

FULL PAPER

Pleural efusion in burkitt's lymphoma: a case report

Dian Sukma Hanggara^{a,*} | Paulus Budiono Notopuro^b | Hendy Setyo Yudhanto^c | Edwin Darmawan^d

^aClinical Pathology Education Program, Hematology Division, Faculty of Medicine, Airlangga University, Surabaya, Indonesia

^bClinical Pathology Department, Faculty of Medicine, Airlangga University, Surabaya, Indonesia

^cAnatomical Pathology Laboratory, Dr. Saiful Anwar General Hospital, Malang, Indonesia

^dClinical Pathology Laboratory, Brawijaya University, Malang, Indonesia

Pleural effusion in sporadic Burkitt's lymphoma is very rare. The diagnosis of Burkitt's lymphoma was confirmed by histopathological and immunohistochemical examination, while pleura involvement was confirmed by pleural fluid analysis and its cytology. We presented a 6-year-old girl diagnosed with Burkitt's lymphoma who came for the sixth cycle of chemotherapy presented with shortness of breath. Lymphoma cell infiltration was confirmed by immunohistochemical examination of the mass in the ileum and pleural fluid cytology. Although rare, the possibility of lymphoma cell infiltration should be considered if a pleural effusion is found in Burkitt's lymphoma.

KEYWORDS

Burkitt's lymphoma; pleural effusion; Burkitt's lymphoma-related pleural effusion; pleural fluid analysis; lymphoma cell infiltration; case report.

*Corresponding Author:

Dian Sukma Hanggara

Email: dian_sukma.fk@ub.ac.id

Tel.: +62817389269

Introduction

Non-Hodgkin lymphoma (NHL) makes up 7–10% of all malignancies in children under the age of 20. Lymphoma is the third most prevalent type of malignancy in children. About 1% to 5% of NHL cases are Burkitt's lymphoma, a B-cell non-Hodgkin's lymphoma [1-4].

Primary pleural malignancies or intrathoracic and extrathoracic malignancies that spread hematogenously, lymphatically, or contiguously to reach the pleural space can cause malignant pleural effusions. Over 75% of malignant pleural effusions are brought on by lymphoma, breast, ovarian, or lung neoplasms [5,6]. Effusion occurs in malignant lymphomas that are highly proliferative, such as Burkitt's lymphoma and lymphoblastic lymphoma, and is linked to a poor prognosis.

In this instance, urate-lowering medication may be considered for the patient to diagnose tumor lysis syndrome through examination of the effusion fluid [7]. The purpose of this case report is to discuss malignant pleural effusion in a patient with Burkitt's lymphoma, more importantly its diagnostic management.

Patient and observation

Patient Information

A 6-year-old girl came to our hospital for her last cycle of chemotherapy for Burkitt Lymphoma. The patient also complained of leg pain since the end of the 5th cycle, which was accompanied by swollen feet. The patient had a fever since 3 days prior to the hospital admission. The patient had been diagnosed with Burkitt's Lymphoma of the intestine a

year prior, thus subsequently undergoing chemotherapy according to Magrath protocol. At that time, the patient complained of an enlarged abdomen since a month prior, and a mass was identified by MRI. The mass of the ileum was removed by laparotomy, followed by histopathological and immunohistochemical examinations. Immunohistochemical examination showed 100% Ki-67 positive and positive CD20 diffuse pattern suggesting Burkitt's lymphoma (Figure 1a and 1b).

Clinical Findings

The patient's vital signs on arrival were within normal limits. Laboratory examination showed Hb 9.8 g/dL, platelets 904,000/uL, and uric acid 7.7 g/dL.

Timeline of current episode

The patient had shortness of breath on the third day, and fluid accumulation was found on physical examination and ultrasound three weeks after her last cycle of chemotherapy.

Diagnostic assessment

Thoracentesis was performed to collect the pleural fluid for analysis. It showed a cloudy yellow fluid with blood clots, the dominantly found leukocytes were mononuclear cells, the pleural fluid total protein was 3.42 g/dL, and the LDH was 11.470 g/dL. On Wright-Giemsa staining, mononuclear cells were found with a basophilic and vacuolated cytoplasmic appearance that matched the Burkitt's lymphoma cells (Figure 2).

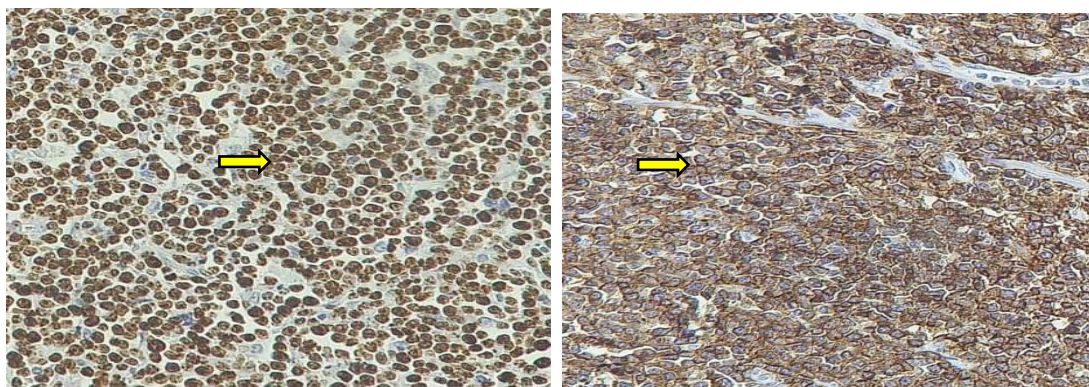


Figure 1 The results of the immunohistochemical examination of the tumor in the patient's intestine on her last hospital hospitalization. (A) Immunohistochemical examination of Ki-67 was 100% positive (high proliferation index) (left). (B) Diffuse pattern positive CD20 immunohistochemistry examination (400x magnification) (right)

Diagnosis

A Burkitt's lymphoma of the intestine and pleura was confirmed.

Therapeutic interventions

The patient underwent pleural fluid evacuation and received supportive management.

Follow-up and outcomes

The patient returned home on the 12th day of hospitalization with an improved general condition compared to when she was initially admitted. Her last laboratory examination finding showed normal platelets and uric acid levels (platelets 164,000/uL; uric acid 4.2 g/dL) and leukopenia (3,080/uL). The patient was planned for the next chemotherapy a week after her discharge.

Patient Perspective

During her hospitalization, the parents were satisfied with the care she received and seemed optimistic about her status of health. The patient was discharged and planned for the next chemotherapy a week after.

Informed Consent

Written consent was obtained from the patient for publication of this case report.

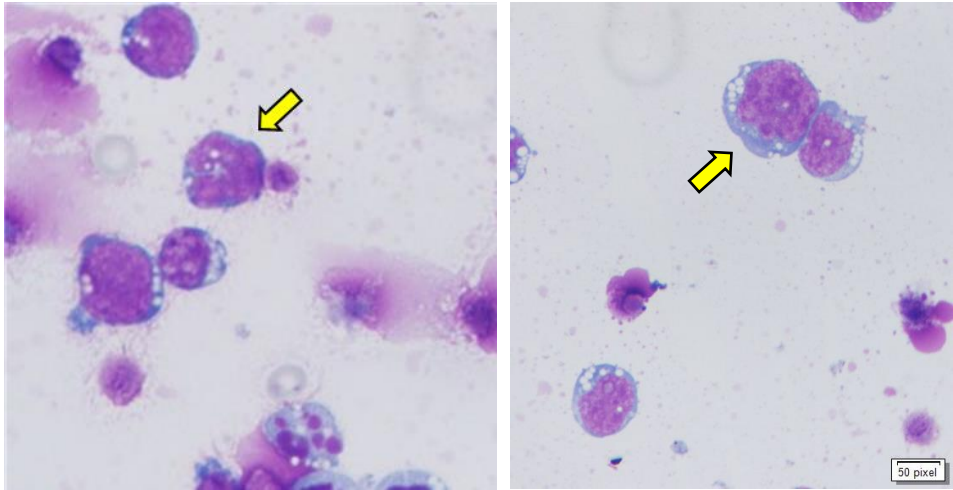


FIGURE 2 Cytology analysis of pleural fluid shows cells with morphology: large cells, heterogeneous in size, basophilic cytoplasm, cytoplasmic vacuoles, and multiple nucleoli. (Wright-Giemsa painting, 1000x magnification).

Discussion

The patient had a history of Burkitt's lymphoma in the ileum which was confirmed with histopathological and immunohistochemical examinations. In the World Health Organization (WHO) classification, Burkitt's lymphoma is defined as a highly aggressive B-cell neoplasm that often presents extranodally or as an acute leukemia [8]. Macroscopically, gastrointestinal involvement presents as a large mass with bowel wall thickening and hemorrhage, often associated with multiple polypoid lesions. Histologically, the lymph node structure eventually disappears and a characteristic diffuse proliferation can be found, with a clear starry-sky pattern seen in small visual fields [9,10]. Burkitt lymphoma

is also characterized by a c-myc translocation, CD10+/bcl-2-/bcl -6+ with a very high Ki-67 proliferation index, and positive B cell antigens such as CD19, CD20, CD22, and CD79a [11,12].

Based on the geographical distribution, Burkitt's lymphoma have 3 types, which are endemic (eBL) found in Africa, sporadic (sBL) found in countries other than the African continent, including Europe and Asia, and the last is associated with immunodeficiency (iBL). Our patient can be classified as sporadic type, because the patient is Asian. The majority of the sporadic type occurs in children and involves the abdominal organs, especially the ileocecal, up to about 80% of cases [9].

Pleural effusion was present three weeks after her completion of fifth cycle of chemotherapy [13]. Pleural effusion is an

accumulation of fluid in the pleural space which is classified as transudate or exudate according to its composition and underlying pathophysiology [14,15]. Pleural effusion in patients with low immune status can be associated with non-malignant processes, such as infection. However, it can also be associated with malignancies, such as sarcoma. Kaposi's, thoracic non-Hodgkin's lymphoma, or primary effusional lymphoma [16]. Malignant pleural effusion diagnosis is made when malignant cells in the pleural fluid was found. It is a pathological process that indicates a failure of defense mechanisms in the pleura and mesothelial function. Malignant pleural effusion is naturally an exudate characterized by high protein and lactate dehydrogenase (LDH) on pleural fluid analysis [17-19].

The patient was discharged with a complete blood count showing leukopenia. The pediatric patient with Burkitt's lymphoma at Dr. Saiful Anwar General Hospital underwent chemotherapy according to Magrath protocol. In the last cycle of chemotherapy, the patient received high-dose methotrexate and leucovorin. Methotrexate is a chemotherapeutic agent that stops DNA anti-metabolites so that it has a risk of myelosuppression, causing neutropenia and megaloblastic anemia. However, this can be managed by administering leucovorin-a folic acid supplementation [20]. In this patient, there may be a marrow suppression after the third day of treatment, but has shown improvement until the 12th day.

Conclusion

Burkitt's lymphoma is a very aggressive tumor with varied manifestations. In children with sporadic Burkitt's lymphoma, the majority of cases involve the abdominal organs, particularly the ileocecal. The manifestation of pleural effusion is rare. Therefore, in Burkitt's lymphoma patients who complain of shortness of breath, the

possibility of pleural effusion should be suspected. It is necessary to undergo radiology examination to confirm the presence of pleural effusion, and perform pleural fluid analysis and cytology to determine the cause. Burkitt's lymphoma in children has a decent possibility of recovery if intensive chemotherapy is immediately performed.

Acknowledgments

The authors would like to thank the patient and the support of the staff in hematological and all other lab studies.

Conflict of interest

The authors have no conflict of interest regarding this investigation.

Authors' contributions

The case report was written by Dian Sukma Hanggara, the figures of immunohistochemical examination was interpreted and assured by Hendy Setyo Yudhanto, the figures of cytology analysis was interpreted and assured by Edwin Darmawan, and the review by Paulus Budiono Notopuro. All the authors have read and agreed to the final manuscript.

Orcid:

Dian Sukma Hanggara*:

<https://orcid.org/0000-0002-0881-096X>

Paulus Budiono Notopuro:

<https://orcid.org/0000-0001-6927-2205>

Hendy Setyo Yudhanto:

<https://orcid.org/0009-0006-2713-8247>

Edwin Darmawan:

<https://orcid.org/0000-0001-8315-7166>

References

- [1] M.R. Lokeshwar, N.K. Shah, A. Sachdeva, B.R. Agarwal, M.V., Pillai A. Manglani, Textbook of Pediatric Hematology and

- Hemato-Oncology [Internet], Jaypee Brothers Medical Publishers (P) Ltd.; **2016**. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [2] H. Istiadi, U. Sadhana, D. Puspasari, I.P. Miranti, V. Karlowee, D.E. Listiana, A. Prasetyo, Prognostic significance of double expressor lymphoma subtype in patient with diffuse large B-cell lymphoma, *Bali Medical Journal*, **2021**, *10*, 366-372. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [3] G. Khusnurrokhman L. Wulandari Mediastinal Non-Hodgkin's Lymphoma Metastatic to Right Atrium Mimicking Right Atrial Myxoma, *Folia Medica Indonesiana*, **2021**, *57*, 345-350. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [4] R.S. Salma, M.P. Sedana, S.U. Yudho, CHOP and R-CHOP Therapeutic Responses in Non-Hodgkin Lymphoma Patients in Dr. Soetomo General Hospital Surabaya, *Biomolecular and Health Science Journal*, **2018**, *1*, 93-96. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [5] D. Muduly, T. Subi, N. Shukla, S. Deo, A. Kallianpur, An update in the management of malignant pleural effusion, *Indian Journal of Palliative Care*, **2011**, *17*, 98. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [6] R. Hashempour, , Aryannia, A., M. Mehrjerdian, S.S. Baniaghil, A. Rezaie, R. Alipoor, The Concentration of Interleukin-27 in the pleural fluid of patients with exudative pleural effusion and its diagnostic value in differentiating between benign and malignant pleural effusion, *Bali Medical Journal*, **2018**, *7*, 205-209. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [7] (a) Y. iang, W. Xie, K. Hu, J. Sun, X. Zhu, H. Huang, An aggressive form of non-Hodgkin's lymphoma with pleural and abdominal chylous effusions: A case report and review of the literature, *Oncology Letters*, **2013**, *6*, 1120-1122. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)], (b) M.K. Najim, Q.R. Lahhob, H.J. Abbas, H.A. Alidrisi, Z.J. Ibrahim, Z.K. Budaiwi, Z.H. Abdul-Jabbar, Association of serum apelin and atherogenic indices in patients with primary thyroid diseases, *Journal of Medicinal and Pharmaceutical Chemistry Research*, **2023**, *5*, 588-597. [[Pdf](#)], [[Google Scholar](#)], [[Publisher](#)], (c) J. Nourmohammadi, M. Jafari, R. Abbaszadeh, S. Rahimi Ghasabeh, H. Amani, S.A. Kalali Sani, Chest CT findings in patients with COVID-19 infection: a systematic review and meta-analysis, *Journal of Medicinal and Pharmaceutical Chemistry Research*, **2022**, *4*, 425-431. [[Pdf](#)], [[Google Scholar](#)], [[Publisher](#)], (d) A. Zafar-Mohtashami, A. Bakhtiari, B. Hadian, Z. Obeidavi, Nephrotic syndrome associated with carcinoma of unknown primary treated with chemotherapy: A rare case report, *Journal of Medicinal and Pharmaceutical Chemistry Research*, **2020**, *2*, 196-201. [[Pdf](#)], [[Google Scholar](#)], [[Publisher](#)]
- [8] R. Jaffe, WHO classification of tumours of haematopoietic and lymphoid tissues, *World Health Organization Classification of Tumours*, **2008**, 358-360. [[Google Scholar](#)], [[Publisher](#)]
- [9] G. Lenz, L.M. Staudt, Aggressive lymphomas, *New England Journal of Medicine*, **2010**, *362*, 1417-1429. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [10] A. Septiani P.P.A.P. Dewi, Widyoningroem A., Sensusiaty A.D., Yamin M., The relationship between Epidermal Growth Factor Receptor (EGFR) mutation and computed tomography findings in lung adenocarcinoma, *Bali Medical Journal*, **2019**, *8*, 511-514. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [11] S.S. Chuang, H. Ye, M.Q. Du, C.L. Lu, A. Dogan, P.P. Hsieh, W.T. Huang, Y.C. Jung, Histopathology and immunohistochemistry in distinguishing Burkitt lymphoma from diffuse large B-cell lymphoma with very high proliferation index and with or without a starry-sky pattern: a comparative study with EBER and FISH, *American journal of clinical pathology*, **2007**, *128*, 558-564. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [12] K. Kelemen, R.M. Brazier, K. Gatter, T.C. Bakke, S. Olson, G. Fan, Immunophenotypic variations of Burkitt lymphoma, *American*

journal of clinical pathology, **2010**, *134*, 127-138. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[13] B. Askandar, Lung metastasis of gynecologic cancers, *Bali Medical Journal*, **2021**, *10*, 701-707. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[14] H. Yu, March. Management of pleural effusion, empyema, and lung abscess. In *Seminars in Interventional radiology*, **2011**, *28*, 75-86. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[15] I. Asmara, Clinical and laboratory comparison between End-Stage Kidney Disease patients with and without COVID-19: a cross-sectional study in a top referred hospital of West Nusa Tenggara, *Bali Medical Journal*, **2022**, *11*, 1074-1079. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[16] E.A. Pangarsa, D. Rizky, B. Setiawan, D. Santosa, S.M. Haryana, C. Suharti, Crosstalk between hypoxia and inflammation in non-Hodgkin lymphoma, *Bali Medical Journal*, **2022**, *11*, 1063-1073. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[17] J.A. Kastelik, Management of malignant pleural effusion. *Lung*, **2013**, *191*, 165-175. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[18] R.M. Mercer, J.P. Corcoran, J.M. Porcel, N.M. Rahman, I. Psallidas, Interpreting pleural fluid results, *Clinical Medicine*, **2019**, *19*, 213. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[19] W.Q. Zheng, Z.D. Hu, Pleural fluid biochemical analysis: the past, present and future, *Clinical Chemistry and Laboratory Medicine (CCLM)*, **2023**, *61*, 921-934. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[20] J. Ritter, L. Lewis, T. Mant, A. Ferro, *A textbook of clinical pharmacology and therapeutics*, CRC Press, **2008**. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

How to cite this article: Dian Sukma Hanggara*, Paulus Budiono Notopuro, Hendy Setyo Yudhanto, Edwin Darmawan, Pleural efusion in burkitt's lymphoma: a case report. . *Journal of Medicinal and Pharmaceutical Chemistry Research*, 2024, *6*(4), 411-416.
Link:
http://jmpcr.samipubco.com/article_185736.html