Commentary

10.5505/tjh.2012.16013

Pulmonary Complications in Acute Myeloid Leukemia

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In this issue of the journal, Bugdaci et al. reports on the pulmonary radiological findings in patients with acute myeloblastic leukemia (AML) and their relation to chemotherapy and prognosis [1]. Respiratory events occurred in 19% of the 278 patients, especially in advanced aged patients with low absolute neutrophil leukocyte counts at initial presentation of disease. Pulmonary findings were due to infection in 56.6% of cases and to another cause in 24.5%. These results and the rate of pulmonary events with undetermined etiologies were consistent with similar studies from different groups such as Chaoui et al. and Rano et al. [2, 3].

In the present study, Bugdaci et al. reported infection as the most common pulmonary complication in AML. Although most cases represent infectious pneumonia, with bacteria (28.3%) and fungi (26.5%) the leading pathogens, noninfectious etiologies such as leukemic infiltration (3.8%), pulmonary embolism (7.5%), pneumothorax (3.8%), and cardiac disease (9.4%) also must be taken into account.

Both pulmonary leukostasis and malignant infiltration of the lung have been described in patients with AML [4]. In contrast to leukostasis, leukemic pulmonary infiltration has been defined in AML patients without hyperleukocytosis, suggesting that the type of blasts and their affinity for the pulmonary endothelium may be involved in the development of ARF. Bugdaci et al. reported two cases of AML M5 and M4/5 with pulmonary leukemic infiltration at initial presentation of disease. Azoulay et al. showed that adding dexamethasone (10 mg every 6 hours, until leukopenia occurred) to the chemotherapy regimen in AML M5 with acute respiratory failure from leukemia-related pulmonary involvement significantly diminished mortality [5].

Pulmonary manifestations including leukemia-related respiratory involvement and infectious process such as hypoxemic acute respiratory failure (ARF) and pneumonia, constitute diagnostic and therapeutic emergencies, and contribute to the morbidity and mortality during the course of AML [6]. In patients with AML and pulmonary infiltrates, infection must be suspected and treated empirically, because ARF, the leading reason for intensive care unit admission, still carries a 50% overall mortality rate despite improvements in supportive therapy. However, clinically defined respiratory events may be directly due to the leukemia-related involvement consist of leukostasis, leukemic infiltrates and lysis pneumopathy [5]. In addition to rapid cytoreduction by hydration and chemotherapy, anti-inflammatory therapy appears to be effective in improving outcomes in these patients. For many years, glucocorticoids (GCs) are often clinically used to treat lymphoid leukemia and lymphoma. The induction of apoptosis is thought to be a main mechanism mediating the therapeutic effect of GCs [7]. In contrast to acute lymphoblastic leukemia, AML cells have usually been resistant to these agents [8]. Nevertheless, steroid therapy has been used in AML with pulmonary disease of infectious or noninfectious origin, to prevent acute respiratory distress syndrome through various mechanism, including decrease cytokine and oxidant release, blast adhesion to endothelial cells and blast degeneration within the interstitium [5].

In conclusion, irrespective of their etiology, respiratory events are of a major prognostic significance [2]. Moreover, leukemic pulmonary involvement should be considered in AML patients with noninfectious lung infiltration.

References

1. Bugdaci MS, Yanardag H, Ar MC, Soysal T, Coskun S, Demirci S. Pulmonary radiological findings in patients with acute myeloid leukemia and their relation to chemotherapy and prognosis: a single center retrospective study. Turk J Hematol. 2012;29:217-222.

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2. Chaoui D, Legrand O, Roche N, Cornet M, Lefebvre A, Peffault de Latour R, Sanhes L, Huchon G, Marie JP, Rabbat A. Incidence and prognostic value of respiratory events in acute leukemia. Leukemia. 2004;18(4):670-675.
3. Rañó A, Agustí C, Jimenez P, Angrill J, Benito N, Danés C, González J, Rovira M, Pumarola T, Moreno A, Torres A. Pulmonary infiltrates in non-HIV immunocompromised patients: a diagnostic approach using non-invasive and bronchoscopic procedures. Thorax. 2001;56(5):379-387.
4. Azoulay E, Fieux F, Moreau D, Thiery G, Rousselot P, Parrot A, Le Gall JR, Dombret H, Schlemmer B. Acute monocytic leukemia presenting as acute respiratory failure. Am J Respir Crit Care Med. 2003;167(10):1329-1333.
5. Azoulay É, Canet E, Raffoux E, Lengliné E, Lemiale V, Vincent F, de Labarthe A, Seguin A, Boissel N, Dombret H, Schlemmer B. Dexamethasone in patients with acute lung injury from acute monocytic leukaemia. Eur Respir J. 2012;39(3):648-653.
6. Uzunhan Y, Cadranel J, Boissel N, Gardin C, Arnulf B, Bergeron A. The specific pulmonary manifestations of acute myeloid leukaemia. Rev Mal Respir. 2010;27(6):589-598.
7. Kanatani Y, Kasukabe T, Okabe-Kado J, Hayashi S, Yamamoto-Yamaguchi Y, Motoyoshi K, Nagata N, Honma Y. Transforming growth factor beta and dexamethasone cooperatively enhance c-jun gene expression and inhibit the growth of human monocytoid leukemia cells. Cell Growth Differ. 1996;7(2):187-196.
8. Hicsonmez G. A novel approach to treatment in childhood acute myeloblastic leukemia and myelodysplastic syndrome with high-dose methylprednisolone as a differentiation -and apoptosis- inducing agent of myeloid leukemic cells. Turk J Hematol. 2010;27:1-7.