Acute Cerebral Infarction in a patient of Myelodysplastic Syndrome: A Case Report and literature review

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Case report

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Abstract

Myelodysplastic syndrome (MDS) is a bone marrow failure syndrome characterized by cytopenia that results in infection and bleeding. However, there are few reports of cerebral infarction in MDS. In this case report we reported a Chinese female patient diagnosed MDS without drugs and an onset of acute cerebral infarction. Imaging examinations showed an ischemic stroke and further bone marrow aspiration identified MDS in the patient. Low dose aspirin and rehydration were used to improve symptom, as well as anti-epileptic drugs and rehabilitation. We also reviewed acute cerebral infarction associated with MDS from a total of three reported cases without drugs for the treatment of MDS. Our data provide further evidence that acute ischemic stroke might be associated with MDS, which may be due to complex chromosomal abnormality and inflammatory processes.

Background

Myelodysplastic syndromes (MDS) are clonal marrow stem-cell disorders, characterized by ineffective hemopoiesis and a tendency to evolve into acute myeloid leukemia (AML) in a third of patients [1]. MDS is the most common cause of acquired bone marrow failure in adults, with an incidence in the general population reported as five new MDS diagnoses per 100,000 people[2]. Such patients have an approximately low risk of thrombotic events due to cytopenia. The relationship between MDS and cerebrovascular disease is uncertain. So arterial thrombosis especially cerebral infarction in MDS is not previously reported with only few cases of arterial thrombosis especially cerebral infarction in MDS were reported in the literature. We represented a rare case of acute cerebral infarction in a female MDS patient.

Case Presentation

A 72-year-old female was admitted to our emergency department, with acute onset blurred of vision, headache and unresponsive for 3 days. She denied the history of hypertension, diabetes, heart disease, hyperlipidemia, other vascular risk factors, the history of recent respiratory infections and history of anemia. On neurological examination, the understanding and executive is slightly reduced, no other deficits were apparent except for blurred vision. She was therefore unable to receive treatment for thrombolytic therapy and thrombectomy because of the onset time of 3 days.

Her initial National Institutes of Health Stroke Scale (NIHSS) score was 2 (complete hemianopia). Brain magnetic resonance imaging (MRI) revealed the acute cerebral infarction in the right occipital temporal lobe and corpus callosum (Fig. 1). Brain computed tomography angiography (CTA) indicated a right posterior cerebral artery P2 segmental occlusion, bilateral intracranial artery intracranial segment\bilateral anterior middle cerebral artery proximal stenosis, bilateral cerebral artery M1 segment\bilateral anterior cerebral artery A1 segment running area with multiple small blood vessels (Fig. 2). Her laboratory test revealed pancytopenia (hemoglobin concentration, 10.0 g/dL; white blood cell count, 1.24×109/L; platelet count:77×109/L) and progressive decline, which was diagnosed as MDS-excess blasts 2 according to the WHO classification. The reticulocyte ratio was 0.018 and low

fluorescence reticulocyte ratio was 0.911. Bone marrow chromosome detection reported 46, XX, N (20). Morphological analysis of bone marrow revealed dysplasia in erythroid cells and neutrophil granulocytic, manifested as abnormal nuclear shape and megaloblastoid changes. The patient had high fasting blood sugar, whose glycated hemoglobin was 6.9%; Abnormal serum lipid profile (total cholesterol, 4.67mmol/L; high-density lipoprotein, 0.80mmol/L; low-density lipoprotein 3.56mmol/L).

On the third day,the patient's temperature and CRP were increased compared to her time of admission, and a chest CT scan showed inflammation progression. We gave her cefoperazone-sulbactam anti-infective. On the 7th day, the patient recurring visual hallucinations and choking whiles drinking water. Valproic acid-Depakine and lamotrigine were used to control seizures, which improved her symptoms. Due to the use of Depakine, the patient developed a rash hence we discontinued the use of lamotrigine, relieving her off this side effect (Fig. 3). On the 12th day of admission, the patient presented sudden numbness in the right arm and leg her NIHSS was 10 (complete hemianopia 2;no movement at all in arm 4 and no movement at all in leg 4). We gave 100mg aspirin and rehydration to improve cerebral perfusion stabilizing her symptoms. On the 23rd day of admission, she underwent a rehabilitation consult. Manual muscle strength test (MMT) of which the right arm was grade 3 proximally and grade 4 at the wrist and the right leg was grade 4 at the whole lower limb. Conservative treatments were administered including transfusion. Additional chemotherapy was not possible because of poor general conditions and economic state. On the 31th day of admission, the patient was transferred to a secondary local hospital. On the day of discharge at secondary local hospital, her NIHSS score was 4 (visual field 2□right arm motor 1, right leg motor1) and had ecchymosis. After half a year of telephone follow-up, the patient was reported to have not undergone further chemotherapy due to her economic status, and died with unknown reason.

Discussion

Patients with MDS usually have thrombocytopenia and at a risk of systemic bleeding.

The case reported acute cerebral infarction as a thrombotic event in a Myelodysplastic Syndrome patient. To the best of our knowledge, this is an incredibly rare finding in the disease [3] and the incidence of arterial thrombosis in MDS was uncertain. To review published literature for cases of acute cerebral infarction with Myelodysplastic Syndrome, we conducted a PubMed search on July 15th,2020, using the search terms “Myelodysplastic Syndrome” and (“stroke” or “infarct” or “infarction” or “cerebrovascular”). Our search initially yielded 59 results. Upon detailed review of titles, abstracts, and full texts, we identified 3 articles (3 cases) describing acute cerebral infarction with Myelodysplastic Syndrome (Table 1). One case reported a 72-year-old female with MDS who developed acute cerebral infarction [4] and the other reported a 25-year-old male juvenile MDS with cerebral infarction concerning the invasion of the CNS by leukemia cells [5]. In addition, Gregorius J Sips et.al described a 77-year-old male with intravascular lymphomatosis who had a pathological diagnosis of MDS, developed progressive stroke-like symptoms [6]. Moreover, another case reported a patient with MDS who developed fatal sagittal sinus thrombosis [7].

The mechanisms through which patients with MDS are at increased risk for arterial events and VTE are likely multifactorial. The increased ischemic stroke risk may be linked to commonly used drugs. A meta-analysis reported an increased risk of thromboembolic events (a composite of VTE, transient ischemic attack, stroke, and MI) in oncology patients treated with Erythropoiesis-stimulating agents [8] and increased VTE rate has been reported in MDS patients receiving ESAs in combination with thalidomide [9]. However, our case did not receive any medication for myelodysplastic syndrome, which may be related to endothelial cell damage and inflammation caused by neutrophil dysfunction and immune disorder caused by excessive production of inflammatory cytokines [10]. Kimura S indicated that the trisomy of chromosome 8 is a risk factor for MDS thrombosis [11]. In addition, a previous study found that central venous catheter and red blood cell transfusion may lead to MDS thrombosis[12]. Nonetheless, this patient did not experience a thrombotic event at the time of insertion and did not undergo blood transfusion. Potential reasons for stroke risk may include patient-related risk factors such as age and comorbidity with diabetes, vascular complications. In this case, hyperglycemia, dyslipidemia and cerebrovascular malformation were risk factors for stroke. According to ADA standard [13], she was diagnosed diabetes with 6.9% HbA1C. Meantime, she had abnormal LDL and intracranial segment of bilateral internal carotid artery \bilateral anterior middle cerebral artery proximal stenosis with abnormal vascular collateral networks. Landolfi revealed the pathogenetic mechanisms of thrombophilia in myeloproliferative neoplasms (MPNs), including erythrocytosis and red cell abnormalities with a high hematocrit caused a major disturbance to blood flow, thrombocytosis, platelet functional abnormalities and increased in white blood cell count [14]. We hypothesized that our patient may have a similar pathological process. Furthermore, patients may be complicated with other diseases such as case 3 (Table 1), resulting in increased risk of vascular events. Unfortunately, our patient refused to do more tests due to economic reasons.

Conclusions

In summary, we herein reported a Chinese female patient of MDS onset ischemic stroke. Our findings suggested that the cerebral arterial infarction in this patient was a rare result of MDS with pancytopenia rather than conventional risk factors for stroke. Acknowledging the connection between the two conditions to get an accurate diagnosis is crucial. Further studies are needed to clarify the pathophysiology including unknown immunophenotype and genetic aberration.

Abbreviations

MDS
Myelodysplastic syndrome
AML
Acute myeloid leukemia
NIHSS
Initial National Institutes of Health Stroke Scale

MMT
Manual muscle strength test
MRI
Magnetic resonance imaging
CTA
Computed tomography angiography
CNS
Central nervous system
VTE
Venous Thromboembolism
ESAs
Erythropoiesis-Stimulating Agents
MPNs
myeloproliferative neoplasms

Declarations

Acknowledgments

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Conflict of interest: None

The authors declare that there is no potential conflict of interest.

Authors' contributions

B-LH, K-YC, S-FC, and NS examined the patient, acquired, and analyzed all clinical data, and interviewed her relatives. L-ST, NS collected and analyzed blood samples and interpreted the genetic data. B-LH and K-YC reviewed literatures and drafted the manuscript. B-LH supervised the study. All authors read, revised and approved the final version of the manuscript.

Ethics approval and consent to participate

The study was approved by the Ethics Committee of the Second Affiliated Hospital and Yuying Children's Hospital, Wenzhou Medical University. Written informed consents were obtained from the patient's sons.

Availability of data and materials

Data sharing is not applicable to this article as no other data were created or analyzed in this study.

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Figures

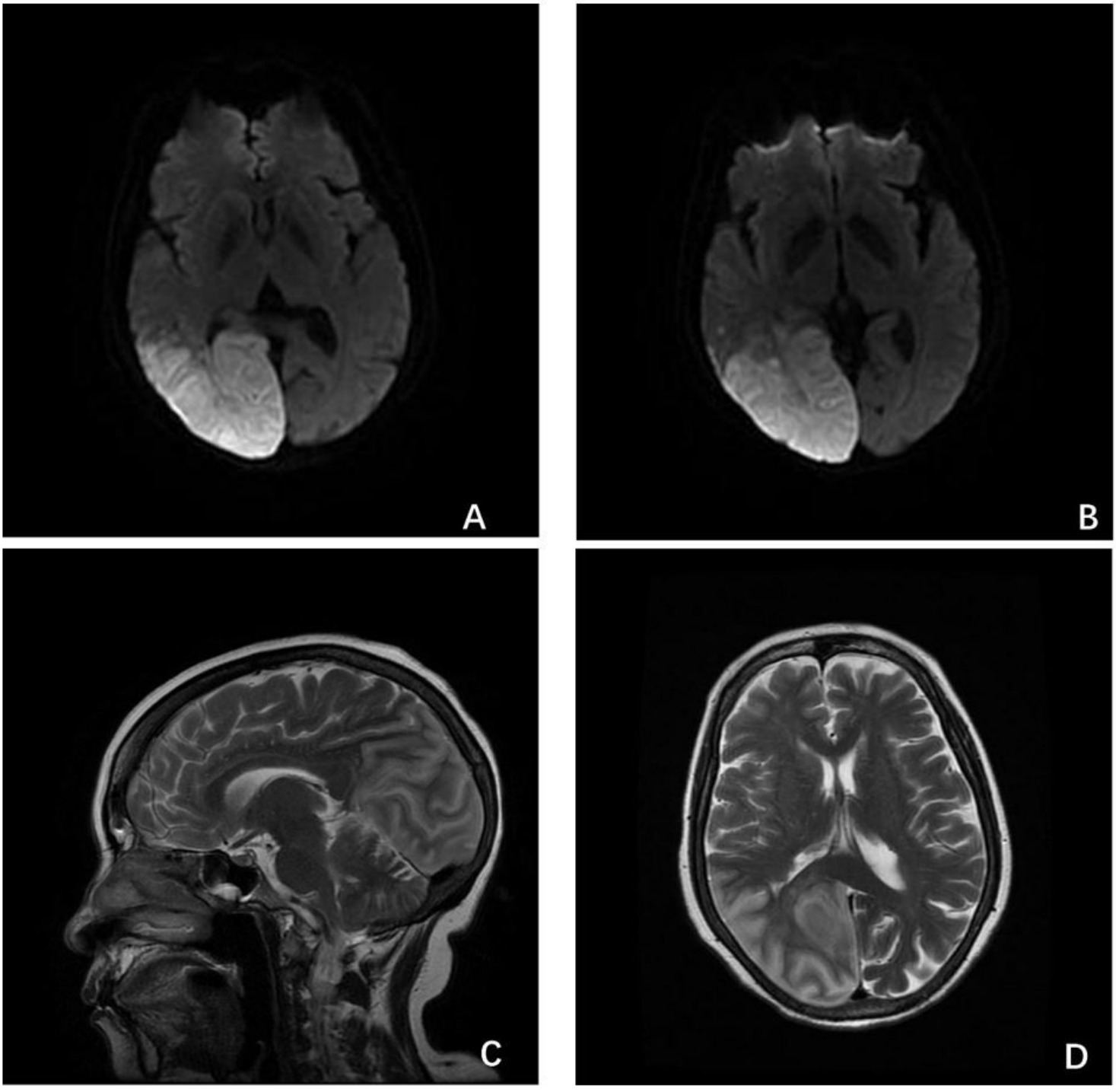

Figure 1

Acute cerebral infarction in the right PCA area deep white matter showing (A, B) high signal intensity on diffusion-weighted images and (C, D) high signal intensity on T2.

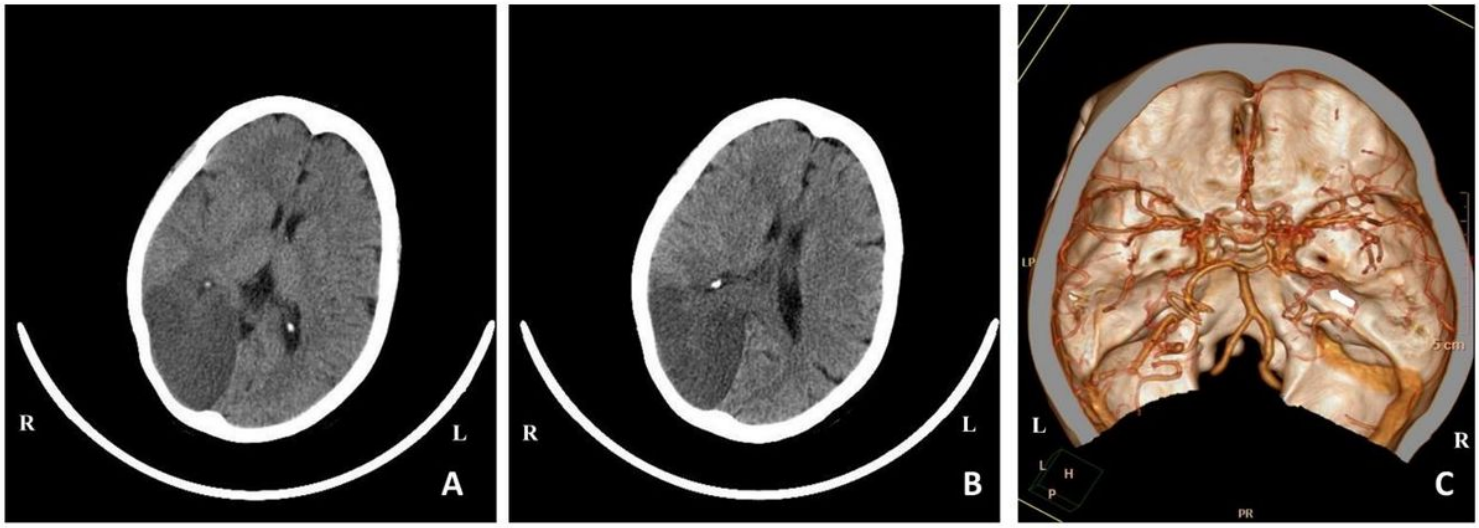

Figure 2

CT scan (A, B) showed the right parietal-occipital infarction. The initial CTA images (C) showed the segmental occlusion of right P2 segment (arrow); Multiple small blood vessels in bilateral M1 segment and A1 segment. CTA=computed tomography angiography, P=posterior cerebellar artery, M= middle cerebellar artery, A=anterior cerebellar artery

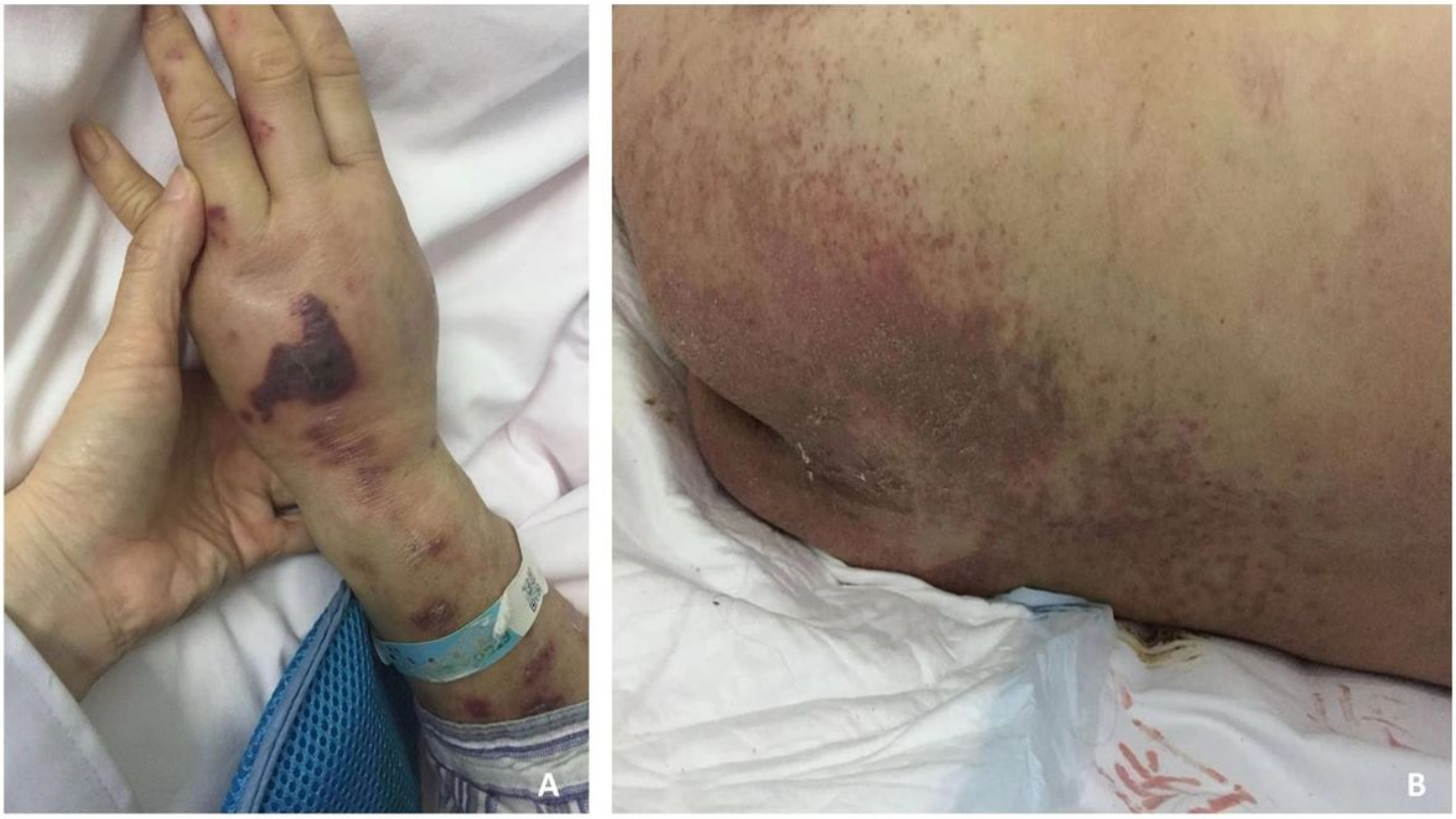

Figure 3

A: Auptured blister with desquamation. B: Maculopapular eruptions on her back.