Testicular Cancer - Staging

This section has been reviewed and approved by the Cancer.Net Editorial Board [1], August / 2012

Stages

Staging is a way of describing where a cancer has spread. Doctors use diagnostic tests, including CT scans and blood tests, to determine the cancer's stage, so staging may not be complete until all of the tests are finished. Knowing the stage helps the doctor to decide what kind of treatment is best and helps predict a patient's prognosis. Patients with early stage cancers are more likely to be cured and often need less aggressive treatment than patients with more advanced stage cancers. There are different stage descriptions for different types of cancer.

There are also two different types of staging in testicular cancer: clinical staging and pathological staging. In clinical staging, the stage is based on a physical examination of the patient or x-rays, CT scans, and other imaging tests (see Diagnosis [2]). In pathological staging, the stage is based on evaluating tissue under a microscope after it has been removed during surgery. Pathological staging for testicular cancer is especially important when there is cancer in the retroperitoneal lymph nodes. For example, clinical stage II testicular cancer means that the retroperitoneal lymph nodes are enlarged when viewed with a CT or MRI scan. Whereas, pathological stage II testicular cancer means that cancer has been found when tissue removed from the retroperitoneal lymph nodes is examined under a microscope. Pathological staging is more accurate than clinical staging, but it is not always necessary.

One tool that doctors use to describe the stage is the TNM system. This system judges three factors: the initial tumor in the organ where the cancer started (sometimes referred to as the primary tumor), whether the cancer has spread to the lymph nodes in the back of the abdomen (retroperitoneum), and whether the tumor has spread to other parts of the body.

For testicular cancer, the TNM staging system also includes information on the levels of the three serum (S) tumor markers: AFP, beta-hCG, and LDH (see Diagnosis [2]). For staging purposes, these blood tests are done before the surgical removal of the affected testicle(s). For patients receiving chemotherapy for metastatic cancer, the tumor marker levels on the first day of chemotherapy are the values used for staging.

The results of the different tests described in the Diagnosis [2] section are combined to determine the stage of the cancer. There are three stages of testicular cancer: stages I, II, and III (one, two, and three). The stage provides a common way of describing how advanced the cancer is so that doctors can work together to plan the best treatments. Stage I is the least advanced and stage III is the most advanced. The staging process is described in more detail below.

TNM staging system

TNM is an abbreviation for tumor (T), node (N), and metastasis (M). Doctors look at these three factors, plus serum tumor markers (S), to determine the stage of testicular cancer:

- How much has the primary tumor grown and where is it located? **(Tumor, T)**
- Has the tumor spread to the lymph nodes? **(Node, N)**
- Has the cancer metastasized to other parts of the body? **(Metastasis, M)**
- Are serum tumor markers elevated and, if so, how high are they? **(Serum, S)**

Tumor. Using the TNM system, the "T" plus a letter or number (0 to 4) is used to describe the size and location of the tumor. Some stages are also divided into smaller groups that help describe the tumor in even more detail. For testicular cancers, the T stage can only be determined when tissue removed during surgery is examined under a microscope. This means that the T stage is only determined after the testicle is removed, and the T stage is always a pathological stage and never a clinical stage. The ?p? before the T stage indicates that it is a pathological stage. Specific tumor stage information is below.

pTX: The primary tumor cannot be evaluated. If a man has not had a radical inguinal orchiectomy (surgical removal of the testicle[s]), the term "TX" is used.

pT0: There is no evidence of a primary tumor in the testicles.

pTis: In this stage, there is intratubular germ cell neoplasia (a precancerous condition in which there are germ cells that appear cancerous but are not yet behaving the way cancer cells do), also called carcinoma in situ (CIS). CIS becomes cancer when the cells spread to areas of the testicle(s) where they do not normally belong.

pT1: The primary tumor is only in the testicle (with or without involvement of the epididymis or rete testis), and it has not invaded blood vessels or

lymph vessels in the testicles. The tumor may have invaded the tunica albuginea (the inner membrane layer surrounding the testicle) but not the tunica vaginalis (the outer membrane layer surrounding the testicle).

pT2: The tumor is in the testicle (with or without involvement of the epididymis or rete testis) and has invaded blood vessels or lymphatic vessels, and/or the tumor has grown through the tunica albuginea and into the tunica vaginalis.

pT3: The tumor has invaded the spermatic cord.

pT4: The tumor has invaded the scrotum.

Node. The ?N? in the TNM staging system stands for lymph nodes, the tiny, bean-shaped organs that help fight infection. Lymph is a fluid that flows from the different tissues and organs of the body and eventually drains into the blood stream. It passes through specialized tubes called lymphatic vessels and is filtered along the way by the lymph nodes. Cancer cells often buildup and grow in lymph nodes before they spread to other parts of the body. The first place the lymphatic fluid from the testicles drains is the retroperitoneal lymph nodes located in the retroperitoneum. These are called the regional lymph nodes for testicular cancer. Lymph nodes in the pelvis, chest or other parts of the body are called distant lymph nodes.

In men with testicular cancer, lymph nodes are usually neither biopsied nor removed. Instead, the ?N? stage is most often estimated by using CT scans. Lymph node stage (N stage) that is based on CT scans is a clinical stage and N stage based on a biopsy or removal of the lymph nodes is a pathological stage. When a stage has been determined pathologically, the letter ?p? is added as the first letter of the stage (for example pN1).

NX: The regional lymph nodes cannot be evaluated.

cN0: There is no spread to regional lymph nodes as seen on imaging tests.

pN0: There is no cancer found in lymph nodes removed during RPLND (see Treatment [3]).

cN1: Imaging tests show at least one enlarged lymph node in the retroperitoneum but none of the enlarged lymph nodes are bigger than 2 centimeters (cm).

pN1: There is cancer in one to five lymph nodes and none is larger than 2 cm.

cN2: Imaging tests show at least one enlarged lymph node (or lymph node mass) in the retroperitoneum that is larger than 2 cm but not larger than 5 cm.

pN2: Either or both of the following conditions:

- There is cancer in more than five lymph nodes but none are larger than 5 cm.
- There is cancer in at least one lymph node that is bigger than 2 cm and smaller than 5 cm

cN3: Imaging tests show at least one enlarged lymph node or a lymph node mass in the retroperitoneum larger than 5 cm.

pN3: There is cancer in at least one enlarged lymph node or lymph node mass that is larger than 5 cm.

Distant metastasis. The "M" in the TNM system indicates whether the cancer has spread to other parts of the body. When testicular cancer spreads, it most commonly spreads to the lung and the lymph nodes of the chest, pelvis, and the base of the neck. More advanced stages may have spread to the liver and bones. Testicular cancer rarely spreads to the brain unless the primary tumor is a choriocarcinoma.

MX: Distant metastasis cannot be evaluated.

M0: The disease has not metastasized to distant lymph nodes or other organs.

M1: There is at least one distant metastasis.

M1a: There is cancer in distant lymph nodes and/or the lungs.

M1b: The cancer has spread to organs other than the lung (the lungs may or may not also be involved). For example, a testicular cancer that has spread to the liver or the bones is stage M1b.

Serum tumor markers (S). Serum tumor markers also help to stage testicular cancer. As noted in the Diagnosis [2] section, blood tests for tumor markers will be done before and after surgical removal of the testicle(s). The levels taken before the testicle(s) are removed are used for staging. For patients with metastatic testicular cancer who will receive chemotherapy, the tumor marker levels on the first day of chemotherapy are used to determine the patient?s risk group (see below).

SX: Tumor marker levels are not available or tests have not performed.

S0: Tumor marker levels are normal.

S1: At least one tumor marker level is above normal (LDH less than 1.5 times the upper limit of the normal range; and beta-hCG [mIu/mL] less than 5,000, and AFP [ng/mL] less than 1,000).

S2: At least one tumor marker level is substantially above normal (LDH 1.5 to 10 times the upper limit of the normal range, or beta-hCG. [mIu/mL]) 5,000 to 50,000 or AFP [ng/mL] 1,000 to 10,000) and none of the tumor markers is elevated high enough to qualify as S3 (see below).

S3: One or more tumor marker level is very highly elevated (LDH more than 10 times the upper limit of the normal range, or beta-hCG [mIu/mL] more

than 50,000 or AFP [ng/mL] more than 10,000).

Cancer stage grouping

Doctors assign the stage of the cancer by combining the T, N, and M classifications and the S level information.

Stage 0: Refers to carcinoma in situ, also called intratubular germ cell neoplasia (pTis).

Stage I: Cancer is at any T level, and there is no evidence of spread to either lymph nodes or other organs. Serum tumor marker levels have not been performed or are not available (any T, N0, M0, SX).

Stage IA: Cancer is in the testicle and may have invaded the rete testis and the epididymis but has not invaded the lymphatic or blood vessels in the testis or spread to lymph nodes or distant sites. The tumor in the testis may have invaded the inner membrane surrounding the testis (the tunica albuginea) but not the outer membrane (the tunica vaginalis). Serum markers are normal (pT1, N0, M0, S0).

Stage IB: The testicular tumor has invaded the outer membrane surrounding the testicle (the tunica vaginalis), invaded blood or lymphatic vessels within the testicle, spread to the spermatic cord or invaded the scrotum. The cancer has not spread to lymph nodes or distant sites. Serum markers are normal (pT2, pT3, or pT4, and N0, M0, S0).

Stage IS: Cancer is of any T stage (T1, 2, 3 or 4) and has not spread to lymph nodes or distant sites. Serum markers remain above normal levels after the cancerous testicle has been removed (any T, N0, M0, and S1-3). Stage IS non-seminoma testicular cancer is treated the same as stage III testicular cancer.

Stage II: The cancer has spread to any number of regional lymph nodes but not to lymph nodes in other parts of the body or distant organs. Serum markers are unavailable (any T, N1-3, M0, SX).

Stage IIA: Cancer has spread to retroperitoneal lymph nodes, either clinical or pathological stage N1, but none is larger than 2 cm and, if a lymph node dissection has been performed, no more than five lymph nodes contain cancer. In addition, serum tumor markers are at normal levels or slightly high (S0 or S1), and there is no evidence of cancer having spread anywhere other than the retroperitoneum (any T, N1, M0, S0-1).

Stage IIB: Cancer has spread to lymph nodes in the retroperitoneum, at least one of which is greater than 2 cm and none of which are greater than 5 cm (N2); or, if a lymph node dissection has been performed, cancer has spread to at least one lymph node (or lymph node mass) between 2cm and 5cm or to more than five nodes, none more than 5 cm. Serum markers are at normal levels or slightly high (S0 or S1) and there is no evidence of cancer having spread anywhere other than the retroperitoneum (any T, N2, M0, S0-1).

Stage IIC: Cancer has spread to at least one lymph node (or lymph node mass) that is larger than 5 cm (N3). Serum markers are at normal levels or slightly high (S0 or S1) and there is no evidence of cancer having spread anywhere other than the retroperitoneum (any T, N3, M0, S0-1).

Stage III: Cancer has spread to distant lymph nodes or to any organ, and serum tumor marker levels are unknown (any T, N0-3, M1, SX).

Stage IIIA: Cancer has spread to distant lymph nodes or the lungs. Serum markers are at normal levels or slightly elevated (any T, N0-3, M1a, S0-1).

Stage IIIB: Cancer has spread to any lymph nodes (N1, N2, or N3) and/or the lungs but not to any other organs, and serum markers are at substantially and persistently elevated levels (S2) (any T, N1-3, M0, S2; or any T, N0-3, M1a, S2).

Stage IIIC: Either or both of the following:

- Serum marker levels are highly elevated (S3), and the cancer has spread to at least one lymph node or organ (any T, N1-3, M0, S3; or any T, N0-3, M1a, S3).
- The cancer has spread to an organ other than the lungs (M1b) (any T, any N, M1b, any S).

Recurrent: Recurrent cancer is cancer that comes back after treatment. If there is a recurrence, the cancer may need to be staged again (called re-staging) using the system above.

Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Manual, Seventh Edition (2010) *published by Springer-Verlag New York, www.cancerstaging.net* [4].

Later-stage testicular cancer: risk group classification

If the disease has spread to lymph nodes or other organs, the following system is used to classify a germ cell tumor into a good-risk, intermediate-risk, or poor-risk group. This helps to determine the treatment plan and the likelihood of cure. Patients in the intermediate and poor-risk groups usually receive more chemotherapy than patients in the good-risk category. Even patients with poor-risk disease have about a 50% chance of successful treatment (see Statistics [5]).

Good Risk	
Non-Seminoma	Seminoma

No metastasis to an organ other than the lungs and Good marker levels ? all of the following: AFP < 1,000 ng/mL B-hCG < 5,000 iU/L LDH < 1.5 x ULN	No metastasis to an organ other than the lungs and Normal AFP, any B-hCG, any LDH
Intermediate Risk	
Non-seminoma	Seminoma
No metastasis to an organ other than the lungs and Intermediate markers ? any of AFP >= 1,000 and <= 10,000 ng/mL B-hCG >= 5,000 and <= 50,000 iU/L LDH >= 1.5 x ULN and <= 10 x ULN	Metastasis to an organ other than the lungs and Normal AFP, any B-hCG, any LDH
Poor Risk	
Non-seminoma	Seminoma
Metastasis to an organ other than the lungs or Poor markers ? any of the following: AFP >= 10,000 ng/mL B-hCG >= 50,000 iU/L LDH >= 10 x ULN	There are no patients with poor-risk seminoma.

Source: Journal of Clinical Oncology.

Links:
[1] http://www.cancer.net/about-us
[2] http://www.cancer.net/node/19664
[3] http://www.cancer.net/node/19666
[4] http://www.cancerstaging.net
[5] http://www.cancer.net/node/19660