
*After treatment issues for
leukemia, lymphoma and marrow
or stem cell transplant survivors*

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*“We cannot direct the wind
but we can adjust the sails”*

Anonymous

After treatment screening and prevention of late effects

- **Hodgkin lymphoma**

NCCN Practice Guidelines (nccn.org)

- **Hematopoietic cell transplantation**

EBMT/CIBMTR/ASBMT guidelines

(Bone Marrow Transplant 2006; 37(3): 249-61)

Hodgkin lymphoma

- Follow-up with an oncologist is recommended especially during the first 5Y interval to detect possible recurrence, then yearly to prevent and monitor possible late complications of treatment
 - Treatment summary and consideration of transfer to primary care physician can occur 5 years or more after treatment
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Follow-up after completion of treatment

- History and physical every 2-4 mo for 1-2 y, then every 3-6 mo for the next 3-5 y
 - Consider annual flu vaccine
 - Thyroid testing yearly if radiation to the neck (as high as 50% of patients affected)
 - Counseling on smoking cessation, cardiovascular risk (hypertension, diabetes, abnormal lipids), breast cancer screening (especially women that are treated under the age of 30 with chest irradiation)
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Follow-up 5 years or more after treatment

- History and physical yearly
 - Annual blood pressure and aggressive management of cardiovascular risk factors (eg. hypertension, diabetes, lipids, smoking)
 - Blood tests: blood counts, serum chemistry, thyroid function (if neck irradiation), lipids
 - Consider baseline stress test/echocardiogram at 10Y if chest irradiation or adriamycin administered
 - Pneumococcal revaccination every 5-7 y if spleen removed
 - Consider annual flu vaccine
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Follow-up 5 years or more after treatment continued

- Consider annual chest imaging (chest xray or chest CT) if chest irradiation, smoking
 - Annual breast screening to begin 8-10 y after therapy or at age 40, whichever comes first, if chest or axillary radiation.
 - Includes self-exam and annual examination by health care professional
 - The ACS recommends breast MRI in addition to mammography for women who received irradiation to the chest between ages 10-30
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Late complications after treatment for Hodgkin lymphoma

- Increased second cancers
 - Acute leukemia in first decade related mostly to use of “alkylator” chemotherapy or etoposide + irradiation, now less commonly used; newer drug combination less harsh on bone marrow and fertility
 - Non-hodgkin lymphoma ?immune defects, recurrence of non-classical Hodgkin lymphoma
 - “Solid tumors” (lung, breast, thyroid, salivary gland, stomach, pancreas cancer, melanoma, sarcoma) related mostly to primary irradiation of those areas ± chemotherapy
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Late complications after treatment of Hodgkin lymphoma

- Cardiovascular complications relate to chemotherapy and irradiation (adding to smoking, and other cardiovascular risks)
 - Low thyroid related to irradiation
 - Dental caries related to irradiation
 - The incidence of late complications (with the exception of acute leukemia) increase with longer follow-up and survival time
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What are we doing now to try to cure Hodgkin lymphoma and minimize late complications of treatment?

- Number of cycles of chemotherapy have been limited
 - Chemotherapy regimens less commonly include alkylating drugs or etoposide
 - Less use of white blood cell growth factors to decrease bleomycin lung problems
 - Avoidance of high flow oxygen supplementation if recent bleomycin administration or pre-existing bleomycin lung injury
 - Limit cumulative dose of bleomycin and adriamycin
 - Radiation dose has been reduced
 - The extent of the irradiation field has been reduced
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Late complications of non-Hodgkin lymphomas

- Less known with the exception of chronic lymphocytic leukemia
 - Associated with increased second cancers like lung cancer, skin cancers including melanoma
 - Can be related to immune defects and practices like smoking

 - All patients with altered immune systems should avoid live vaccinations and avoid caring for those who have received live vaccinations for three-six weeks (examples are MMR, chicken pox, small pox, oral polio, shingles vaccine, yellow fever)
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Hematopoietic cell transplantation

- Type and severity of late complications depends on the type of transplant (autologous vs. allogeneic), the conditioning regimen used, pre-transplant treatment, and other coexisting illnesses or conditions
 - Late complications less common after 3 months from autologous transplantation
 - In allogeneic transplantation, late complications may occur from conditioning, chronic graft-vs-host and/or its treatment, and/or infections
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Hematopoietic transplantation late complications

- Lungs
- Kidney
- Cardiovascular

- Screening includes:

History and physical with blood pressure (?smoking, other conditions, prior treatment for cancer)

Pulmonary function tests, EKG, Chest xray, kidney function tests

Yearly blood pressure, kidney and lung testing

Other testing in individual cases

Fertility

- Treatment for cancer by cause infertility or decrease period of fertility in women by causing early menopause and decreased estrogen levels
 - Higher risk with alkylating chemotherapy (eg. cytoxan, BCNU, ifosphamide, nitrogen mustard, procarbazine), or platinum chemotherapy, or irradiation of the ovaries or testicles (pelvic irradiation, testicular irradiation, total body irradiation)
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Fertility

- In men sperm cryopreservation may preserve genetic parenting
 - Some cancers cause low sperm counts even before treatment like Hodgkin lymphoma or testicular cancer
 - In women and pre-pubertal children there are fewer options
 - Embryo cryopreservation if time
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Fertility

- Greater resistance of the ovary to injury at younger age
 - Follow up studies of children of cancer survivors to not show increased risk for congenital abnormalities
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Fertility

- Guidelines for practices related to preservation of fertility published by multiple groups
 - ASCO (American Society of Clinical Oncologists) in Journal of Clinical Oncology 2006; 24(18): 2917-2981
 - Fertile Hope (fertilehope.org)
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