



**Children's Hospital
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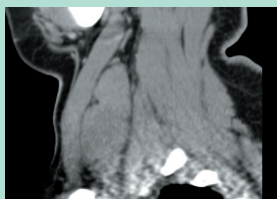
Case Study: Childhood Cancer and Blood Disorders Program

This case history illustrates the typical approach to a pediatric or adolescent patient receiving care at the Childhood Cancer and Blood Disorders Program at the Children's Hospital of Austin. Participation in modern treatment protocols allows patients to receive state-of-the-art therapy approaches along with extensive psychosocial support.

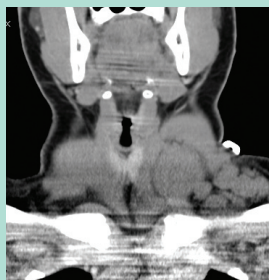
In the present case, this patient benefited from protocol enrollment, by receiving response-based therapy which allowed him to receive a reduction in the total amount of chemotherapy and potentially less exposure to long-term toxicity. Outcome data has demonstrated that pediatric and adolescent patients who are treated according to a pediatric protocol, in a pediatric cancer center, have markedly improved outcome.



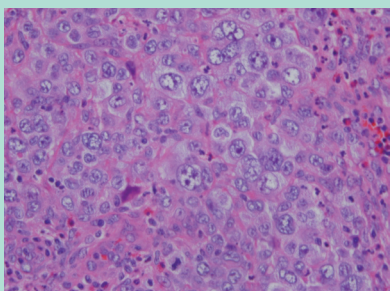
CT of neck, upper chest



lateral view of neck



frontal view of neck



Lymph node biopsy

Patient History:

A 17-year-old male, obese, high school senior, presented with a 6 month history of a painless lump in his left neck region. Otherwise he was asymptomatic (no fever, no weight loss, no night sweats). Lymph node excision and biopsy was performed by adult ENT. Referred to Pediatric Oncology Program for staging and treatment of Hodgkin Lymphoma.

Pre-Treatment Evaluation and Procedures:

CBC with Diff: WBC-7.5, HGB-15.1, Plt-218, Neut-elevated 68.6

ESR: elevated-35

Alk Phos: 114

Lytes: 138/4.2/104/26

BUN: 11

Creatinine: 0.9

AST/ALT/Bili: 26/ elevated-53/ decreased-0.4

Albumin: 3.6

LH/FSH: 7.8/4.4

Testosterone: 228

Free T4, TSH: 0.9/4.11

CXR: WNL except for mediastinum, particularly anterior mediastinum and AP window, appear prominent.

CT chest: Extensive lymphadenopathy in the left side of the neck, left axilla, anterior mediastinum and retroperitoneum.

CT neck: Pathologic lymphadenopathy noted in the left lower neck, left supraclavicular region and superior mediastinum, raising the possibility of lymphoma.

CT abd & pelvis: Adenopathy in the retroperitoneum and in the left side of the pelvis.

Abdominal US: Heterogenous spleen.

Bilateral bone marrow biopsies: Negative

Central Venous Catheter placement by pediatric surgeon, double lumen port-a-cath

ECG/Echo/PFTs: WNL

Gallium scan: Focus of uptake in the left supraclavicular region and both axillary regions consistent with the CT visible adenopathy.

Audiology testing: Borderline Normal bilat.

Sperm analysis and banking: Done

Biology Studies and Path review: One paraffin block and 10 stained slides were submitted to COG for confirmation of diagnosis and 60ml of blood was submitted for biology studies and banking.

Diagnosis and Staging:

Nodular Sclerosing Hodgkin Lymphoma, Stage IIIAS, Intermediate Risk

Children's Oncology Group (COG) Clinical and Staging Criteria for Hodgkin Disease:

Stage III = Involvement of lymph node regions on both sides of the diaphragm, which may also be accompanied by localized contiguous involvement of an extralymphatic organ or site, by involvement of the spleen, or both.

A=Asymptomatic; S=Splenic involvement

Psychosocial Supportive Care/Education

Referrals:

- **Child Life:** Referral to *Hungry Bunch Teen Support Group*; Assistance with arranging *Home Bound Schooling*; Referral to *Make-A-Wish*; Ongoing patient education and support
- **Social Work:** Referral to *Candlelighters Childhood Cancer Foundation/Any Baby Can*; Assistance at *ARD school meeting*, and with insurance and funding issues; Ongoing supportive care
- **Nurse Education:** Provided parent and patient new diagnosis teaching, educational materials and *Kelly's Team Care Kit*

Treatment:

Patient was enrolled and treated on the Children's Oncology Group study, **AHOD0031-A phase III group-wide study of dose-intensive, response-based chemotherapy and radiation therapy for children and adolescents with newly diagnosed Intermediate Risk Hodgkin Disease.**

- He received two, 21 day cycles of ABVE-PC (Doxorubicin, Bleomycin, Vincristine, Etoposide, Prednisone, and Cyclophosphamide).
- Follow up CT of Chest and Neck were done to assess disease status and it was determined that he was a very good partial responder (VGPR). Therefore he was eligible to be treated on the Rapid Early Responder (RER) arm. *Partial responders or patients with stable disease were treated on the Slow Early Responder (SER) arm and were randomized to two more 21 day cycles of ABVE-PC followed by standard radiation VS augmented (more intensive) therapy followed by standard radiation.*
- The patient then received two more 21 day cycles of ABVE-PC, followed by re-evaluation by CT scan.
- CT scans determined that he was a complete responder (CR) and he was eligible for randomization to standard radiation VS no radiation therapy.
- The patient then received 21 Gy involved field radiotherapy in 14 fractions, 150 cGy per fraction to the mantle, periaortics, spleen, and pelvic fields based on his randomization.
- Follow-up CT scans determined that the patient remained a Complete Responder.

Follow-up Plan:

Per protocol recommendations, the patient is to have the following performed:

- Physical exams every 3 months for two years, then every 6 months for 3 years, then yearly.
- CBC, ESR, ALT, AST, BUN, Creatinine, Bili, and Ferritin every 3 months for 1 year, then every 6 months for 4 years.
- Gallium scan at end of treatment.
- Late Effects Toxicity reporting at end of treatment, 1, 3, 5, 7, and 10 years.

- CXR/CT scan every 6 months for 5 years.
- ECHO/EKG/pulm fx at 3 months, and 1, 3, 5,7, 10, and 20 years.
- LH, FSH, Testosterone, Bone Density-at end of treatment, 1, 3, 6, 10, and 20 years.
- T4, TSH at end of treatment, 6 months, and then yearly.
- Quality of Life Patient Questionnaire completed at end of treatment, 1, 3, 5, 7, and 10 years.

Off-Treatment Evaluations:

- At end of treatment the patient had mild fatigue, increased over baseline, but not altering normal activities. Labs and scans were WNL.
- At 6 months post treatment, patient had trouble going to sleep and mild to moderate back pain. Labs and scans were WNL.
- At 12 months post treatment, patient had intermittent back pain. Per MRI of lumbar spine, patient had small to moderate central disc herniation at L4-5 and minor annular bulging at L5-S1. Referred to orthopedic surgeon for evaluation who recommended anti-inflammatory treatment and physical therapy. Lab and other scans were WNL. Patient remains disease free.
- Currently, at 18 months post treatment, patient's Thyroid Studies are decreased; Referred to Pediatric Endocrinologist for evaluation. Patient remains disease free.

Potential Late Effects:

Cure rates for Hodgkin Disease remain among the highest in pediatric oncology. However, cure often comes with a significant cost in the form of delayed effects of therapy. Because of the type of chemotherapy and radiation this patient received, he is at risk for getting a secondary malignancy (most common are leukemia, thyroid, or breast cancer), loss of reproduction function, lung and cardiac toxicity, growth retardation of bones in radiation fields, and damage to organs in radiation fields. When the patient is two years off-treatment he will be eligible for the Childhood Cancer Survivors' Comprehensive Clinic, a collaboration of Children's Hospital of Austin, 'Specially for Children and Candlelighters Childhood Cancer Foundation. An important goal of Survivors' Clinic is for each childhood cancer survivor to protect his/her good health by fully understanding the cancer treatment received and making sure that the right medical follow-up is obtained.

Healthcare Team Members:

James Sharp, MD, Pediatric Oncologist

Melba Lewis, MD, Otolaryngologist

Tory Meyer, MD, Pediatric Surgeon

Stephen Brown, MD, Radiation Oncologist

Maureen Riopel, MD and Amelia Vendrell, MD, Pathologists

Eugene Tong, MD and Bill Banks, MD, Pediatric Radiologists

Anne Jansson, RN, Pediatric Oncology Clinic Nurse

Janet Cavitt RN, BSN, CPON, Pediatric Hematology / Oncology Patient Educator

Jamie Gender RN, BSN, CPON, Pediatric Oncology Research Nurse

Cynthia Fitchpatrick M.Ed., CCLS, Childlife Specialist

Emily Pearcy, LMSW, Candlelighters Social Worker