An atypical isolated CNS blast crisis in chronic myeloid leukaemia

Introduction

Chronic myeloid leukaemia is a myeloproliferative disease. Extramedullary blast crisis is a complication of chronic myeloid leukaemia, defined as the development of extramedullary disease caused by blastic infiltration regardless of proliferation of blasts in the bone marrow. Extramedullary blast proliferation commonly presents in the lymph nodes, skin, spleen, bone or CNS (Altintas et al, 2007). CNS involvement usually occurs concurrently with systemic relapse.

This article describes a rare and atypical case of isolated cranial and spinal blast crisis in a patient diagnosed with chronic myeloid leukaemia who was under imatinib treatment with complete remission. There are no cases in the literature with such different involvement in the CNS.

Discussion

Chronic myeloid leukaemia has three phases: chronic, accelerated and blastic (Jabbour and Kantarjian, 2012). The prevalence of accelerated and blastic phase as initial presentations in patients with chronic myeloid leukaemia has been reported as only 5–10%. Blastic phase or blast crisis is the presence of 20% or more blasts in the peripheral blood or bone marrow, a large focus of blasts in bone marrow or an extramedullary blast proliferation. In 5–15% of cases, the blast phase can present

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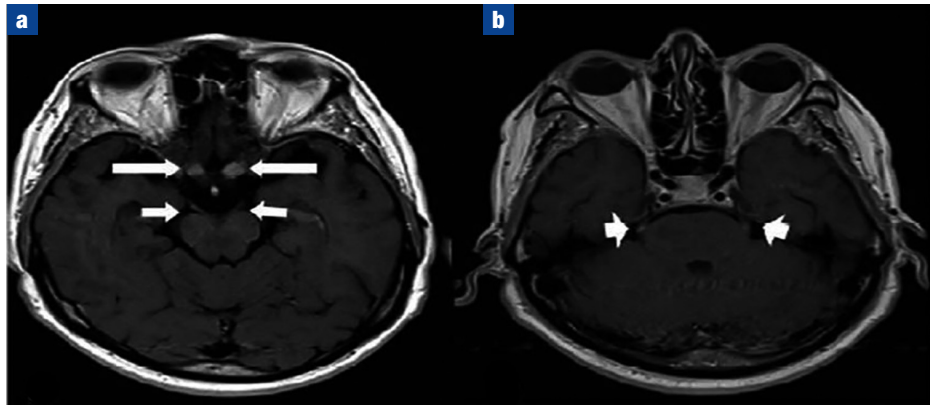
Figure 1. **a** and **b.** Contrast-enhanced T1-weighted magnetic resonance images show thickening and enhancement in bilateral optic tractus (long arrow), 3rd (short arrow) and 5th (arrowhead) cranial nerves.



CASE REPORT

A 70-year-old man had been diagnosed with Philadelphia-positive chronic myeloid leukaemia 2 years ago, and complete remission was achieved with 4 months of treatment with imatinib 400 mg. The patient had been receiving maintenance therapy for 1.5 years.

He was admitted to hospital with difficulty in walking, balance disorder, increased movement of his limbs in sleep, sleep talking, blurred vision, urinary incontinence continuing for 15 days. Examination revealed bilateral papilloedema and his deep tendon reflexes were hypoactive on all extremities. There was no clinical evidence of lymph nodes or hepatosplenomegaly.

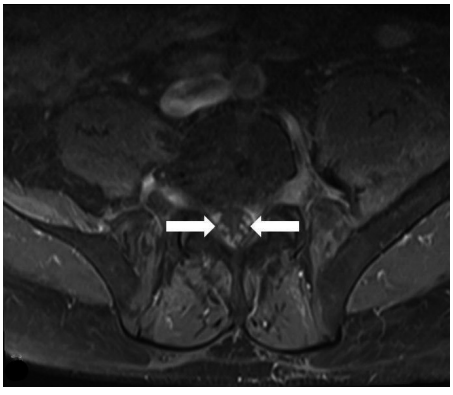
Haemoglobin levels were 11.3 g/dl, white cell count was 4100/mm^3 with normal distribution of differential count without precursor cells, and platelet count was 130 000/mm^3. His peripheral differential blood count was normal and did not indicate a systemic haematological relapse of chronic myeloid leukaemia. CSF cytopathology showed blasts and other myeloid precursor cells consistent with CSF involvement of chronic myeloid leukaemia.

Cranial magnetic resonance imaging showed increased signals in cortical gray matter, subcortical white matter, bilateral cerebellar peduncles, periaqueductal area, brainstem and around the fourth ventricle on T2-weighted images and FLAIR sequences. Diffusion-weighted images showed a mild increase in intensity of these areas but there was no diffusion restriction. There were increased T2 signals expanding the dural sheath of the bilateral optic nerve, and the bilateral papillae were protruding into the vitreous space of the globe because of increased intracranial pressure.

After administering intravenous contrast agent, thickening and enhancement was seen in the bilateral optic nerves, optic tractus, bilateral 3rd and 5th cranial nerves, 7th and 8th cranial nerves (*Figure 1a* and *b*). On thoracic and lumbar magnetic resonance imaging, there were increased T2 signals and enhancement in the spinal cord. Enhancement was seen in spinal nerve roots in the neural foramina and around nerve roots, as well as thickening and enhancement of cauda equina fibres (*Figure 2*).

The patient was diagnosed with isolated CNS blast crisis and treated with intravenous pulsed steroid and intrathecal methotrexate (10 mg), cytarabine (40 mg) and dexamethasone (4 mg). Control magnetic resonance imaging showed that the earlier findings had disappeared and there were no pathological findings.

Figure 2. Contrast-enhanced axial T1-weighted magnetic resonance image shows thickening and enhancement of cauda equina fibres (arrows).



at extramedullary sites such as the lymph nodes, breast, skin, bone, soft tissue, spleen or CNS. CNS involvement is usually seen with systemic disease. In the last 10 years, there have been several isolated cases of CNS blast crisis in patients who maintained major cytogenetic remission while on imatinib therapy. Studies have shown that imatinib-resistant chronic myeloid leukaemia clones reside in the CNS.

Cranial findings such as mass formation, meningeal involvement as meningitis, patchy meningeal enhancement or meningeal seeding, isolated optic nerve infiltration which caused vision loss, high brain pressure and hydrocephalus have been seen in previous isolated CNS blast crises (Schocket et al, 2003; Altintas et al, 2007). In a retrospective series, 1% of all cases of extramedullary blast crisis had chronic myeloid leukaemia in the spinal cord (Chalhoub-Hachem et al, 2003).

In the current case, there were increased signals on T2-weighted magnetic resonance images of the brain and spinal cord, multiple cranial nerves and spinal nerve roots. To the authors' knowledge, this is the only case in the literature of this kind of extensive involvement. With appropriate treatment all magnetic resonance imaging findings disappeared. It is already known from previous cases that the optic nerves can be involved but involvement of multiple cranial nerves at the same time has not been previously identified. This is also the first report in the literature of involvement of spinal nerve roots.

It should be kept in mind that isolated CNS relapse may occur in patients with chronic myeloid leukaemia, especially at the end of the first year, who are on imatinib treatment and in cytogenetic or haematological remission. Clinicians should be alert for the development of neurological symptoms in such patients. **BJHM**

LEARNING POINTS

- Isolated CNS relapse may occur in patients with chronic myeloid leukaemia.
- Cranial mass formation, meningeal involvement as meningitis, patchy meningeal enhancement or meningeal seeding, isolated optic nerve infiltration, hydrocephalus have been seen in previous isolated CNS blast crises.
- This is the first report in the literature of the involvement of multiple cranial nerves and spinal nerve roots at the same time.

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