

Life Threatening Illnesses

Basic Information Guide

This section is intended to be of use to health professionals.

CANCER STAGING

Stage 1

This is defined as a tumour confined to the site of origin known as the primary site. Tumours at this stage tend to be operable and completely removable surgically.

Stage 2

In this situation there is evidence of local-spread into the surrounding tissue, and also into the surrounding lymph nodes. At this stage cancers are also operable, but there is a high risk of further spread of the disease.

Stage 3

In this situation the primary tumour is fixed to deep structures and there is invasion locally. Cancers at this stage are generally not operable and usually require a number of treatment modalities.

Stage 4

At this stage there is evidence of 'distant-spread' known as metastases. The primary site is probably surgically inoperable.

Tumours are often described in relationship to the differentiation of their cells:

1. Well differentiated.
2. Moderately differentiated.
3. Poorly differentiated

Tumour grade is often classified as:

1. Low Grade
2. High Grade

High Grade, poorly differentiated tumours have the worst outlook.

Tumour Markers

Tumour markers are substances present in the bloodstream which can be measured and gives an indication as to the staging of the tumour and as to its extent. The best known is CA125 for carcinoma of the ovary. There are a range of other well accepted tumour markers such as prostate specific antigen (PSA). For other tumours we have found Pyruvate Kinase a reliable tumour marker, even in some cases for sarcomas.

CLINICAL TRIALS

Clinical trials in cancer take place in four phases, each designed to answer different research questions.

Phase 1 Trials

These trials usually involve 15-30 participants and are designed to find the safe dosage, to decide how agents should be given and to observe how the agent affects the human body.

Phase 2 Trials

These trials involve less than 100 participants and are to determine if the agent or intervention has an effect on the particular cancer. They are also designed to see how the agent or intervention affects the human body.

Phase 3 Trials

These generally involve 100 to 1,000's of participants.

Phase 3 studies compare the new agent or intervention (or new use of already existing treatment) with the current standard.

Phase 4 Trials

Phase 4 Trials involve several hundred to several thousand participants.

Phase 4 Trials further evaluate the longterm safety and effectiveness of a new treatment.

CAUSES OF CANCER

There follows here a list of 'best guesses' as to causes of common cancers.

Risk Factor	Percentage
Tobacco (smoking)	30%
Adult Diet/Obesity	30%
Sedentary Lifestyle	5%
Occupation Factors	5%
Family History of Cancer	5%
Viruses or other biological agents	5%
Perinatal Factors/Growth	5%
Reproductive Factors	3%
Alcohol	3%
Socio-economic Status	3%
Environmental pollution	2%
Ionising/Ultra Violet Radiation	2%
Prescription Drugs/Medical Procedures	1%
Salt/other food additives/contaminants	1%

SPECIFIC CANCERS

Breast Cancer

Breast cancer is the most common cancer occurring in women, and the second most common cause of death from cancer in women, after lung cancer. Men also develop breast cancer, but this is rare, accounting for less than 1% of all breast cancer cases. If diagnosed at an early stage breast cancer has a high cure rate.

Studies looking at longterm survival from breast cancer (specifically 12 year survival), have looked at the ability of the cell mediated part of the immune system to respond to cancer cells. Those with good cell mediated immunity have double the chance of surviving in comparison to those with poor cell mediated immunity.

The breast is made of fatty tissue and within this is a network of lobes which are made up of many tiny lobules and contain milk glands. Small ducts connect the glands, lobules and lobes and carry the milk from the lobes to the nipple. Blood and lymph vessels run throughout the breast, the blood feeds the cells and the lymph drains the waste away.

90% of breast cancers occur in the ducts or lobes, with almost 75% of all breast cancers beginning in the cell lining of the milk ducts. These cancers are called ductal carcinomas. Cancers at the beginning of the lobes are called lobular carcinomas and are more likely to be found in both breasts.

If the disease has spread away from its original site it is **called invasive or infiltrating ductal, or lobular carcinoma**. Disease that has not spread is called **carcinoma insitu** which means it's still in its original place. Currently Oncologists recommend that ductal carcinoma insitu (DCIS), and this accounts for the majority of insitu breast cancers, should be treated by surgical removal of the breast to prevent progression to invasive disease. This approach is controversial, and there is some oncological opinion that considers that a more conservative approach should be considered.

Breast cancers grow at different rates, and the average tumour doubles in size every 100 days. As these cancers start with one cell, even with this doubling time they may not be able to be felt clinically for some years. Mammography can find tumours that are too small to be felt, but even so, these tumours may also have been growing for some years before they are large enough to be visible on a mammogram.

Breast cancer cells migrate to lymph nodes under the arm (axilla), to the neck (cervical nodes) or to just below the collarbone (supraclavicular glands). The most common sites of metastases in breast cancer, are the skin, distant lymph nodes, bone, lung and liver.

TREATMENT OPTIONS

Surgery as a lumpectomy or mastectomy, with or without radiation is the first approach.

To reduce the risk of disease re-occurring and to kill off any cancer cells that may remain, radiation, chemotherapy and hormonal therapy, if it is hormone receptor positive, will be considered.

A lumpectomy removes the tumour and a small area of disease free tissue around. Follow-up radiation therapy is given to the diseased site. A combination of lumpectomy and radiation has been shown to be as effective as radical mastectomy in treating small tumours.

A partial-mastectomy removes the tumour, an area of normal tissue, and part of the lining of the chest muscle where the tumour was. This also requires follow-up radiation.

Since both lumpectomies and partial-mastectomies leave a good proportion of the breast in tact, it is important that the surgeon makes sure the cancer, no matter how small, hasn't spread. Therefore he will evaluate the lymph nodes under the arm to make sure there is no sign of cancer cells in them. This can either be axillary lymph node desection in which the surgeon will remove a number of lymph nodes from under the arm and these will then be examined by the Pathologist for the presence of cancer. Or sentinel lymph node sampling can be done. The surgeon finds this by injecting a dye or radioactive tracer into the breast area and this will travel to the lymph nodes

arriving at the sentinel node first. This node can be removed and examined for cancer. If it's cancer-free, then research has shown that the nodes after the sentinel node will also be cancer-free.

Sometimes total mastectomy is required or a modified radical mastectomy which is a more extensive procedure. The most extensive form of surgery is called radical mastectomy and this involves removing the tissue under the breast as well. This operation was common up until the 1950's, when advances in research and surgical techniques revealed that this was not necessary in the majority of cases.

Cytotoxic therapies are nearly always given intending to kill any breast cancer cells remaining in the body, or to block hormonal receptors of remaining cancer cells or of the remaining normal breast cells to decrease their risk of becoming malignant.

Radiotherapy is given regularly for a number of weeks following a lumpectomy or mastectomy. This high exposure to radiation can cause side effects including fatigue, swelling and skin changes. Radiation may damage the heart and lungs since these organs are located under the breasts, or may rarely result in a second cancer. Sometimes radiation is given before surgery to shrink a large tumour and make it easier to remove. More rarely, radiotherapy may be given like an X-ray or by radioactive 'seeds' implanted in the area.

Chemotherapy may be given orally or intravenously and aims to destroy cancer cells that have migrated from the original site of the tumour. So far as chemotherapy is concerned, combinations of certain chemotherapeutic agents are found to be more effective than using individual agents on their own.

Hormonal therapy is useful to manage tumours that test positive for either oestrogen or progesterone receptors. These tumours use hormones to help them grow. Blocking hormones from attaching to the cells will limit the growth of these tumours, eventually starving them.

The main drugs used are Tamoxifen, or more recently Raloxifene, or Arimidex. Tamoxifen is most commonly used and its side effects include hot flushes, a small increase in uterine cancer and increase in the risk of blood clots.

Ovarian Cancer

Ovaries are part of the reproductive system and there are two located on each side of the uterus. They are almond shaped and about 1½" long. Ovaries make eggs. Every month during ovulation an egg is released from an ovary and travels to the uterus via a tube known as the fallopian tube, and this

happens during a woman's reproductive years. Ovaries are the prime source of female sex hormones, oestrogen and progesterone, which influence the female characteristics including breast growth, body shape and body hair. They also regulate the menstrual cycle and pregnancy.

There are three types of ovarian cancer:

Epithelial Carcinoma

Epithelial tumours make up 85%-90% of ovarian cancers. They begin in cells on the outer surface of the ovary. Because it's difficult to diagnose, as the ovaries are deep in the body, 70% of ovarian cancers are not found until the disease has reached an advanced stage and has moved from the ovaries into another part of the body. Most commonly around the abdomen in 'tiny little seeds'.

Germcell Tumours

This is an uncommon form of ovarian cancer and develops in the egg producing cells of the ovary.

Stromal Tumours

This is a rare form of ovarian cancer and develops in the connective tissue cells that hold the ovaries together, as well as those that produce female hormones.

TREATMENT OPTIONS

Surgery

Surgery is the first line of treatment for ovarian cancer. Usually the ovaries and fallopian tubes are removed as well as the uterus and cervix (hysterectomy). The omentum, the layer of tissue covering the stomach and large intestine may often also be removed.

To determine whether cancer has spread lymph nodes will be removed and tissue samples will be taken and also fluid will be taken from the abdominal cavity for testing.

If a woman is of childbearing age and has an early stage cancer, then in some cases only one ovary and fallopian tube may be removed.

In general the surgeon will take out as much obvious cancer tissue as possible. Tumour de-bulking may reduce the amount of cancer that will require further treatment with chemotherapy or radiation.

Radiotherapy

Radiotherapy is concentrated on a specific area, only affecting the cells at that site. This is done with a machine in which the X-rays are beamed from outside the body.

Occasionally internal radiation is given by having a small amount of radioactive material placed into the tumour, or through intraperitoneal radiotherapy.

Chemotherapy

Chemotherapy is the use of drugs to kill cancer cells. Chemotherapy drugs travel through the blood stream and destroy cancer cells remaining in the body after surgery, slows tumour growth and reduces symptoms.

Most chemotherapy for carcinoma of the ovary is given intravenously. In some cases chemotherapy is given through a catheter placed in the abdomen known as intraperitoneal chemotherapy. This approach delivers the chemotherapy drug directly into the abdomen where most of the tumour remains.

In some cases further surgery may be carried out after chemotherapy.

Vaginal Cancer

Vaginal cancer only counts for 3% of gynaecological cancers. The vagina (birth canal) is the corridor from which menstrual fluid leaves the body and babies are born. It's connected to the cervix (the opening of the uterus or womb) and the vulva (folds of skin around its opening). The vaginal walls have a thin layer of cells called the epithelium, which consists of cells called squamous epithelial cells. The vaginal wall underneath the epithelium consists of connective and involuntary muscle tissue, lymph vessels, blood vessels and nerves.

There are several types of vaginal cancer:

Squamous Carcinoma

Squamous cell cancer starts in the vagina's epithelial lining, most often the area close to the cervix. Squamous epithelial cancers make up 85%-95% of vaginal cancers. It's starts slowly through pre-cancerous changes in the vaginal lining.

Adeno Carcinoma

This cancer may develop in tissues of the vaginal glands, it counts for 5%-10% of vaginal cancers.

Clear Cell Adeno Carcinoma

This cancer occurs in young women whose mothers took the drug Diethylstilbestrol (DES) during pregnancy, and this was relatively common between the late 1940's and the early 1980's. About one woman in a thousand exposed to DES develops vaginal cancer.

Melanoma

Melanomas are the most serious types of skin cancer. They are usually found on skin exposed to the sun, but can begin on the skin of the vagina or other internal organs. Dark coloured tumours appear on the lower outer parts of the vagina.

TREATMENT OPTIONS

Vaginal cancer is treated with one, or a combination of treatments including surgery, radiation and sometimes chemotherapy.

Surgery

Surgery is the primary treatment for vaginal cancer. Surgery may require repair or replacement of the vagina.

Laser Surgery

Laser light is sometimes used to kill very early stage cancer cells. Additional tissue may also be removed to make sure that all cancer has been destroyed.

Wide local excision is usually carried out by the surgeon. In some cases complete removal of the vagina and surrounding lymph nodes in the pelvic area is carried out.

Radical hysterectomy is used when the cancer has spread outside of the vagina. In extreme cases it might also be necessary to remove the lower colon, rectum, and bladder.

Radiotherapy

X-ray beams are focussed from a machine outside the body onto the tumour area. Treatment is usually given 5 days a week for about 6 weeks, usually on an outpatient basis.

In some cases tiny tubes of radioactive material are placed in the vagina for a few days. In other cases needles filled with radioactive material are sometimes placed directly into the cancer.

Chemotherapy

In some cases of vaginal cancer chemotherapy is given generally by an intravenous route, or in some cases oral chemotherapy is used. Generally speaking however, chemotherapy is not affective in the treatment of vaginal cancer so this is a rare treatment modality.

Prostate Cancer

Prostate cancer is an increasingly common malignant tumour that begins in the prostate gland in men. Over 95% of prostate cancers are adenocarcinomas, that means cancers that develop in the glandular tissue of the prostate. Another type of prostate cancer is known as Neuroendocrine or Small Cell Anaplastic Cancer. This type tends to spread earlier, but does not produce prostate specific antigen (PSA).

The prostate is a walnut sized gland located behind the base of the penis, in front of the rectum and below the bladder. It surrounds the urethra which is the channel that carries urine and semen through the penis. The prostate's main function is to produce seminal fluid, the liquid in semen that protects, supports and helps to transport sperm.

Sometimes prostate cancers grow very slowly and might not cause problems for years. Many men with slow growing prostate cancer may co-exist with the disease and die of something else. But if cancer does spread quickly to other parts of the body, treatment can help manage cancer and control pain, fatigue and other symptoms.

TREATMENT OPTIONS

Surgery

Radical prostatectomy is sometimes used to treat prostate cancer. Recent studies have shown that men survived no longer having had radical surgery than having more conservative approaches.

Radiation

X-rays can be focussed on the prostate area, or radioactive beads can be placed in the prostate (Brachytherapy). This has the effect of killing cancer cells. Recent studies show that prostate cancer patients' treated in this way do not live any longer than those treated using more conservative approaches.

Hormonal Therapies

These preparations such as Zolidex and Casodex are commonly used to treat prostate cancer. This blocks the hormones that can encourage prostate cancer cells to grow. Practically always the use of these drugs lowers PSA

readings to less than 1. These are effective treatments, but the downside is that they often make men impotent as do the majority of surgical and radiotherapy interventions. Generally speaking, in the course of time prostate cancers become hormone resistant, and they begin to grow again anyway, in spite of the hormone treatment.

Chemotherapy is rarely used in prostate cancer, as it is generally found not to be effective.

Cervical Cancer

Cervical cancer starts in a woman's cervix, that is the lower part of the uterus. The uterus holds the growing baby during pregnancy. The cervix connects the lower part of the uterus to the vagina and with the vagina forms the birth canal. Cervical cancer is also called cancer of the cervix. Recent work has suggested that human papilloma virus is commonly associated with cervical cancer. Multiple sexual partners increases the possibility of exposure to human papilloma virus, meaning that in these women that is a risk factor. Cervical cancer is correspondingly rare in Nuns. Vaccines for human papilloma virus offer a real hope of protection against cervical cancer.

Cervical cancer usually grows very slowly over a period of several years. Cells on the surface of the cervix change from normal to abnormal, and the first to change is pre-cancerous, but this can eventually lead to cancer. These pre-cancerous phases are called cervical dysplasia. Often the pre-cancerous tissue can be removed or destroyed without harming healthy tissue, but in some cases a hysterectomy (removal of the uterus) is needed to prevent cervical cancer. How a pre-cancerous area is treated depends on how big the area is and what type of changes have occurred in the cells, whether the woman wants to have children in the future, the woman's age, the woman's general health, preference to the woman, and advice of her doctor.

If the pre-cancerous cells change into cancer and spread deep into the cervix as well as other tissues and organs, the disease is then called cervical cancer.

Cervical cancer is divided into two main types, named according to the cell within the cervix where the cancer originated:

Squamous cell carcinomas make up about 85%-90% of all cervical cancers. Another 10%-15% are adeno carcinomas.

TREATMENT OPTIONS

The most common treatments for cervical cancers are, surgery, radiation therapy and chemotherapy.

The type of treatment used depends on the stage of the disease, the size of the tumour, the woman's age, her health and a desire to have children.

Women who are pregnant may decide to delay treatment until after the baby is born.

Palliative treatment with the radiotherapy may give pain relief. Chemotherapy and surgery may be used to treat or remove newly affected areas, both within the pelvic area and other parts of the body.

Surgery

Surgery removes the cancerous tissue. For cervical cancer that has not spread beyond the cervix the following procedures may be used:

- Cryo-surgery which freezes cancer cells and thereby destroys them.
- Laser surgery which destroys cancer cells using a narrow beam of coherent intense light.
- A so-called 'cone biopsy' to remove all of the abnormal tissue.
- A hysterectomy which removes the uterus and the cervix. Also, this is often combined with bi-lateral salpingo-oophorectomy which removes both fallopian tubes and ovaries and is often also done together with the hysterectomy.

For cervical cancer that has spread beyond the cervix, then radical hysterectomy, involving removal of the cervix, part of the vagina and nearby lymph nodes, may be carried out and in some cases where the spread has gone into the pelvis, then parts of the lower colon, rectum and bladder may also have to be removed surgically. These kinds of operations are significantly mutilating, and often other approaches are therefore looked at in these situations.

Radiotherapy

External X-rays focussed on the cervix can be used, or implanted radioactive pellets (Brachytherapy) placed directly into the cervix through thin plastic tubes or needles, can also be used.

Chemotherapy

Chemotherapy for cervical cancer is used primarily when the cancer has spread to other parts of the body. Usually a combination of drugs are used.

Colorectal Cancer

Colorectal Cancer is cancer affecting the colon, or the rectum. The colon and the rectum are parts of the large intestine, and they pass solid waste out of the body. The colon makes up the first part of the large intestine, and the rectum is the last 8"-10", ending at the anus.

The colon has four sections, the ascending colon is the part that goes up from a pouch called the caecum on the right side of the abdomen, the transverse colon crosses the top of the abdomen, and the descending colon takes the

food down the left side of the abdomen, and finally the sigmoid colon at the bottom of the descending colon takes the food down to the rectum.

Colorectal cancer can begin either in the colon or the rectum. A cancer that begins in the colon is often referred to as colon cancer, and cancer that begins in the rectum is called rectal cancer.

Most colorectal cancers begin as polyps which are non-cancerous growths that may occur on the inner wall of the colon and the rectum as people get older. Certain types of polyps may eventually turn cancerous, and one way to prevent colorectal cancer is to detect and remove the polyps before they become cancerous, using colonoscopy. Anybody with a family history of colon or rectal polyps, would be well advised to have a prophylactic colonoscopy every two or three years.

Most colon and rectal cancers are adeno carcinomas, that is cancers of the cells that line the inside of the colon and rectum. Sometimes carcinoid tumours, gastrointestinal stromal tumours, and lymphomas can also begin in the colon or the rectum.

TREATMENT OPTIONS

The treatment of colorectal cancer depends on the location and the extent of the cancer. Usually a team of specialists including a Gastroenterologist, a Surgeon, a Medical Oncologist and a Radiation Oncologist take part. Colorectal cancer can spread to distant organs such as the liver, lung, peritoneal or ovary. A combination of surgery, radiation and chemotherapy can be used to slow the spread of the disease. At this stage surgery usually cannot cure the cancer, but it can help relieve blockage of the colon or other complications. Surgery may also be used to remove parts of other organs that contain cancer and can cure some people if a limited amount of cancer spreads to a single organ such as the liver. Unfortunately, chemotherapy and radiation at this stage can rarely cure the cancer, but it can help to relieve pain and other symptoms.

Surgery

The most common treatment for colorectal cancer is surgery to remove the tumour. Part of the healthy colon or rectum and nearby lymph nodes will also be removed. If surgery causes damage to the colon, a patient may need to have a colostomy which is a surgical opening or stoma through the abdominal wall to provide a pathway for solid waste to exit the body and collect in the bag worn on the front of the abdomen by the patient. In many cases the colostomy is only temporary and the colon can be joined up again at a further operation.

If the cancer is early in its progress ie: Stage 1 or 2, surgical removal of the tumour is often the only treatment. If the cancer is likely to return, then

radiation and/or chemotherapy will be suggested. In the very early stages when a pre-cancerous polyp is found in the colon all that need happen is for the polyp to be removed by colonoscopy.

If a cancer is Stage 3 or more and has spread to nearby lymph nodes, the treatment is usually followed by chemotherapy. Radiation may also be used depending on the location of the cancer.

Radiotherapy

Radiation is used by focussing X-ray beams onto the tumour site so as to shrink the tumour. This can be carried out prior to surgery so that the tumour is then easier to remove, or after surgery to destroy any remaining cancerous cells.

Chemotherapy

Chemotherapy is routinely used in colon cancer following surgery. Often a combination of a chemotherapeutic drugs are used, in many cases intravenously, but in some cases orally.

Oesophageal Cancer

The oesophagus is a hollow muscular tube about 10" long which connects the throat to the stomach. On swallowing, the walls of the oesophagus contract to push food down into the stomach. Cancer of the oesophagus begins on the inner layer of the oesophageal wall and grows outwards. It spreads through the oesophageal wall and can invade lymph nodes, blood vessels in the chest, and other organs. Oesophageal cancer can also spread to the lungs, liver, stomach and other parts of the body.

There are two types of oesophageal cancer:

Squamous cell carcinoma and adeno carcinoma. Squamous cell carcinomas arise in the squamous cells that line the oesophagus, these cancers usually start in the upper and middle part of the oesophagus. Adeno carcinomas begin in the glandular tissue in the lower part of the oesophagus. Treatment is similar for both types.

TREATMENT OPTIONS

Surgery

Surgery is the most common treatment for cancer of the oesophagus. The oesophagus may be removed entirely, or part of it may be removed. The stomach or part of the intestine may sometimes be used to reconnect the top

of the oesophagus with the rest of the gastrointestinal tract. Lymph nodes may also be removed around the oesophagus.

Often the tumour cannot be completely removed surgically, and a combination of chemotherapy and radiation can be used to shrink the tumour.

To help patients to be able to eat, the following approaches may be used:

- Create a new pathway to the stomach, this is done surgically.
- Put in a peg-tube which leads directly into the stomach and the patient can be fed liquid feeds through the peg-tube.
- To dilate the oesophagus, this often has to be repeated as the tumour grows.
- Put a stent, which is a rigid tube into the oesophagus in order to keep it open.

Radiotherapy

Focussed X-rays can be used to reduce tumour size. One of the risks of this is of radiation-oesophagitis. Also scarring can occur which can be unpleasant.

Chemotherapy

Chemotherapy is sometimes used in carcinoma of the oesophagus, and is generally not very effective. Chemotherapeutic drugs are usually given in combination by the intravenous route.

Liver Cancer

Liver cancer is most often secondary cancer to other tumours, most commonly the colon, but also primary cancers such as the breast etc. Primary liver cancer begins in the liver, and is relatively uncommon in Europe, but is much commoner in Japan for example. When patients in Europe say they have liver cancer, generally speaking they have metastatic cancer in the liver from a primary tumour somewhere else.

The liver is the largest organ in the body and its functions are vital to the digestion of food. The liver does the following:

- Collects and filters blood from the intestine via the portal circulation.
- Processes and stores nutrients absorbed from the intestines.
- Metabolises some nutrients before they can be used by the rest of the body for energy or to repair and build tissue.
- Producing some of the clotting factors needed by the blood.
- Removes toxic waste from the body.
- Helps with other organs to maintain proper sugar levels in the body.

TREATMENT OPTIONS

Surgery, radiation and chemotherapy are used in liver cancer, both secondary and primary.

Surgery

In some cases the liver may be removed in its entirety if it is a primary liver cancer and a liver transplant may be done. In secondary cancer only a portion of the liver affected is removed. This is called a partial hepatectomy. The remaining part of the liver takes over the functions of the entire liver and can in some cases regenerate to its normal size within a few weeks.

Radiotherapy

Focussed X-rays can be used to shrink liver cancers.

Chemotherapy

Intravenous chemotherapeutic drugs are often used in secondary liver cancer. The success rate from this line of treatment is not high.

Pancreatic Cancer

The pancreas is a gland located deep in the abdomen between the stomach and the spine. The pancreas is about 6” long and is like a ‘flat pear’. The widest part of the pancreas is the head, the middle section is the body, and the thinnest part is the tail. The pancreas makes insulin which controls blood sugar and a range of other hormones. The pancreas also makes pancreatic digestive enzymes that help digest food. The pancreas releases these enzymes into a system of ducts leading to the common bile duct, which then empties into the duodenum which is the first section of the small intestine. Most pancreatic cancers begin in the ducts that carry the pancreatic enzymes. There is a rare type of pancreatic cancer which begins in the cells that make insulin and this case is called Islet T-cell cancer.

Cancer of the pancreas commonly spreads outside of the pancreas, in this case it is known as metastatic pancreatic cancer.

The likelihood of developing pancreatic cancer increases with age, is more common in cigarette smokers and diabetics and more common in men than in women.

If there is a strong family history of pancreatic cancer then the risks are tripled if a persons mother, father, sister or brother had the disease. Also a family history of colon or ovarian cancer increases the risk of pancreatic cancer. Chronic pancreatitis which is a painful inflammatory condition of the pancreas, predisposes that patient to pancreatic cancer later in life.

Pancreatic cancer is sometimes called a ‘silent disease’ because early pancreatic cancer does not cause symptoms. Most often it is diagnosed by

an episode of jaundice where the skin becomes yellow due to blockage of the common bile duct.

TREATMENT OPTIONS

Treatment for pancreatic cancer is either chemotherapy, radiotherapy or surgery.

Surgery

A range of surgical procedures can be used in early stage pancreatic cancer, and as often pancreatic cancer is diagnosed late, surgery is often not a treatment option.

Most often surgery is confined to inserting a stent which is a rigid tube to open up the common bile duct and allow the patient's obstructive jaundice to then clear.

Radiotherapy

Radiotherapy is often used to treat pancreatic cancer, but this is often regarded as palliative radiotherapy and is not regarded as curative.

Chemotherapy

Chemotherapy is often used to treat pancreatic cancer. The success of this approach to treatment is not high.

Lung Cancer

Cigarette smoking is the main cause of lung cancer, but anyone can develop lung cancer.

The lungs contain many different types of cells, most of which are epithelial cells. These cells line the airways and produce mucous which lubricates and protects the lung. The lung also contains nerve cells, hormone producing cells, blood cells and supporting cells.

There are two main types of lung cancer:

Non-small cell lung cancer (the most common) is believed to arise from the epithelial cells, and is often connected with smoking as a cause. Small-cell lung cancer is believed to arise from nerve cells or hormone producing cells. The term small-cell refers to the size/shape of the cancer cells seen under the microscope.

Not all lung cancers metastasize, in general small-cell lung cancers are more likely to metastasize than non-small cell lung cancers, so the two types of lung cancers are treated in different ways.

Surgery

A thoracic surgeon usually performs lung cancer surgery. The aim is to remove the tumour and associated lymph nodes which may be involved. The tumour needs to be removed with a surrounding border of normal tissue. Often a lobectomy is done, in other words just a lobe of the lung is removed (the lung has five lobes, three on the right and two on the left). For non-small cell lung cancer removing an entire lobe of the lung has been shown to be the most effective type of surgery, even when the lung tumour is very small.

Radiation

Radiation used externally focuses X-rays onto the tumour site.

Chemotherapy

Chemotherapy is usually given intravenously in lung cancer. It is often not effective.

Treatment of Non-small Cell Lung Cancer

In general early stage non-small cell lung cancer (Stages 1 & 2) is treated with surgery. Often this can be cured with a single operation. Sometimes radiation is used to treat and cure early stage lung tumours in patients who do not wish to have surgery.

In Stage 3 non-small cell lung cancer, because of the spread, it means that surgery or radiation alone is either impossible or not enough to treat the disease. Patients with Stage 3 disease are at high risk for cancer returning, either in the same place or at a distant location, even if the surgery and radiation has completely removed the cancer. Therefore for this reason immediate surgery may not be recommended and instead chemotherapy may be recommended for patients with Stage 3 disease. This chemotherapy can shrink a tumour and make it easier for a surgeon to then remove.

In Stage 3B non-small cell lung cancers, surgery is not recommended, no matter how effective previous chemotherapy might have been, because of the high risk of spread both locally and at a distance. In many of these cases chemotherapy and radiation are given together. The side effects from these treatment regimes tend to be marked.

Kidney Cancer

Kidney cancer arises in the kidneys which are reddish-brown, kidney shaped organs about the size of a small fist located above the waist at either side of the spine. They are closer to the back of the body than to the front.

Kidneys filter blood and remove impurities, excess minerals and salts and surplus water. They process a large amount of fluid every day and generate urine which it passes down the ureter to the bladder. Kidneys also produce hormones to help control blood pressure, red blood cell production, and other functions. We normally have two kidneys, but each works independently. The body can work with one kidney. It is possible to use an artificial kidney known as dialysis which provides a mechanised filtering process, so therefore it is possible to live without kidneys.

There are several kinds of kidney cancers:

Renal cell carcinomas comprise about 85% of kidney cancers. This arises within the tiny tubules which filter body fluids in the kidney.

Transitional cell carcinoma begins in the area of the kidney where the urine collects after being processed by the kidneys and on its way down to the bladder. This kidney cancer is similar to bladder cancer and is treated like bladder cancer.

Wilm's tumour is found in children and is treated differently from adult kidney cancer.

TREATMENT OPTIONS

Local surgery to remove the tumour or all of the kidney and possibly nearby tissue and lymph nodes offers the most reasonable chance of a cure. If the cancer spreads then systemic treatments such as immunotherapy and chemotherapy may be used alone or in combination. The best treatment to date for metastatic kidney cancer is immunotherapy, enhancing the ability of the body itself to fight disease. The specific treatment used is most often dendritic cell therapy.

Surgery

Total removal of the kidney is the only real surgical option. Also the adrenal gland may be removed if it is involved, and this is called adrenalectomy.

Radiotherapy

The use of radiotherapy is not considered as effective as a primary therapy for kidney cancer. It is sometimes used in a patient who can't tolerate surgery. Most often radiotherapy is used after the cancer has spread to ease symptoms such as pain due to tumour enlargement. Recent advances have enabled stereotactic radio-surgery to be a more encouraging option in the whole range of cancers, including kidney cancer.

Immunotherapy

Unlike most cancers, advanced kidney cancer responds poorly to chemotherapy but well to immunotherapy, making it the treatment of choice. Specific tumour directed vaccines known as dendritic cell therapy vaccines have been shown by several clinical trials to be effective in this situation.

Conventionally Interleukin 2 and Interferon are used to stimulate a cell mediated immune function in order to get rid of the kidney cancer.

Melanoma

Skin cancer is the most common of all cancers and there are three main types:

Squamous cell carcinoma

The top layer of the skin is made of flat scale-like cells called squamous cells. Approximately 16% of skin cancers begin in this layer and they are called squamous cell carcinomas. They usually arise from exposure to the sun but can appear when the skin been burn-damaged by chemicals or exposed to X-rays.

Basal Cell Carcinoma

Under the squamous cells in the lower part of the skin known as the epidermis are round cells known as basal cells. About 80% of skin cancers arise from this layer in the skin that has been exposed to the sun, and are called basal cell carcinomas. Basal cell carcinomas most often form on the head and neck.

Melanoma

The deepest layer of the epidermis contains scattered cells called melanocytes, which produce the melanin which gives the skin colour. Melanoma starts in melanocytes and it is the most serious of the three cancer types and is related to exposure to the sun.

TREATMENT OPTIONS

Usually squamous cell carcinomas and basal cell carcinomas can be treated with relatively simple surgery. Or if the cancer is very small, another form of removal such as cryo-surgery (freezing), or laser surgery can be used.

In some instances squamous cell cancer grows deep into the skin and can spread to other parts of the body. Squamous cell cancers most likely to spread are those that appear on sites of chronic inflammatory skin conditions, or on the mucous membranes, or the lips.

Surgery

A range of surgical approaches are used in all skin cancers, particularly melanoma. This doesn't necessarily cure the melanoma but it reduces tumour load.

Radiotherapy

Radiotherapy can be used for skin cancers that are hard to treat with surgery, such as those that appear on the eye-lid, tip of the nose and the ear.

Topical Chemotherapy

Cancers that are limited to the top layer of the skin can be treated with topical chemotherapy as well as pre-cancerous skin conditions. The anti-cancer drug may be applied in a cream or lotion. These preparations are usually applied daily for several weeks, and may in the short term cause inflammatory changes, which later disappear.

Chemotherapy

Chemotherapy is sometimes used for skin cancers, particularly melanoma. Photodynamic therapy is a relatively new possibility for skin cancers.

Thyroid Cancer

Thyroid cancer is a group of malignant tumours that start in the thyroid gland. The thyroid is a gland in the front of the neck, and it absorbs iodine from the bloodstream so it can produce thyroid hormone. This hormone regulates body metabolism and temperature, it affects heart rate and if it is deficient it produces lack of energy, dry hair constipation, dry skin and a thick swelling of the skin in various parts of the body known as hypothyroidism. The thyroid gland consists of two types of cells, follicular cells which produce thyroid hormone and C-cells which make calcitonin, a hormone that is involved in calcium metabolism. There are two lobes one each side of the windpipe joined by a narrow strip of tissue of called the isthmus. If a mass develops in the thyroid this is felt as a lump in the neck. A diffusely swollen thyroid gland is called a 'goitre', which is often due to iodine deficiency. Thyroid tissue growths are known as nodules, 90% are benign and 10% are malignant.

There are 4 types of thyroid cancer:

Papillary thyroid cancer. These tumours cells grow slowly and are usually found in one lobe and only 10%-20% of papillary cancers appear in both lobes. Follicular thyroid cancer develops in the follicular cells and grows slowly, but is less common.

Papillary and **follicular** cancers make up 80%-90% of thyroid cancers and are grouped under the term 'differentiated thyroid cancer'. When detected early, especially in people below the age of 50, they can often be treated successfully and thereby cured.

Medullary thyroid cancer. Develops in the C-cells and accounts for 5%-10% of thyroid cancers.

Anaplastic thyroid cancer is rare, is aggressive, and in its giant cell variety is often rapidly fatal.

TREATMENT OPTIONS

Surgery, radioactive iodine, hormone therapy and radiotherapy, and in some cases chemotherapy are used.

Surgery

Surgery is a treatment for most thyroid cancers. Depending on the size of the nodule either the whole gland or part of the gland will be removed.

Complications of surgery may include temporary or permanent hoarseness due to the damage of the nerves supplying the larynx. Sometimes this inadvertent damage at surgery may cause permanent hoarseness.

Hormone Replacement of thyroid hormone is essential following a thyroidectomy. Also some patients may have to take vitamin D and calcium supplements if the parathyroid glands are removed as well.

Radiotherapy

Radioactive Iodine is used to destroy cancer cells not removed by surgery. This is given in either liquid or pill form.

Hormone Treatment

In addition to replacing thyroid hormone with Thyroxine, Thyroxine also slows down the growth of any remaining cancer cells, therefore it serves a double purpose.

Radiotherapy

Radiotherapy in some cases is given in thyroid cancer, concentrated in a stereotactic way on a specific area. This is in cases where an advanced thyroid cancer has not responded to radio iodine therapy.

Chemotherapy

Chemotherapy is sometimes used to treat thyroid cancer.

Bladder Cancer

The bladder is an expandable hollow organ in the pelvis that stores urine before it leaves the body during urination. The urinary tract is made up of the kidneys, ureter bladder and urethra and is lined with a layer of transitional

cells. This layer of cells is separated from the bladder muscles by a thin fibrous band called the lamina propria. The lamina propria separates tumours that have spread into muscle (called invasive cancer) from those that have not (non-invasive cancers).

There are 3 types of bladder cancer:

Transitional cell carcinoma which accounts for 90% of bladder cancers. Squamous cell carcinoma which accounts for about 8% and adenocarcinomas which account for about 2%.

All three types can metastasize beyond the bladder. The tumour can grow into the surrounding organs (uterus and vagina in women – prostate in men), and this is called 'locally advanced disease'. It can also spread to nearby lymph nodes, and/or into the liver, collarbones, or lungs, which is called 'distance metastasis'.

TREATMENT OPTIONS

Treatment for bladder cancer depends on how big the tumour is and if it has spread. Early stage cancers can often be treated locally without removing the bladder. More advanced cancers often need systemic chemotherapy.

Surgery

Trans-urethral resection of the bladder with a cystoscope passed through the urethra into the bladder can be used to remove cancer and to cauterise it.

Cystectomy which involves removal of the whole bladder has to be done in advance cases. Also nearby tissues may also have to be removed.

A urostomy which is an opening onto the front of the abdomen has to be made in this case, in which the urine passes out of this opening and collects in a bag attached to the stoma, to collect and drain the urine.

Radiotherapy

Radiotherapy is sometimes used in advanced bladder cancer.

Chemotherapy

Local chemotherapy is often used with drugs put into the bladder through a catheter. This kills any superficial tumour cells and it cannot reach tumour cells of the bladder wall or growths that have spread to other organs. The most common drug that is used in intravesical treatment is an immune therapy drug called BCG (Bacillus, Calmette-Gaerin). This is a biological response modifier, and is essentially an immunotherapy and is on an attenuated form of the bacterium that causes tuberculosis. This modified bacteria irritates the inside of the bladder and attracts the patients own

immune cells specifically their cell mediated immune function, to the bladder to fight the tumour.

Systemic Chemotherapy

In some cases of bladder cancer systemic chemotherapy has to be used. A combination of chemotherapeutic agents works better than one chemotherapeutic agent on its own.

Brain Cancer

The brain and spinal column makes up the central nervous system (CNS), through which all the vital functions the body controlled. When tumours arise in the CNS they are especially problematic because the persons thought processes and movements can be affected. These tumours are particularly difficult to treat because the tissue surrounding a tumour may be affected by surgery or radiation and may be damaged, sometimes causing unacceptable loss of vital functioning.

There are two broad types of cancers occurring within the CNS. Primary tumours originate in the CNS, where as secondary tumours migrate from cancers located elsewhere in the body such as breast cancers or lung cancers, forming secondary or metastatic brain tumours. Metastatic brain tumours are more common than primary brain tumours. This section focuses on primary brain cancers.

The brain is composed of:

1. The cerebrum which has two hemispheres. These control higher functioning such as thought process, memory, reasoning etc.
2. The cerebellum located at the back of the brain and this controls co-ordination, balance, and muscular movement.
3. The brain stem which is the centre and lowest part of the brain and connects to the spinal cord and controls involuntary functions essential for life such as breathing, heart-beat etc.
4. The meninges are membranes that surround and protect the brain spinal cord.

The type of primary brain cancers are classified according to the type of cells from which they originate.

Gliomas

Most brain tumours are gliomas, which originate in the glial cells (supporting cells of the nervous system). Gliomas are described as low grade (slow growing), intermediate grade (more aggressive), or high grade (aggressive).

There are many different types of gliomas:

1. Astrocytoma, the most common type of glioma which usually begins in cells called astrocytes within the cerebrum or cerebellum. Glioblastoma Multiforme is a form of aggressive astrocytoma.
2. Oligodendroglioma, a tumour that develops from oligodendrocytes. These cells are responsible for producing the myelin that surrounds nerves.
3. Brain stem gliomas, which begin in the glial cells in the brain stem.
4. Ependymoma, which begins in the ependyma, and these are the cells that line the passageways in the brain such as the ventricles to the brain, where cerebral spinal fluid is made and stored.
5. Mixed tumours, which compose of more than one of a glial cell type.

None-glial tumours include:

1. Acoustic-neuroma, which occurs on the eighth or vestibular nerve which is to do with hearing and balance.
2. Craniopharyngioma, which begins near the pituitary gland.
3. Meningiomas, which originate in the meninges, which are the membranes surrounding the brain's spinal column. These are generally benign, but they may cause significant symptoms as they grow and press on the brain and spinal cord.
4. Medulloblastoma, which arises from the cells in the cerebellum.
5. Primary CNS Lymphomas.
6. The pineal and pituitary glands located near the base of the brain can also be the site of tumours.

Treating brain and spinal cord tumours can be difficult, due to the important functions of CNS tissue. The blood brain barrier which normally serves to protect the brain's spinal cord from damaging chemicals getting into them, also keeps out many types of potentially beneficial chemotherapeutic drugs.

TREATMENT OPTIONS

People with CNS tumours should seek treatment quickly. The pressure caused by growing CNS tumours can cause severe symptoms, including raised cerebro spinal fluid pressure which can damage other nerves and deprive neurological tissue of nutrition, which can often cause permanent damage.

Symptom management is always important since the symptoms of brain tumours can interfere with quality of life in a major way.

Surgery

Surgery is the most common type of treatment for brain cancers and is often the only treatment needed in benign brain tumours such as meningiomas. Removing some of a tumour, even if it's not totally removed in the case of gliomas, can be important as it stops pressure building up in the brain due to the tumour size. Surgery to the brain requires removal of part of the skull, a procedure known as craniotomy. After the surgeon removes the tumour or part of it, the patient's own bone will be used to cover the opening in the skull.

Radiotherapy

Radiotherapy is often used to treat brain tumours and can reduce tumour size and is highly effective in doing this. New techniques of the stereotactic radiotherapy add to the sophistication of this approach.

Chemotherapy

Occasional Oncologists' may use intrathecal (delivered directly into the cerebrospinal fluid) chemotherapy drugs.

The use of corticosteroids is often used in brain tumours because this reduces their size, by reducing any inflammatory change which occurs around tumours.

Acute Myeloid Leukaemia

Acute myeloid leukaemia (AML) is a cancer of the cells in the blood, bone marrow and lymph nodes. AML is sometimes called acute non-lymphocytic leukaemia, acute myeloblastic leukaemia, or acute granulocytic leukaemia.

In AML the bone marrow begins producing large numbers of abnormal blast cells. Blast cells are immature white cells. Instead of producing three types of mature white blood cells, the bone marrow begins to produce only one type, usually immature white blood cells called myeloblasts. These myeloblasts then over-run the blood stream and they can also invade the brain, skin, ovaries, testes and other organs. AML occasionally form a solid tumour called an isolated granulocytic sarcoma.

AML is one of four types of leukaemia. Like acute lymphoblastic leukaemia (ALL), AML appears and progresses quickly, but begins in a different type of cell. Chronic lymphocytic leukaemia and chronic myelogenous leukaemia both progress more slowly.

TREATMENT OPTIONS

Chemotherapy is the primary treatment for AML. The is usually divided into two phases; induction and consolidation.

Induction chemotherapy uses chemotherapy drugs to kill as many of the cancer cells as possible and cause the AML to go into remission.

Consolidation chemotherapy begins once a cancer has gone into remission. Another round of chemotherapy is used at this stage to kill any remaining cancer cells in the body.

Radiotherapy

Radiotherapy is sometimes used when AML has spread to the brain, or for localised AML disease called granulomas.

Haematopoietic Stem Transplantation

Haematopoietic stem transplantation is a more recent form of treatment. This is preceded by high doses of chemotherapy, possibly along with radiotherapy, to destroy all the leukaemia cells and also destroy the patient's bone marrow. Then normal stem cells of the bone marrow or blood of a donor if tissue matches the patient as closely as possible, are used. The healthy stem cells are infused into the patient's vein where they replace the destroyed marrow.

The best match for transplantation usually comes from a sibling.

If no donor is found then an autologous transplant using the patient's own stem cells is used. In this case the blood or bone marrow is removed, treated to rid it of cancer cells and then frozen. The patient then receives the treatment to kill his/her bone marrow. The frozen stem cells are thawed and injected to replace the destroyed marrow. In this case there is no risk of the patient rejecting the transplant. One drawback is that if the chemotherapy has not killed all of the cancer cells, the leukaemia and collected bone marrow could be re-infused into the patient's body.

Immunotherapy

Stimulating the body's own cell mediated immune system to kill off leukaemia cells is a new form of treatment being looked at in AML.

Chronic Lymphocytic Leukaemia

Chronic Lymphocytic Leukaemia (CLL) is a cancer of the blood and is the second the most common type of leukaemia. It is caused by the over-production of immature blood cells in the marrow. These immature cells

crowd out healthy cells needed to fight infection and deliver oxygen to the body. CLL progresses slowly and may take years for symptoms to appear or for treatment to be needed.

CLL forms because of genetic mutations in lymphocytes, a kind of white blood cell that fights infection. In CLL lymphocytes are not as good at fighting infection as they are normally. Over time they crowd the bone marrow allowing less room for cells that make red blood cells, white blood cells and platelets.

CLL is one of four types of leukaemia, like chronic myeloid leukaemia (CML), CLL progresses slowly. Acute lymphocytic leukaemia (ALL) affects the same lymphocytes but progresses much more quickly. Acute myeloid leukaemia (AML) also progresses quickly. CLL is often found only in the blood and bone marrow. It may involve lymph nodes causing swelling in the neck, under the arms or in the groin, called lymphadenopathy. As CLL progresses the liver and spleen may also enlarge. If the bone marrow space is filled up there's not enough room for normal marrow cells to form and the levels of red cells and platelets fall. In these patients therefore blood transfusions and platelets transfusions may be required. Generally speaking the disease is divided into whether it arises from T-cells or B-cell lymphocytes. Less common T-cell type of CLL (5% of cases only) progresses more rapidly than the B-cell form of the disease (95%).

TREATMENT OPTIONS

'Watch and Wait'

The main treatment of CLL is 'watch and wait'. Many patients have no symptoms for many years or even decades and they never need treatment. Treatment is reserved for those patients who develop signs that the disease needs to be treated. These might be increased fatigue, night sweats, enlarged lymph nodes or falling red cell and platelet counts.

Chemotherapy

Chemotherapy is the treatment choice for CLL.

Leukapheresis

Sometimes doctors will filter out white blood cells (including cancer cells) by running the blood through a machine that removes the white blood cells and leaves the red blood cells and platelets. This strategy works only temporarily and may be used along with chemotherapy.

Radiotherapy

Radiotherapy may be used on enlarged spleen or lymph nodes.

Stem Cell Transplantation

This is also known as bone marrow transplantation. If a patient with CLL is not responding to chemotherapy then stem cell transplantation may be considered. In this case the patient's bone marrow is destroyed with high dose chemotherapy and the cells are then replaced with healthy cells known as stem cells which can be joined to many different types of blood cells.

Destroying the marrow effectively eliminates the body's normal defences against infection leaving the patient at risk. Until the patient's immune system is back to normal, antibiotics, blood transfusions and platelet transfusions may be needed.

Stem cells used in the transplant come from one of two different sites, the patient or a closely matched donor, usually a sibling. If the cells come from a patient the procedure is known as an autologous transplant, if the stem cells come from a sibling this is known as an allogenic transplant. In any allogenic transplant even from a sibling, the patient's body may reject the transplant itself.

Chronic Myeloid Leukaemia

Chronic myeloid leukaemia (CML) is a cancer of blood producing cells in the bone marrow. CML is also called chronic myelocytic leukaemia. Most people with CML have a genetic abnormality where two chromosomes swap their end pieces. This is called trans-location and in this case involves chromosomes numbers 9 and 22 and is named the 'Philadelphia Chromosome'. The mutation causes bone marrow cells (called myeloid cells) to produce an enzyme that prompts white blood cells (cells that normally fight infection) to grow un-checked.

TREATMENT OPTIONS

Chemotherapy

Chemotherapy is the treatment of choice in CML. There are three phases of treatment:

1. Chronic Phase – Treatment is designed not to eliminate cancer cells in the marrow but to control the cancer.
2. Accelerated Phase – Chemotherapy is less likely to be successfully during this stage and other options such as stem cell transplant are often considered.

3. Blastic – Phase – This treatment is design to return the patient to the ‘Chronic Phase’.

A drug Gleevec has transformed treatment CML. This is given orally and it works by disabling a faulty enzyme that causes the cells to grow. This is one of the most exciting new cancer drugs.

Stem Transplantation

In this case the patient’s bone marrow is destroyed using chemotherapy and either and autologous or an allogenic stem cell transplant is used.

Hodgkin’s Disease

Hodgkin’s disease is a type of lymphoma which is a cancer of the lymph system. The lymph system is made of thin vessels that branch out all over the body and its job is to fight infection and disease. The lymph system carries ‘lymph’ which is a colourless fluid containing white blood cells (called lymphocytes). Groups of ‘bean-shaped’ organs called lymph nodes are found throughout the body. There are clusters of lymph nodes in the abdomen, pelvis, the armpits and the neck. Other parts of the lymphatic system are the spleen which makes lymphocytes that filters blood, the thymus an organ of the breast bone, and the tonsils located in the throat.

Hodgkin’s disease most commonly affects the lymph nodes used at the beginning of the neck or the area between the lungs and behind the breast bone.

TREATMENT OPTIONS

The most common treatment method for Hodgkin’s disease is radiotherapy, chemotherapy, or a combination of both.

Radiotherapy

Radiotherapy is often used locally on sites of lymphoid tissue affected by Hodgkin’s disease.

Peripheral Blood Stem Cell Transplantation

In this case the patient is treated with very high doses of chemotherapy and then stem cells either from the patient or a from a sibling are injected with another drug known as Granulocyte Colony Stimulating Factor (G-CSF). Not all stem cell transplantations ‘take’.

Chemotherapy

Chemotherapies are often used to treat Hodgkin’s disease.

Non-Hodgkin's Lymphoma

Non-Hodgkin's lymphoma is a cancer of the lymphatic system, and as lymph tissue is found in many parts of the body Non-Hodgkin's lymphoma can start almost anywhere. Common sites outside of the lymph nodes where lymphoma can start include the stomach, bowel and thyroid gland.

There are many types of non-Hodgkin's lymphoma and they are often described as to how quickly they grow, therefore being given titles such as low-grade, medium-grade or high-grade. High-grade Non-Hodgkin's lymphomas are the most common in children.

The disease type can be further described by the appearance of the cells on the microscope. Follicular lymphomas, while diffuse cells are evenly distributed throughout the lymphatic tissue. Non-Hodgkin's lymphoma is also classified as to whether they affect the B-lymphocytes or the T-lymphocytes. Most Hodgkin's lymphomas (90%) affect the B-cells.

Common types of low grade Non-Hodgkin's lymphoma include:

- 1, Follicular lymphomas Grades 1 & 2.
2. Small lymphocytic lymphomas known as chronic lymphocytic leukaemia (CLL).
3. Marginal zone lymphomas.
4. Lymphoma of mucosa associated lymphoid tissue.

Common types of aggressive Non-Hodgkin's Lymphoma include:

1. Follicular lymphoma Grade 3.
2. Diffuse Large B-cell Lymphomas.
3. Mediastinal Large B-cell Lymphomas
4. Burkitt's Lymphoma
5. Lymphoblastic Lymphomas

TREATMENT OPTIONS

The main treatments for Non-Hodgkin's lymphoma are chemotherapy, radiation therapy, and immunotherapy.

Radiotherapy

Radiotherapy is mainly limited to patients who have early stage disease. This is usually given along with chemotherapy. This treatment is particularly important for patients who have lymphomas affecting lymph nodes in the centre of the chest known as mediastinal B-cell lymphoma.

Bone Marrow Transplantation

Bone marrow or stem cell transplant, is done by taking marrow from the bone or from blood treated with drugs to kill any cancer cells, and frozen. The patient then receives high dose chemotherapy, possibly with radiotherapy, to destroy all the remaining cancer cells. The bone marrow that was removed is then thawed and given to the patient intravenously to replace the bone marrow that was destroyed.

If the bone marrow comes from the patient it's called an 'autologous transplant', It comes from another person such as a sibling, it's called an 'allogenic transplant'. These treatments are usually for patients who have had at least one type of previous conventional treatment, after which the lymphoma has recurred.

Peripheral stem cell transplantation uses stem cells from the blood instead of the bone marrow. The stem cells are removed from the patient's blood before treatment and then returned after treatment.

Chemotherapy

Chemotherapy either given by mouth or IV is commonly used in Non-Hodgkin's lymphoma.

Immunotherapy

Monoclonal antibodies, Interferon and vaccines are being tested in clinical trials as treatment for Non-Hodgkin's lymphoma.

A common monoclonal antibody used in Non-Hodgkin's lymphoma is Rituximab and this works by targeting a cell surface molecule called CD20. Many similar antibodies are being developed, some of which have radioactive substances attached to 'target' the radiation onto the lymphoma. This kind of treatment is known as immunotherapy.

Interferons are proteins that help strengthen the immune system and are given alone or together with chemotherapy for some types of low-grade lymphomas.

Vaccines

Several vaccines are now being assessed in clinical trials, mostly for low-grade lymphomas. They are designed to reduce the chance of recurrence of lymphomas and are given after some form of treatment which reduces tumour mass, such as radiotherapy and chemotherapy for example.

