according to test results and will advise you on how to prevent infections • Let your doctor or nurse know if you experience a persistent cough. Troublesome dyspnoea can be treated with drugs called opioids or benzodiazepines, and in some cases, steroids are used (<i>Kloke and Cherny, 2015</i>) • Report any signs of dysaesthesia (distortion to the sense of touch, particularly in cold conditions) to your doctor or nurse, who will help you to manage this side effect • To prevent and treat stomatitis, you can maintain good oral hygiene using a steroid mouthwash and mild toothpaste. Steroid dental paste can be used to treat developing ulcerations. For more severe (grade 2 and above) stomatitis, your doctor may suggest lowering the dose of treatment, or delaying therapy until the stomatitis resolves, but in most cases, symptoms will be mild and will subside once you have finished treatment • Treatment can cause reduced/abnormal sperm production, which can result in irreversible infertility in some patients, although this is uncommon. Advice on sperm banking should be provided by your doctor prior to starting treatment • Let your doctor or nurse know if you experience any burning or skin changes at the injection site, nose bleeds, pain or headaches so that they can decide how to manage these • Your liver function will be monitored during treatment

Important side effects associated with individual chemotherapy drugs used in the treatment of biliary tract cancer.

The most recent Summary of Product Characteristics (SPC) for any individual drug can be located at: <http://www.ema.europa.eu/ema/>.

Radiotherapy

Common side effects of **radiotherapy** include **fatigue**, redness of the skin (like mild sunburn) in the treatment area, nausea/vomiting and diarrhoea.

Fatigue from **radiotherapy** usually starts during treatment and lasts for about a week after you have finished treatment. Nausea/vomiting is usually mild, but you can ask your doctor or nurse for anti-sickness tablets to help with this. If the nausea affects your appetite, your doctor or nurse might suggest a high-calorie supplement to ensure you are getting enough nutrition. Diarrhoea as a side effect of **radiotherapy** is usually mild and you may not experience it at all. If you do have diarrhoea, you should drink plenty of fluids to avoid becoming dehydrated. A low-fibre diet can help, and if necessary, your doctor or nurse might give you medications to help slow down your bowel.

Radioembolisation

Fatigue, nausea, abdominal pain, fever and loss of appetite are common after **radioembolisation**, but these effects are usually mild. Serious side effects from **radioembolisation** are uncommon, but a small number of people may experience complications such as ulcers in the stomach or small intestine, liver failure, **gallbladder** failure or a low white blood cell count (**leukopenia**). It is important to understand that these side effects are very rare, and you will be monitored for any signs of complications before leaving hospital.

Long-term side effects

After completing treatment for **biliary tract cancer**, you may experience some long-term side effects, depending on the treatment you have received.

After surgery to the biliary tract, non-cancerous scars called **strictures** can form. **Strictures** may narrow the **bile ducts**, causing symptoms similar to those of the original cancer. This can usually be relieved by inserting a **stent** to open up the **bile duct**.

Bile acid malabsorption can be a long-term side effect following surgery to remove **bile tract cancer**.

This results in increased **bile** in the large intestine causing chronic diarrhoea. Diarrhoea is also a common problem after **gallbladder** removal and can last for many years. This can make everyday life more difficult but your doctor or nurse may be able to recommend some things to try, such as avoiding certain foods (e.g. foods that are spicy, fatty or contain caffeine), using anti-diarrhoea medicines or incontinence pads.

Radiotherapy can have side effects that gradually appear over a long time, including bowel changes and diarrhoea, abdominal pain and permanent skin changes in the treatment area. It is important that you let your doctor or nurse know about any new side effects that you are experiencing, even if they occur months or years after the **radiotherapy** treatment.

The long-term effects of **biliary tract cancer** and its treatment can have a negative effect on both physical and mental quality of life, so it is important that you tell your doctor or nurse about any persistent or new symptoms. Your doctor or nurse will also work with you to develop a personalised survivorship care plan.

For further information and advice regarding how to regain your life as far as possible after treatment for cancer, see ESMO's patient guide on survivorship (<http://www.esmo.org/Patients/Patient-Guides/Patient-Guide-on-Survivorship>).



What happens next?

Follow-up appointments

You will be able to discuss any concerns you have at your follow-up appointments

After treatment for **biliary tract cancer**, your doctor will arrange follow-up appointments to ensure that any **recurrences** or late side effects are diagnosed and treated quickly.

Your doctor will let you know how often you need to return for further follow-up appointments, but a typical follow-up schedule after **curative** surgery would involve check-ups every 3 months in the first 2 years after treatment, every 6 months after 2 years, and every 12 months after 5 years (Valle *et al.*, 2016). During these appointments, you may have a clinical examination, blood tests and a CT scan of the chest, abdomen and pelvis.



What if I need more treatment?

Despite the best possible treatment at diagnosis, there is a possibility that your cancer may return. Cancer that comes back is called a **recurrence**. The treatment that you will be offered depends on the extent of the **recurrence** and your previous treatment. Your doctor will discuss all of the treatment options with you.

Looking after your health

After you have had treatment for **biliary tract cancer**, you may feel very tired and emotional. Give your body time to recover and make sure you get enough rest, but there is no reason to limit activities if you are feeling well. It is important to take good care of yourself and get the support that you need.

- **Take plenty of rest when you need it:** Give your body time to recover. Complementary therapies, such as aromatherapy, may help you relax and cope better with side effects. Your hospital may offer complementary therapy; ask your doctor for details.
- **Eat well and keep active:** Eating a healthy diet and keeping active can help improve your fitness. It is important to start slowly and build up as you start to feel better.

The following eight recommendations form a good foundation for a healthy lifestyle after cancer

(Wolin *et al.*, 2013):

- Don't smoke.
- Avoid second-hand smoke.
- Exercise regularly.
- Avoid weight gain.
- Eat a healthy diet.
- Drink alcohol in moderation (if at all).
- Stay connected with friends, family and other cancer survivors.
- Attend regular check-ups and screening tests.



A healthy, active lifestyle will help you to recover physically and mentally

Regular exercise is an important part of a healthy lifestyle, helping you to keep physically fit and avoid weight gain. It is very important that you listen carefully to the recommendations of your doctor or nurse, and talk to them about any difficulties you have with exercise.

Emotional support

It is common to be overwhelmed by your feelings when you have been diagnosed with cancer and when you have been through treatment. If you feel anxious or depressed, talk to your doctor or nurse – they can refer you to a specialist counsellor or psychologist who has experience of dealing with emotional problems of people dealing with cancer. It may also help to join a support group so that you can talk to other people who understand exactly what you are going through.



Support groups

In Europe, there are patient advocacy groups, which help patients and their families to navigate the **biliary tract cancer** landscape. They can be local, national or international, and they work to ensure patients receive appropriate and timely care and education. These groups can provide you with the tools you may need to help you better understand your disease, and to learn how to cope with it, living the best quality of life that you can.

AMMF – The Cholangiocarcinoma Charity is a UK-based organisation dedicated solely to **cholangiocarcinoma (bile duct cancer)**. It was established in 2002 and works to increase awareness, provide information and guidance to patients, and encourages and supports specialised research towards better diagnostic techniques and treatments and, ultimately, a cure. For further information about AMMF – The Cholangiocarcinoma Charity visit: <https://ammf.org.uk>



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GLOSSARY

ADENOCARCINOMA

Cancer that begins in glandular (secretory) cells

ADJUVANT (TREATMENT)

Additional treatment given after the primary treatment to reduce the chance of the cancer coming back; usually refers to **chemotherapy** and/or **radiotherapy** after surgery

AGRANULOCYTOSIS

Severe deficiency of white blood cells, usually **neutrophils**

AMPULLA OF VATER

The point at which **bile ducts** from the liver and **pancreas** join and enter the small intestine

AMPULLARY (CANCER)

Cancer that develops in the **ampulla of Vater**

ANAEMIA

A condition in which there is a shortage of haemoglobin (a protein in red blood cells that carries oxygen throughout the body)

ASTHENIA

Abnormal feeling of weakness or lack of energy

AUTOIMMUNE DISEASE

A condition in which the body's immune system mistakes its own healthy tissues as foreign and attacks them

BILE

A fluid made by the liver and stored in the **gallbladder**. **Bile** helps to digest fat when released into the small intestine

BILE ACID MALABSORPTION

A condition in which **bile** is not reabsorbed from the small intestine, resulting in excess **bile acid** in the large intestine

BILE DUCT

Tube through which **bile** passes from the liver and **gallbladder** to the small intestine

BILIARY TRACT CANCER

Cancer that forms in the cells of the **bile ducts**, **gallbladder** or **ampulla of Vater**

BIOMARKER

Biological molecule found in tissue, blood or other body fluids that is a sign of a condition or disease, or describes the behaviour of the disease

BIOPSY

A medical procedure in which a small sample of cells or tissue is taken for examination under a microscope

BONE MARROW

A spongy tissue found inside some bones (e.g. hip and thigh bones). It contains stem cells which are cells that can develop into red blood cells, white blood cells or platelets

BRONCHOSPASM

Tightening of the muscles that line the airways in the lungs

CANCER ANTIGEN 19-9 (CA 19-9)

A protein released into the bloodstream by both cancer cells and normal cells. High levels of **CA 19-9** can be a sign of **biliary tract cancer**. **CA 19-9** levels can be used to help keep track of how well cancer treatments are working or if the cancer has come back

CAPECITABINE

A type of **chemotherapy** that is administered orally

CHEMOTHERAPY

A type of cancer treatment using medicine that kills the cancer cells by damaging them, so that they cannot reproduce and spread

CHOLANGIOCARCINOMA (CCA)

Cancer that develops in the **bile ducts** (also known as **bile duct cancer**)

CHOLECYSTECTOMY

Surgery to remove the **gallbladder**

CHOLEDOCHAL CYSTS

Cysts or enlargements in **bile ducts**

CISPLATIN

A type of **chemotherapy** that is administered through a drip into a vein in your arm or chest

CLINICAL TRIAL

A study that compares the effects of one treatment with another

COMPUTED TOMOGRAPHY (CT)

A scan using **x-rays** and a computer to create detailed images of the inside of your body

CURATIVE (TREATMENT)

A treatment that is intended to cure the cancer

DEOXYRIBOSE NUCLEIC ACID (DNA)

The chemical that carries genetic information in the cells of your body

DIABETES

A condition in which the kidneys make a large amount of urine. Usually refers to **diabetes mellitus** in which there is a high level of sugar in the blood

GLOSSARY

DIETICIAN

A qualified health professional who is an expert on diet and nutrition

DIGESTIVE ENZYMES

A group of **enzymes** that break food down into smaller components for the body to absorb the nutrients

DUODENUM

The first part of the small intestine

DYSAESTHESIA

A condition in which a sense, especially touch, is distorted

DYSPNOEA

Shortness of breath

ENDOSCOPE

A thin, tube-like instrument used to look at tissues inside the body

ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY (ERCP)

A procedure that uses an **endoscope** to examine and **x-ray** the pancreatic duct, hepatic duct, common **bile duct**, duodenal papilla, and **gallbladder**

ENDOSCOPIC ULTRASOUND SCAN (EUS)

A procedure in which an **endoscope** with an **ultrasound** probe and **biopsy** needle is inserted into the body to create an image by **ultrasound** and take a **biopsy**

ENZYME

A protein that speeds up chemical reactions in the body

EXTRAHEPATIC CCA

Cancer that develops in the **bile ducts** outside the liver

FAMILIAL ADENOMATOUS POLYPOSIS

An inherited condition in which growths form on the inside walls of the colon and rectum

FATIGUE

Overwhelming tiredness

FIRST-LINE (TREATMENT)

The initial treatment(s) given to a patient

FLUOROURACIL (5-FU)

A type of **chemotherapy** that is administered through a drip into a vein in your arm or chest

FOLINIC ACID

A form of folic acid used to lessen the toxic effects of some anti-cancer drugs

GALLBLADDER

An organ located below the liver, which stores **bile**

GALLBLADDER POLYPS

Growths on the lining of the **gallbladder**

GASTROINTESTINAL SYSTEM

The system of organs responsible for getting food into and out of the body and for making use of food to keep the body healthy – includes the oesophagus, stomach and intestines

GEMCITABINE

A type of **chemotherapy** that is administered through a drip into a vein in your arm or chest

GENES

Pieces of **DNA** responsible for making substances that the body needs to function

HAND-FOOT SYNDROME

A condition marked by pain, swelling, numbness, tingling or redness of the hands or feet. It sometimes occurs as a side effect of certain anti-cancer drugs

HEPATITIS (VIRUS)

A virus that causes inflammation of the liver

HILAR CCA

Cancer that develops in the **bile ducts** immediately outside the liver

HYPONATRAEMIA

An abnormally low level of sodium in the blood

IMMUNOSUPPRESSION

Suppression of the body's immune system and its ability to fight infections and other diseases

INTRAHEPATIC CCA

Cancer that develops in the **bile ducts** inside the liver

IONISING RADIATION

Any type of particle or electromagnetic wave that carries enough energy to ionise or remove electrons from an atom (e.g. **x-rays**)

JAUNDICE

A condition in which the skin and the whites of the eyes become yellow, urine darkens and stools becomes lighter than normal. Occurs when the liver is not working properly or a **bile duct** is blocked

LEUKOPENIA

A decrease in the number of leukocytes (a type of white blood cell) in the blood, which places individuals at increased risk of infection

GLOSSARY

LIVER CIRRHOSIS

A chronic, progressive disease in which liver cells are replaced by scar tissue

LIVER FLUKE

A parasitic worm that lives in the **bile ducts** and liver of infected individuals

LOCALISED (CANCER)

Cancer that has not spread anywhere else in the body

LYMPH NODES

Small structures throughout the **lymphatic system** that work as filters for harmful substances, such as cancer cells or bacteria

LYMPHATIC SYSTEM

A network of tissues and organs that help rid the body of toxins, waste and other unwanted materials. The primary function of the **lymphatic system** is to transport lymph, a fluid containing infection-fighting white blood cells, throughout the body

LYMPHOPENIA

An abnormally low level of lymphocytes (a type of white blood cell) in the blood, which places individuals at increased risk of infection

MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY (MRCP)

A specialised type of **MRI** scan that takes detailed pictures of the abdomen, **gallbladder**, **bile ducts** and pancreatic duct

MAGNETIC RESONANCE IMAGING (MRI)

A type of scan that uses strong magnetic fields and radio waves to produce detailed images of the inside of the body

MARGIN

The edge or border of the tissue removed in cancer surgery. The **margin** is described as negative or clean when no cancer cells are found at the edge of the tissue, suggesting that all of the cancer has been removed. The **margin** is described as positive or involved when cancer cells are found at the edge of the tissue, suggesting that all of the cancer has not been removed

METASTASES

Cancerous **tumours** that have originated from a primary **tumour**/growth in another part of the body

METASTATIC

A cancer that has spread from its (primary) site of origin to different parts of the body

mFOLFOX

A **chemotherapy** combination consisting of **5-FU** + **folinic acid** + **oxaliplatin**

MOLECULAR PROFILING

The classification of tissue or other specimens based on multiple **gene** expression

MUCOSITIS

Inflammation and ulceration of the membranes lining the **gastrointestinal system**

MULTIDISCIPLINARY TEAM

A group of healthcare workers who are members of different disciplines (e.g. oncologist, nurse specialist, physiotherapist, radiologist) and provide specific services to the patient. The activities of the team are brought together using a care plan

MUTATIONS

Permanent alterations in the **DNA** sequence that makes up a **gene**, such that the sequence differs from what is found in most people and alters the function of the related protein

NEPHROTOXICITY

Toxicity in the kidneys

NEUTROPENIA

An abnormally low level of **neutrophils** in the blood which increases the risk of infection

NEUTROPHILS

A type of white blood cell that play an important role in fighting off infection

OEDEMA

A build-up of fluid in the body which causes the affected tissue to become swollen

OXALIPLATIN

A type of **chemotherapy** that is administered through a drip into a vein in your arm or chest

PALLIATIVE (CARE)

The care of patients with advanced, progressive illness. It focuses on providing relief from pain, symptoms and physical and emotional stress, without dealing with the cause of the condition

PANCREAS

An organ in the abdomen that produces **digestive enzymes** and hormones

GLOSSARY

PANCREATODUODENECTOMY (WHIPPLE'S PROCEDURE)

Surgery to remove the head of the **pancreas** along with the **duodenum** and part of the stomach

PANCYTOPENIA

Low levels of red cells, white cells and platelets in the blood

PATHOLOGY

The diagnosis of disease by examining cell and tissue samples

PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY

A procedure to **x-ray** the hepatic and common **bile ducts**. A contrasting agent is injected through the skin into the liver or **bile duct**, and the ducts are then **x-rayed** to find the point of obstruction

PERIPHERAL NEUROPATHY

Damage to the nerves in the extremities of the body. Symptoms may include pain, sensitivity, numbness or weakness in the hands, feet or lower legs

PORCELAIN GALLBLADDER

Calcification of the **gallbladder**

PORTAL VEIN EMBOLISATION (PVE)

A procedure that encourages growth on one side of the liver in advance of a planned **resection** on the other side. Microspheres are infused into the portal vein to cut off its blood supply. This blockade of the portal vein induces the other side of the liver to grow

POSITRON EMISSION TOMOGRAPHY (PET)

An imaging test that uses a dye with radioactive tracers, which is injected into a vein in your arm

PRIMARY SCLEROSING CHOLANGITIS

A chronic liver disease in which the **bile ducts** inside and outside the liver progressively decrease in size due to inflammation and scarring

PROGNOSIS

The likely outcome of a medical condition

RADIOEMBOLISATION

A type of internal **radiotherapy** used to treat liver cancer or cancer that has spread to the liver. Tiny beads containing a radioactive substance are injected into the main blood vessel that carries blood to the liver. The beads collect in the **tumour** and in blood vessels near the **tumour**, destroying the blood vessels that the **tumour** needs to grow and killing the cancer cells

RADIOTHERAPY

Treatment involving the use of high-energy radiation, which is commonly used to treat cancer

RECURRENCE/RECURRING

Return of a cancer

RESECTABLE

Able to be removed (resected) by surgery

RESECTION

Surgery to remove tissue

RISK FACTOR

Something that increases the chance of developing a disease

SECOND-LINE (TREATMENT)

Subsequent treatments given to a patient once the previous therapy has not worked or has been stopped because of the occurrence of side effects or other concerns

SIMPLE CHOLECYSTECTOMY

Gallbladder resection when only the **gallbladder** is removed

SPERM BANKING

Freezing sperm and storing it for future use

STENT

A small tube that is used to keep a duct, airway or artery open

STERIOD

A type of drug used to relieve swelling and inflammation. Some **steroid** drugs also have anti-**tumour** effects

STOMATITIS

Inflammation of the inside of the mouth

STRICTURE

Narrowing of a tubular structure, such as a duct

THROMBOCYTOPENIA

A decrease in platelets in the blood. This causes bleeding into the tissues, bruising, and slow blood clotting after injury

TINNITUS

The hearing of a sound (such as ringing, whining or buzzing) when no external sound is present

GLOSSARY

TUMOUR

A lump or growth of abnormal cells. **Tumours** may be benign (not cancerous) or malignant (cancerous). In this guide, the term '**tumour**' refers to a cancerous growth, unless otherwise stated

ULCERATIVE COLITIS

Chronic inflammation of the colon that results in ulcers in its lining

ULTRASOUND

A type of medical scan where sound waves are converted into images by a computer

UNRESECTABLE

Unable to be removed (resected) by surgery

WHIPPLE'S PROCEDURE (PANCREATODUODENECTOMY)

Surgery to remove the head of the **pancreas** along with the **duodenum** and part of the stomach

X-RAY

An imaging test, using a type of radiation that can pass through the body, which allows your doctor to see images of inside your body

YTTRIUM-90

A radioactive form of the metal yttrium that is used in **radiotherapy** to treat some types of **tumours**

Biliary tract cancer

This guide has been prepared to help you, your friends and your family better understand the nature of biliary tract cancer and the treatments that are available. The medical information described in this document is based on the clinical practice guidelines of the European Society for Medical Oncology (ESMO) for the management of biliary tract cancer. We recommend that you ask your doctor about the tests and types of treatments available in your country for your type and stage of biliary tract cancer.

This guide has been written by Kstorfin Medical Communications Ltd on behalf of ESMO.

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We can help you understand biliary tract cancer and the available treatment options.

The ESMO Guides for Patients are designed to assist patients, their relatives and caregivers to understand the nature of different types of cancer and evaluate the best available treatment choices. The medical information described in the Guides for Patients is based on the ESMO Clinical Practice Guidelines, which are designed to guide medical oncologists in the diagnosis, follow-up and treatment in different cancer types.

For more information, please visit www.esmo.org

