Fatal outcome of non-Hodgkin B cell lymphoblastic lymphoma: A case report

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ABSTRACT

B-lymphoblastic lymphoma is more slow-growing than T-LL and can be found in the skin, bone, or lymph nodes. Lymphoblastic lymphoma can be spread all over the body parts, including the brain and spinal cord (cerebrospinal fluid), in a male to the testes. It is a type of non-Hodgkin lymphoma (NHL). Children are most affected by lymphoblastic lymphoma and about 35% of all NHLs in children. Here, we report a 2-year and 6-month-old male child who was brought with complaints of swelling in the right testicular region in the last 6 days. The patient was alright 6 months back when he developed swelling in the temporal region, sudden in onset and not associated with pain. The further clinical investigation with hematological and radiological aids confirmed a final diagnosis of non-Hodgkin B cell lymphoblastic lymphoma.

Keyword: B-lymphoblastic lymphoma, hematological, non-Hodgkin lymphoma, radiological

Introduction

Lymphoid tissue, lymphocyte, and histiocytes are some of the cells that make up a heterogeneous group of malignancies. In recent years, better clinical, pathological, and genetic statistics have assisted developments in lymphoma classification reflected in the WHO revision of 2016.¹ This acknowledges more than 40 mature B-cell neoplasms as well as more than 25 mature T-cell and natural killer (NK)-cell neoplasms.² The fourth most common childhood cancer and higher incidence in adolescents is non-Hodgkin lymphoma (NHL).³ A short, intense high-dose of methotrexate and cyclophosphamide is used to cure children with diffused large B cell lymphoma. Even with intensive treatments, remission of B-cell and lymphoblastic lymphomas are extremely rare.⁴ Anaplastic large-cell lymphomas have a 75% event-free survival rate when treated with a short, intensive B-like Regimen.⁵ The same protocols are used in children and adolescents, except that there have been reports of relapses up to 3 years after diagnosis.⁶

The response to treatment significantly differs between Large B-cell Lymphomas in pediatric and adult patients. Diffuse large B-cell lymphoma in children responds well to therapeutic interventions, and it has an event-free survival at about 90%.⁷

NHL refers to all lymphomas other than Hodgkin’s lymphoma (HL). Over the last three decades, there has been persistent evidence of an increase in the incidence of NHL.⁸ Diffuse large B-cell lymphoma (about 30% of all NHL subtypes) and follicular lymphoma (about 20%) are by far the most common in developed countries, and the prevalence of all other NHL subtypes is less than 10%.⁹ NHL is the leading cause of cancer-related deaths in the United States, claiming only breast, lung, colorectal, and bladder cancer. After squamous

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cell carcinoma, the second most common cancer is in the oral site, i.e., oropharyngeal lymphomas. The yearly incidence of lymphoma is per million persons ranges from 5.9 in children under five to around ten in children aged five to fourteen, with adolescents accounting for fifteen (approximately 150 in adults). Most childhood NHL is high-grade lymphoma, with most cases being B-cell in nature.

Patient and Observation

Patient information

A 2-year and 6-month-old male child was brought with complaints of swelling in the right testicular region in the last 6 days. The patient was alright 6 months back when he had developed swelling in the temporal region, sudden in onset and not associated with pain. Magnetic resonance imaging brain with contrast was suggestive of Non-Hodgkin’s lymphoma with muscle infiltration. Biopsy from parotid gland swelling was suggestive of B-cell lymphoblastic lymphoma/leukemia. The case was presented in the tumor board and was advised to chemotherapy. Intensive chemotherapy was started with Inj. Vincristine, Inj. Daunorubicin, intrathecal methotrexate, Inj. Leunase, Tab. Omacamril for 1 month. Complete blood count showed hemoglobin-7, total leucocyte count-200, and platelets-22000. Packed red cells were transfused. Potassium was on the lower side, so intravenous fluid was done with double maintenance. Complete blood count was repeated and found a decrease in total cell counts and hemoglobin.

A tumor board discussion was done and advised to start broad-spectrum antibiotic and filgrastim and DEXA. The central line was placed. The patient had swelling, and albumin was on the lower side; albumin was transfused. Blood culture found methicillin-resistant Staphylococcus aureus (MRSA), so gentamycin was added. The ophthalmic call was done, which came to be normal. The patient had an episode of convulsion, so Inj. Levera was added. The patient had shallow respiration with decreased drive; sensorium depressed with increased PCO$_2$–79, so patient was intubated. Computed tomography scan of the extra-axial ill-defined hypodense collection in bilateral fronto-pareito-temporal region. The patient had continued seizures, so Inj. Midaz and fentanyl drip was started, and the patient was loaded with phenytoin. The patient had a sudden fall in BP and feeble pulses, so the adrenaline was added. Nasogastric feeds were started and gradually increased. The patient was not maintaining saturation and went into bradycardia, so cardiopulmonary resuscitation was started, and adrenaline boluses were given, but after every resuscitative measure, the patient could not be revived and died on 31/7/2021 at 2 am. The cause of death is a relapse of leukemia, chronic subdural hemorrhage, and leukemia.

Clinical findings

On clinical finding, inpatient physical general examination found shortness of breath with a rate of 12 breaths per minute, heart sound was S1, and S2 clear sound was heard with a rate of 102 beats per min, oxygen saturation was 98%, blood pressure was 140/72 mmHg, weight was 12 kg, and height was 65 cm.

On genitourinary clinical examination, left testicular swelling was found; in head examination, parotid swelling was found; in lower limb examination, bilateral lower limb pain with edema and weakness was found.

Diagnostic assessment

The patient was undergoing various types of investigation and tumor board discussion. Red blood cells are predominantly normocytic on peripheral smear with occasional macrocyte and target cells and mildly hypochromic. Hematomorphological features are suggestive of NHL cells spilling into the peripheral blood.

Cytopathology examination (CSF fluid cytology) revealed that smear shows almost 70% of blastoid cells and others are lymphoid cell populations with very rare lymphocyte with a degenerated nucleus in the granular background material, rare smudged nucleus, and contaminates. No pleocytosis is seen.

Computed tomography of the brain found extra-axial ill-defined hypodense collection in the bilateral fronto-pareito-temporal region (left > right) and anterior interhemispheric spaces likely subdural effusion. Evidence of extraxail hypodense collection (9–11 HU) was noted in the bilateral fronto-pareito-temporal region (Left > Right) of maximum thickness 1.2 cm in the left frontal region and anterior interhemispheric spaces. Mucosal thickening was noted in the bilateral maxillary, frontal, ethmoid and sphenoid sinus suggestive of sinusitis. In left mastoid air cells, soft tissue attenuation was noted, suggestive of left-sided mastoiditis.

On Immunohistochemistry, radiological detail left parotid swelling in the last 4 months. The mass lesion in the left parotid region was measured 3.9 × 2.9 × 3.8 cm with submandibular lymphadenopathy. The specimen was a core biopsy of the left parotid lesion. On microscopy view, the specimen showed tiny cores showing diffuse malignant round blue cells invading the adjacent stroma. Native unremarkable salivary gland structure is seen. Histomorphology favors non-Hodgkin lymphoma. Tumor cells show diffuse and robust immunoreactivity for Tdt and CD79a, and CD3 cells are immunonegative. The MIB 1 labeling Index is 90%.

Ultrasoundography of inguinoscrotal region showed that left testis appears normal in size, shape, and vascularity size 19 × 8.5 mm, and right testis is 30.5 × 17.8 mm in size, oval heterogeneously hypoechoic area, and moderate vascularity on color Doppler.

Therapeutic intervention

As said earlier, in NHL, several treatments are available, but which treatment or combination of treatment is suitable to patients depends on the types of lymphoma. In our patient,
targeted drugs therapy, which was discussed in tumor board, was given as follows:

Chemotherapy medication administered to the patient: Inj. steroid 60 mg/m², Inj. vincristine 1.4 mg/m², Inj. Daunorubicin 30 mg/m², intrathecal methotrexate 10 mg, Inj. Leunase 5000 IU.

Three human packed blood cells were given, nine platelets were concentrated, and one whole human blood was administered to fulfill blood components.

Informed consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient's parents have given their consent for their child images and other clinical information to be reported in the journal. The parents understand that their child name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Discussion
Lymphoma refers to a complex group of lymphoreticular system malignancies. These malignancies start in the lymphatic tissues and proceed to extranodal masses (NHL), non-tender masses, or masses in a lymph node region (HL) before spreading to other lymph node groups and implicating the bone marrow. Lymphoma in the mouth's soft tissues usually manifests as an extranodal, soft to firm asymptomatic mass, though the tumor can also be painful.[9]

Because treatment options, response to therapy, and prognoses differ greatly depending on the diagnosis, the accuracy of these cancer diagnoses is critical.

B-cell lymphoma, T-cell/Natural Killer cell lymphoma, and Hodgkin's lymphoma are the three major lymphoid malignancies recognized by the WHO modifications to the Revised European–American Lymphoma Classification. After the gastrointestinal tract, the head and neck regions are the second most common extranodal NHLs. The most common site of origin in the head and neck is Waldeyer's ring, accompanied by cervix involvement. There is a chance that the nose, paranasal sinuses, and salivary glands are affected by decreasing order of frequencies, with rare spread to the regional lymph nodes.[9]

Large cell histologic types have increased the incidence of NHL since 1950. However, the most recent increase has been related to the HIV epidemic. The first sign of the disease is usually found in the oral cavity. The differential diagnosis needs to be considered when these are presented as squamous cell carcinoma.[9]

There is no single method for preventing the NHL. Treatment for NHL is determined by the grade of lymphoma, i.e., low/intermediate/high, and the patient's age and condition. With a combination of radiation therapy and chemotherapy, low-grade (slow-growing) lymphomas can sometimes be cured in their early stages. Chemotherapy with or without radiation therapy and a bone marrow transplant can treat advanced-stage, low-grade lymphoma. Radioimmunotherapy entails injecting antibodies with added radioactive iodine to treat advanced, higher-grade lymphomas or those that recur after treatment. If there is no HIV infection, the risk is decreased. It is unclear whether avoiding certain chemicals would protect patients from lymphoma.[9]

Conclusion
Though NHL is a reticuloendothelial system disease, it can affect extranodal regions, namely, the stomach, skin, lung, salivary glands, and mouth, in rare cases. Chemotherapy tailored to specific lymphoma types and disease severity will cure most children and adolescents with non-Hodgkin's lymphoma. At the same time, acute myelosuppressive and GI toxicities, which can be life-threatening, can reduce the quality of life. Because of the elimination of radiation therapy and the low cumulative chemotherapy doses, many children are expected to have little long-term toxicity. Children and adults have different treatment strategies and intensities regarding NHL subtypes.

Key point
1. This was a case of non-Hodgkin's lymphoma with muscle infiltration in a child aged two and half years.
2. Challenges in diagnosis and treatment were obvious considering the patient age and location of the tumor. In spite of chemotherapy and palliative care, the patient succumbed.

New knowledge emerging from this manuscript
1. Main way to diagnose B-lymphoblastic lymphoma is to biopsy a lymph node or study a sample of a lymph node under the microscope.
2. Chemotherapy is a golden way to treat B-lymphoblastic lymphoma.

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Conflicts of interest
There are no conflicts of interest.

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