A cricketer Yuvraj Singh is undergoing treatment for cancer. Earlier reports said it was a tumor in his lung. Now they say it is cancer but not lung cancer. Yuvi has ‘extragonadal germ cell seminoma’, a rare form of cancer. What, on earth, is this? Will Yuvi be fine? Will he really be back on the crease again? Is it true that this form of cancer is curable? Is any cancer actually curable?

You’ve heard a lot about cancer...about blood cancer, especially in Bollywood movies... about breast cancer in numerous awareness programs in your city...about lung cancer or oral cancer in protests against use of tobacco... But ‘extragonadal germ cell seminoma’ is probably a new term for you.

YuvaSingh has been diagnosed with ‘extragonadal germ cell seminoma’ – a form of cancer. But the good news is that it can be treated.

The Germ Cell Path
A germ cell is a cell that develops into an egg or a sperm. To understand about extragonadal germ cell tumors, we need to understand about the development of the human gonads or the sex organs – the testes in males and the ovaries in females. Although the sex of a child is determined during fertilization, the development of...
male or female gonads does not occur until the seventh week of development.

In the embryo, when you are nothing but a mass of cells, even before the formation of the gonads, the germ cells develop near the hindgut. The gonads first appear as longitudinal ridges of tissue called gonadal or genital ridges. They extend from near the embryonic heart region to the cloaca, a common exit for the intestinal and urinary tracts. The cloaca splits into separate passages during later part of embryonic development.

The gonadal ridges are made from proliferation of epithelium (the kind of tissue that can grow into membranes, skin, nails and hair) and the condensation of mesenchyme (embryonic tissue that gives rise to connective tissues such as bones, muscles, blood etc). During the initial development, the gonadal ridges contain no reproductive tissue. Germ cells do not appear in the gonadal ridges until about the sixth week of development. As the nerve fibers grow, the germ cells migrate from behind the hindgut along these nerve fibers and reach the gonadal ridges. They arrive there at the beginning of the fifth week and invade the genital ridges in the sixth week.

If the germ cells do not reach the gonadal ridges, the gonads do not develop. They are therefore important for the development of gonad into the ovary or the testis. The presence of a gene on the Y chromosome that encodes the testis-determining factor, decides that the gonadal ridges must develop into a pair of testes. If the gene is absent, the gonadal ridges develop into the two ovaries, instead.

**The Extragonadal Destination**

Do you remember falling from your bicycle and getting a swollen bluish green bruise on your forehead? In medical terms, even that bruise or an abscess or boil is a tumor. A tumor is simply a swelling or lump or aggregate of cells. Thus, a tumor isn't only a cancer. And a cancer isn't always a tumor. Many cancers present as lumps of tissue, and hence the term tumor is commonly used.

There are two main types of tumors – benign and malignant. Benign tumors are not cancerous. Malignant tumors are cancerous. Typically, a benign tumor grows only in one place. It does not spread or invade other parts of the body. A malignant tumor can spread and invade other tissue... sometimes spreading through the blood vessels to rather distant tissues.

Germ cell tumors are formed most commonly in the testes. However, 2-5% of germ cell tumors can occur in other locations. When tumors of germ cells are formed outside the gonads, they are termed 'extragonadal germ cell tumors'. Initially, it was believed that these were tumors that originated in the gonads and spread through metastasis to other sites beyond the gonads (extragonadal sites). Current hypotheses suggest that these are congenital tumors, which actually originate outside the gonads.

They can begin to grow almost anywhere in the body but usually occur along the midline. The most common locations include the pineal gland in the brain, the mediastinum or the abdomen.

The mediastinum is the central compartment of the thoracic cavity. It lies between the two lungs. It is the part of the body where lie the heart and its large vessels, the wind pipe, the food pipe, the thymus, lymph nodes, and other structures and tissues. Incidentally, the site of Yuvraj Singh's extragonadal germ cell tumor is the mediastinum. Before its actual location was correctly diagnosed, it was initially believed to be a lung tumor, which it is not.

**A Rare Cancer**

Extragonadal germ cell tumors are very rare. An extragonadal germ cell tumor may or may not be cancer. Most extragonadal germ cell tumors, almost 80%, are noncancerous. They grow very
Fast and are often very large. Such tumors can be removed by surgery.

While benign extragonadal germ cell tumors occur with equal frequency among males and females, the malignant ones occur predominantly in males (9:1). A cancerous extragonadal germ cell tumor may be either a seminoma or a nonseminoma. Yuvi has an extragonadal germ cell seminoma located in his mediastinum. Seminoma is a malignant tumor arising from sperm-forming tissue. Nonseminomatous germ cell tumors include all other germ cell tumors. Nonseminomatous germ cell tumors are more common (60-80%) while seminomas are less common (30-40%).

Risk Factors and Possible Symptoms

Whether you are born a male or female and your age can affect your risk of developing extragonadal germ cell tumors. A risk factor is anything that

Within a few months of completion of his chemotherapy, he is expected to be back on the cricket field with a fresh crop of hair and his ever-winning spirit.
Chemotherapy drugs are powerful drugs. Thus, chemotherapy causes hair loss.
Fortunately, hair loss due to chemotherapy is only temporary.

With adequate treatment, in seminoma patients, a very good survival rate can be achieved...over ninety per cent at five years. Nonseminomas have a worse prognosis. Survival rate is around forty-five per cent at five years.

Treatment for extragonadal germ cell tumors includes three or four cycles of chemotherapy i.e., the use of anticancer drugs. The basic treatment strategy includes chemotherapy plus additional secondary surgery. Surgery may be considered if the tumor is more than 3 cm in diameter after the use of chemotherapy. Otherwise, only watchful waiting is needed after chemotherapy. If the tumor is only a small mass confined to one area, there may be no need for chemotherapy. It can be treated with radiotherapy and a careful follow up.

Why has chemotherapy caused Yuvi to go bald? Will he regrow his hair again? Chemotherapy drugs are powerful drugs. They attack rapidly growing cancer cells. At the same time, they also attack other rapidly growing normal cells of the body – including the cells in the hair roots. Thus, chemotherapy causes hair loss.
Fortunately, hair loss due to chemotherapy is only temporary. The normal cells of the body repair themselves. Within a few months after the chemotherapy cycles end, Yuvi will regrow all his hair. The hair may temporarily be of a different shade and texture.

Yuvi has a rare but curable type of cancer. Within a few months of completion of his chemotherapy, he is expected to be back on the cricket field with a fresh crop of hair and his ever-winning spirit.

“In 2005, a man diagnosed with multiple myeloma asked me if he would be alive within a few months of chemotherapy. Within a few months of chemotherapy, his disease was no longer visible, and his cancer actually curable? The answer is Yes! Cancer is curable. The prognosis of a cancer depends on several factors. These include the type of cancer, the stage of the disease and response of the patient to the kind of treatment provided.

Luckily, Yuvi has a type of cancer that has a high cure rate. In comparison to nonseminomatous germ cell tumors, seminomas tend to grow much slower and spread less quickly.

The extent to which a cancer has spread is often described through staging. For extragonadal germ cell tumors, prognostic groups are used instead. An extragonadal germ cell seminoma is believed to be in the good prognostic group if the tumor has not spread to organs other than the lungs. If it is in the intermediate prognostic group if the tumor has spread to organs other than the lungs. There is no poor prognosis group for extragonadal germ cell seminoma.

Dr Natasha Das and Ms Juhl Nachane are freelance medical writers. Address: B12, Dronacharya, Mayur Vihar Extension, Delhi-110092. Email: natdas@gmail.com; Website: www.natashamedicalwriting.com