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Case report

Acute psychosis in patient with hydroxyurea-induces anemia

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A 65-year-old Thai woman with underlying essential thrombocythemia (ET) presented with acute psychosis. Hydroxyurea has been used in the patient with ET to reduce the frequency and severity of thrombotic complications of the disease. Its side effect is anemia which is almost always reversible and will go away after the treatment is completed. In this case report, the psychotic symptoms happened with no other specific causes. This novel evidence suggests the possibility of the association between hydroxyurea and anemia.

Keywords: Essential thrombocythemia, hydroxyurea, psychosis, psychotic disorder.

Hydroxyurea has been used in treatment of high-risk patient with essential thrombocythemia [1] The effectiveness of hydroxyurea in treatment of this disorder is due to the suppression of bone marrow and subsequent anemia. [2, 3] Anemia is defined as the fall of hemoglobin (Hb) concentration in blood below the normal level, which is determined by age and sex. [4] The World Health Organization defines that when the Hb is < 13.0 g/dL in an adult male or < 12.0 g/dL in an adult female, the individual is anemic. [5]

We known that hydroxyurea can induce anemia but rarely see a case report that anemia can induce acute psychosis except that vitamin B12 deficiency induced psychosis [6] which is different from our patient, due to incompatible blood picture profile, and not macrocytic anemia. In this case report, we will discuss about a female adult patient with essential thrombocythemia who had developed the symptoms of psychosis while being treated with hydroxyurea.

Case report

A 65-year-old Thai woman female was diagnosed essential thrombocythemia (ET) and hydroxyurea 500 md OD had been given to the patient. The dose of the hydroxyurea was adjusted every 3 months. Hydroxyurea dose adjustment and follow-up laboratory are shown in Table 1.

In January 2019, her family noticed some changes in her mood and behaviors. She thought that the neighbor had stolen her belongings and heard the neighbor's voice speaking back at her abusively. She had a fixed belief that it was real, even though her son had told her that it was not true. She was irritable, and she scolded at the neighbor every time she saw him. However, she had not been yet in a depressed stage. She had neighter history of prior/previous psychiatric disorder, drug abuse nor had a family history of psychiatric illness or any psychological stressors. Since the diagnosis of ET, she understood about her disease and had been coping well with it over time. Besides, she had a good relationship with her neighbor. There was no report of any psychological stressors at the time.

In February 2019, her paranoid delusion was getting worse. So she was brought to the hospital by her family. Physical findings were normal except for her markedly pale conjunctivae. Mental status examination revealed increase psychomotor activities, tangential, delusional thought. She was oriented to time, place and persons. Her attention and memory were intact. The blood test showed hemoglobin 7.8 g/dl, hematocrit 23.0%, white blood cell counts 2,200/mm^3, platelet count 410,000/mm^3. Urine and routine blood examinations were normal. CT brain revealed no definite intracranial abnormalities. The bone

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Table 1. Dose of hydroxyurea with complete blood count.

	Laboratory findings				
	Hydroxyurea (mg/day)	**Hemoglobin (g/dl)**	**Hematocrit (%)**	**White blood cells (cells/mm^3)**	**Platelet (x10^3 cells/mm^3)**
May - 2011	-	13.7	42.4	16.5	805
Jun - 2011	500	13.9	42.5	14.8	711
Jul - 2011	500	15.1	45.6	15.1	575
May - 2012	1,000	16.5	51.4	18.9	609
Mar - 2014	1,250	14.8	45.3	13.4	585
Jun - 2014	1,500	13.5	40.8	12.1	435
Jul - 2014	1,250	13.5	41.2	11.5	449
Jan - 2015	1,500	12.8	40.0	9.7	500
Jul - 2017	1,000	9.1	28.3	4.3	277
Dec - 2017	1,500	11.1	34.6	6.7	562
Mar - 2018	1,250	9.0	27.7	3.4	353
May - 2018	1,000	9.7	30.2	4.3	370
Aug - 2018	1,250	10	30.2	4.2	545
Oct - 2018	1,000	10	32.9	4.84	633
Jan - 2019	1,500	9.6	30.2	5.1	718
Feb - 2019	1,500	9.0	26.9	4.15	628
Feb - 2019	Stop	7.8	23.3	2.2	410
Mar - 2019		8.8	26.8	3.9	573

marrow biopsy showed mild hyper cellularity with the presence of dysplastic megakaryocytes, most likely features of essential thrombocythemia; no evidence of myelofibrosis was observed.

Therefore, the patient was diagnosed acute psychosis. She received risperidone and clonazepam and came for review after one month. In the same day, the patient received 2 units of leukocyte poor red cells (LPRC). There were neither immediate nor delay reaction after receiving the blood transfusion.

The patient was reexamined in detail in the following session. She had no pallor. Mental examination at the time revealed that the patient was not agitated, cooperative and somehow reserved. Her speech was spontaneous, coherent and relevant. Her delusional thought about the neighbor was improved. Her mood was in normal stage. The psychiatrist could decrease antipsychotic drugs and her symptoms went well. Hydroxyurea dose was also taped down and she continued the follow-up in the following month.

Discussion

Our patient has been receiving hydroxyurea for 8 years. The data in Table 1 show that she was gradually developing anemia accordingly to the increased dose of hydroxyurea. When the anemia was markedly increasing, she started to develop psychotic symptoms. She showed signs of systematic paranoid delusion, auditory hallucination with intact orientation and no fluctuated symptoms. Hence, her diagnosis was acute psychosis. After receiving blood transfusion, her psychotic symptoms showed improvement. In addition, her irritable mood, her paranoid idea also improved rapidly after the treatment. Therefore, we could assume that psychotic symptoms developed from medical caused due to her clinical presentations of rapid onset of first episode psychological symptoms. However, the mechanism of anemia-induced psychosis is not clear, and it is rarely reported in the literature. There was only one report in the study of Romano J, *et al*. [7] a patient with symptomatic psychosis due to chronic post hemorrhagic anemia.

Conclusions

Apart from treating psychiatric conditions in the patient with acute behavioral change, other medical conditions such as drug and substance abuse should also be considered in order to improve the quality of life, shorten the treatment period, and most importantly to decrease the morbidity and mortality.

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