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Three clinical cases of halidol-induced anemia

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ABSTRACT

Several psychotropic drugs, including Halidol, may its chronic administration causes anemia. Halidol is an antipsychotic drug that the Food and Drug Administration (FDA) has approved for psychosis, schizophrenia and epileptic psychosis treatment. A few cases of halidol-induced anemia have been previously reported on, but the pathophysiology and clinical manifestations are not yet known.

This case series reports on 3 patients with different medical conditions who experienced anemia during treatment with halidol. In these cases, the induced anemiaoccurred upon chronic administration ofhalidol. We also discuss several characteristics of halidol-induced anemia.

KEYWORDS

Halidol,anemia;
Psychosis;
Schizophrenia;
Epilepsy.

INTRODUCTION

Halidol is indicated for long term maintenance treatment where a neuroleptic isrequired. Food and Drug Administration (FDA) has approved for Psychosis, schizophrenia,epileptic psychosis. Blood dyscrasias such as neutropenia, thrombocytopenia and pancytopenia have not also been reported[3]. Furthermore, a few cases of Halidol -induced agranulocytosis have been reported, but its exact pathophysiology is as yet unknown. It has been reported that half of the patients with bipolar disorder may take at least 3 psychotropic drugs, and that the usage of multiple drugs increases the risk of hypochromia [2]. Therefore, it is necessary to be aware of the possibility of hypochromia during the treatment of psychosis, schizophrenia,epilepsy with halidol. We report here on 3 cases of hypohromia with their different characteristics during treatment with halidol.

CASES

Case 1

A 25-year-old man was admitted to a psychiatric ward due to Schizophrenia. He was treated with Halidol amp for 2 continuous years in addition to achtenone 2 mg,respiridone 4 mg and serteraline 100. His measured cystolic blood pressure was 118 mmHg and diastolic blood pressure was 75 mmHg. Normal pulse rate was recorded 86 per min. The investigated random blood sugar was (156 mg/dl). Disturbance in its complete blood count was noticed as following in TABLE 1:

Case 2

A 38-year-old man was admitted to a psychiat-

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TABLE 1 : Changes of haematological parameters after treatment of Schizophrenic patient with halidolamp

Hematological parameter	Result	Normal range	Remarks
RBC	/µL 5,76 10^6	3,8-5,3	High value
HGB	13,7 g/dL	12-18	Normal value
HCT	44,5%	36-56	Normal value
MCV	77,3fL	80-100	Low value
MCH	23,8pg	27-32	Low value
MCHC	30,8 g/dL	32-36	Low value

TABLE 2 : Changes of haematological parameters after treatment psychiatric patient of with halidol

Hematological parameter	Result	Normal range	Remarks
RBC	/µL 6,64 10^6	3,8-5,3	High value
HGB	14,9 g/dL	12-18	Normal value
HCT	47,3%	36-56	Normal value
MCV	71,2fL	80-100	Low value
MCH	22,4pg	27-32	Low value
MCHC	31,5 g/dL	32-36	Low value

ric ward due to Psychosis. He was treated with Halidol amp for 10 continuous years in addition to safinase5mg,cogentol 2 mg and neurazine 100. His measured cystolic blood pressure was 121mmHg and diastolic blood pressure was 82 mmHg. Normal pulse rate was recorded 108 per min. The investigated random blood sugar was (109 mg/dl). Disturbance in its complete blood count was noticed as following in TABLE 2:

Case 3

A 32-year-old man was admitted to a psychiatric ward due to Epilepsy. He was treated with Halidol amp for 24 continuous years in addition tocogentol 2 mg andclozapin100 mg. His measured cystolic blood pressure was 124 mmHg and diastolic blood pressure was 71 mmHg. Normal pulse rate was recorded 90 per min. The investigated random blood sugar was (108 mg/dl).Disturbance in its complete blood count was noticed as following in TABLE 3:

DISCUSSION

Red blood cells (RBCs) are continuously produced in the bone marrow; when a state of iron deficiency proceeds and the iron stores progressively decrease; mean cell volume (MCV), mean cell hemoglobin (MCH), and red blood cell count (RBC) tend to decline. In iron deficient erythropoiesis, synthesis of Hb molecules is severely impaired leading to the production of erythrocytes with low Hb concentration (hypochromic cells). Because of their long-life span of approximately 3 months, several cohorts of normochromic and increasingly hypochromic red cells coexist in the peripheral blood leading to anisocytosis[6].

Hypochromic anemia is a generic term for any type of anemia in which the red blood cells (erythrocytes) are paler than normal. This decrease in redness is due to a disproportionate reduction of red cell in proportion to the volume of the cell. In many cases, the red blood cells will also be small (microcytic), leading to substantial overlap with the category of microcytic anemia[9]. However,the most common causes of Hypochromic anemia were iron deficiency and thalassemia, chronic administration of halidol reviles hypocromicanemia in the presented cases.

In case 1& 2, although the other concurrently administered drugs could not be definitely excluded from the possibility of inducing hypochromia, it is relatively easy to consider halidol amp as the cause of hypochromiabecause the patients had been taking other drugs for over 6 years without any hematologic abnormalities.

In these 3 cases, hypochromia occurredafter 2 Years of halidol amp initiation, respectively, and in

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TABLE 3 : Changes of haematological parameters after treatment of epileptic patient with halidol

Hematological parameter	Result	Normal range	Remarks
RBC	/µL 5,39 10^6	3,8-5,3	High value
HGB	13,8 g/dL	12-18	Normal value
HCT	43,4%	36-56	Normal value
MCV	80,5 Fl	80-100	Normal value
MCH	25,6pg	27-32	Low value
MCHC	31,8 g/dL	32-36	Low value

the 3 previously reported cases, the hypochromiaalso occurred within 8 weeks. It is likely that halidol amp induced hypochromiahas a tendency to occur at the early phase of treatment, which is unlike clozapine that rarely induces neutropenia within the first 6 weeks.

The suggested mechanisms that illustrate the obvious relation between halidol administration and induced hypochromic anaemia, may include firstly enhancement of erythrovute destruction due to situmulation of macroghagedtoengulg RBCs or lastly depression of bone marrow to synthesise RBSs[4].

The proposed approaches for these mechanisms may need other biomarkers as serum ferritin and Tumor necrosis factors TNF-α to have more clear view. To conclude, at the early phase of halidol treatment or after an increased titration of halidol, it is beneficial for the clinician to aware the possibility of an occurrence of hypochromia[1].

Regarding Cases 1 & 2 There have been several reports indicating that schizophrenia is related to the activation of the inflammatory response system (IRS), characterized by increased serum concentrations of interleukin 6 (IL-6) and tumor necrosis factor α (TNF-α), which are mainly the products of activated monocytes/macrophages responsible for destruction of RBCs[8].

An epileptic seizure occur when large groups of neurons in the brain begin firing uncontrollably, disrupting the balance of electrical activity and causing changes in mental function, motor function and behavior. It's not known what sets off a seizure, but lately scientists like O'Connor and Corcoran (2012) have been gathering evidence that inflammation, the immune system's response to injuries or foreign organisms, plays a pivotal role.

Regarding Cases 3 Clinical evidence indicates that inflammatory processes contribute to the pathogenesis of several forms of epilepsy**.** Thus, interactions between leukocytes and vascular endothelial cells modulate spontaneous recurrent seizures (SRSs) in a rodent model of temporal lobe epilepsy (TLE)**.**

Anemia of chronic inflammation is a form of anemia seen in chronic immune activation. Inflammatory cytokines promote the production of white blood cells. The upregulation of white blood cells causes fewer stem cells to differentiate into red blood cells. This effect may be an important additional cause for the decreased erythropoiesis and red blood cell production seen in anemia of inflammation[5]. In conclusion, Either psychotropic diseases or psychotropic drugs may be responsible for induced anaenia through inflammatory intermediates.

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List of abbreviations:

(FDA: Food drug administration**; RBC:** Red blood cell**; MCV:** Mean cell volume**; MCH:** Mean cell hemoglobin**; Hb:** Hemoglobin**; TNF:** tumor necrosis factor**)**

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