International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Monika et al. Int J Reprod Contracept Obstet Gynecol. 2026 Dec;15(12):5091-5095
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20264438

Case Report

Successful pregnancy outcome in a woman with chronic myeloid leukemia and rheumatic heart disease: a rare case report from Northern India and review of literature

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Received: 26 September 2026
Accepted: 02 November 2026

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ABSTRACT

Chronic myeloid leukaemia (CML) with severe rheumatic heart disease (RHD) during pregnancy is an uncommon and clinically challenging scenario. This report demonstrates a 26-year-old G2A1 woman diagnosed with chronic-phase CML approximately one year before presentation during evaluation for progressive leucocytosis. Her BCR-ABL1 transcript level was 10% on the International Scale. Concurrent cardiac evaluation for palpitations revealed RHD with severe mitral and tricuspid regurgitation. Imatinib 400mg once daily was initiated; however, the patient defaulted from follow-up and presented at eight-weeks of an unplanned pregnancy. Following counselling regarding the potential fetal risks of tyrosine kinase inhibitors, imatinib was discontinued during pregnancy. She remained under multidisciplinary monitoring and delivered spontaneously at 38 weeks, healthy neonate without congenital anomalies. Imatinib was restarted on postpartum day four and breastfeeding was contraindicated. This case highlights managing complex pregnancy and demonstrates successful maternal and neonatal outcomes following temporary TKI interruption.

Keywords: Chronic myeloid leukaemia, Pregnancy, Imatinib, BCR-ABL1, Tyrosine kinase inhibitor, Rheumatic heart disease, Valvular heart disease, Teratogenicity, India, Case report

INTRODUCTION

The treatment strategy of chronic myeloid leukaemia (CML) has evolved over the past two and a half decades with the introduction of BCR-ABL1 tyrosine kinase inhibitors (TKIs), resulting in improved overall survival.[1] In India, media age of CML diagnosis is 30-40 years, two decades earlier in comparison to Western cohorts, Earlier occurrence of CML in fertility age needs to clinically considered in countries like India.[2,3]

CML complicating pregnancy is estimated to occur in approximately one in 75,000 to 100,000 pregnancies, accounting roughly 10% of pregnancy-associated leukaemia.[4] The clinical dilemma is well-defined: all currently approved TKIs carry documented teratogenic potential, with exposure during the first trimester associated with skeletal malformations, exomphalos and other structural defects. Yet withholding therapy poses the risk of haematological progression, symptomatic hyperleukocytosis and splenic complications in the mother. The absence of formal clinical guidelines has historically left clinicians reliant on registry data, expert opinion and published case series to navigate this intersection of haematological malignancy and reproductive medicine.[1,2]

The European Leukemia Net (ELN) international registry drawing on over 400 pregnancies in 299 women with CML, represents the most comprehensive dataset available

and has substantially refined our understanding of maternal and fetal outcomes across diverse management strategies.[4] Parallel data from single-institution and national cohort studies, including those from Japan and India, have enriched this evidence base with population-specific insights.[5,6]

The addition of significant cardiac comorbidity, specifically rheumatic heart disease (RHD) with severe valvular dysfunction along with CML in pregnancy is distinctly uncommon and raises concerns around haemodynamic tolerance of the physiological changes of pregnancy, fluid management and the pharmacological interactions of cardiac and haematological therapies. RHD remains a significant public health burden in South Asians, disproportionately affecting young women of reproductive age.[7]

Here a case of a 26-year-old woman with CML in chronic phase, complicated by RHD with severe mitral and tricuspid regurgitation is presented, who became pregnant after initiating imatinib therapy which by discontinued upon discovery of pregnancy and successfully delivered a healthy female neonate at term. We discuss the clinical decision-making, the supporting evidence from international literature and the implications for management in resource-limited tertiary care settings in India. To best of our knowledge this is the first ever case of CML in pregnancy with coexisting RHD.

CASE REPORT

A 26-year-old woman, gravida 2 para 0 abortion 1 (G2A1), presented to the Labour Room of All India Institute of Medical Sciences (AIIMS), Bathinda, at 38 weeks of gestation. She had been married for approximately 18 months. Approximately one year prior to this index presentation, she had experienced episodic palpitations for which she sought evaluation from a local general practitioner. Serial complete blood count (CBC) examinations demonstrated a progressively rising total leucocyte count (TLC), prompting referral to AIIMS Bathinda for comprehensive haematological evaluation.

At the time of haematological assessment, findings included: haemoglobin (Hb) 7.9 g/dl; TLC 68,000 cells/µl; platelet count 120,000/µl (1.2×10^5/µl). Physical examination was significant for massive splenomegaly and hepatomegaly. Peripheral blood morphology revealed a left-shifted granulocytic series with abnormal immature granulocytes comprising 16% of the differential. Bone marrow biopsy was performed and was consistent with chronic myeloid leukaemia (CML) in chronic phase, with a characteristic myelocyte bulge on differential analysis. Confirmatory reverse-transcriptase polymerase chain reaction (RT-PCR) identified a BCR-ABL1 transcript ratio of 10% on the International Scale (IS), establishing the diagnosis of CP-CML ELN criteria.

Given the patient's presenting complaint of palpitations, a two-dimensional echocardiogram (2D Echo) was performed and features consistent with RHD i.e. severe mitral regurgitation (MR) and severe tricuspid regurgitation (TR) was observed. There was no evidence of significant mitral stenosis or left ventricular systolic dysfunction. Patient was put on digoxin 0.25 mg once daily for rate control.

On 22 March 2025, imatinib mesylate 400 mg once daily was commenced as first-line therapy for CP-CML. The patient was subsequently lost to follow-up and re-presented to the Medicine Outpatient Department (OPD), August 2025 with a two-month history of amenorrhoea and a urinary pregnancy test positive for beta-human chorionic gonadotrophin (βhCG), establishing an estimated gestational age of approximately eight weeks at that encounter.

A detailed multidisciplinary counselling session was conducted, involving haematology, obstetrics and gynaecology and cardiology teams. The patient was informed about the documented teratogenic risks of imatinib including fetal skeletal malformations, exomphalos and hypospadias particularly when exposure occurs during the critical organogenesis window (approximately weeks 5–12 of gestation). She was also counselled that while disease progression during pregnancy in CP-CML is uncommon, the risk of haematological deterioration following TKI discontinuation is real and necessitates close monitoring. After fully informed discussion, the patient elected to discontinue imatinib for the duration of the pregnancy. Antenatal care was continued at a private facility and all subsequent antenatal visits were reported to be uneventful.

The patient re-presented to AIIMS Bathinda on 1 March 2026 at 38 weeks of gestation in spontaneous labour. Admission haematological indices are summarized in Table 1. Liver function tests (LFTs) and renal function tests (RFTs) were within normal limits. Cardiology review confirmed haemodynamic stability with adequate rate control; the patient didn't develop any peripartum cardiac decompensation. She underwent an uncomplicated spontaneous vaginal delivery and gave birth to a healthy female neonate with a birth weight of 2.5 kg (appropriate for gestational age). Immediate neonatal assessment was reassuring with Apgar scores within acceptable limits and no clinically apparent congenital anomalies. A repeat 2D Echo on postpartum day two showed no acute change in valvular morphology or ventricular function compared to the baseline study.

Prior to discharge, the patient received structured counselling on effective contraception and the imperative of resuming disease-modifying therapy in the postpartum period. Breastfeeding was contraindicated in view of imatinib excretion in breast milk.

On postpartum day four, she was discharged on imatinib mesylate 400 mg once daily, with instructions to attend the Haematology OPD for molecular monitoring and Cardiology for ongoing valvular surveillance.

Table 1: Relative risk of abnormal Doppler indices with adverse perinatal outcome.

Parameters	Diagnosis (~March 2025)	On Imatinib (pre-pregnancy)	At Admission (38 wks, March 2026)	Reference range
Haemoglobin (g/dl)	7.9	Not recorded	12.9	11.0–16.0
TLC (cells/µl)	68,000	Not recorded	31,000	4,000–11,000
Platelets (×10³/µl)	120	Not recorded	230	150–400
BCR-ABL1 IS (%)	10	Not recorded*	Not checked	< 0.1 (MMR)
LVEF (%)	65	65	65†	55–70

TLC, total leucocyte count; IS, International Scale; LVEF, left ventricular ejection fraction; MMR, major molecular response. *Patient lost to follow-up before first response assessment. †Postpartum day two echocardiogram

DISCUSSION

This case encapsulates challenging dimensions that arise when CML diagnosed young woman with RHD becomes pregnant, an unplanned pregnancy occurring before molecular response milestones could be established and the critical question was whether and how to treat the underlying haematological malignancy during gestation. Incidence of CML in pregnancy is low but not negligible, estimated at approximately one in 75,000–100,000 pregnancies, representing roughly 10% of pregnancy-associated leukaemia.[4] In the Indian subcontinent, the epidemiological profile of CML differs meaningfully from Western series: the median age at diagnosis is considerably younger (30–40 years), a higher proportion of patients present with intermediate or high-risk Sokal scores and access to cytogenetic and molecular monitoring remains variable across levels of healthcare.[3] Published reports from Indian centres confirm that CML in pregnancy, while uncommon, is encountered with sufficient regularity in tertiary referral hospitals to warrant familiarity with management algorithms.[6,8]

The concurrent diagnosis of RHD added an additional layer of complexity that distinguishes this case from the majority of reports in the literature. RHD disproportionately affects young women in South Asia and Sub-Saharan Africa, and severe mitral regurgitation in pregnancy carries the risk of volume overload and cardiac decompensation as plasma volume expands by up to 50% across gestation.[7] In this patient, predominantly regurgitant (rather than stenotic) valvular lesion appeared to afford haemodynamic tolerance throughout pregnancy, with no peripartum cardiac event documented.

TKIs, Imatinib is a category D teratogen under the former FDA classification system and use during the first trimester has been associated with an increased incidence of structural congenital abnormalities. Foetal malformations including exomphalos, renal agenesis and skeletal defects were observed in 180 pregnancies with imatinib exposure primarily in first-trimester exposure.[9] However, several series and registry analyses have suggested safety profile when imatinib exposure is restricted to the second and third trimesters, after the completion of organogenesis.

Another study in consistence with ELN guidance recommended that TKIs should be discontinued as soon as a positive pregnancy test is obtained, ideally by four to five weeks of gestation and that treatment-free monitoring with four-to-six-weekly BCR-ABL1 IS quantification should be instituted.[1] In our patient, though the pregnancy was discovered at eight weeks of gestation (slightly beyond the recommended interception point), imatinib was discontinued promptly at first visit. The fact that the drug had been initiated only approximately five months prior. Hence, deep molecular remission was not established yet.

Another study provides a clinically focused algorithm for managing both planned and unplanned CML pregnancy across different response levels.[2] Study highlights that patients with a BCR-ABL1 IS of 10% at diagnosis and have not yet achieved major molecular response, as was the case here, are at greater risk of haematological loss of control during TKI interruption and require more frequent surveillance. Our patient's haematological parameters at delivery indicated some residual haematological disease activity but no progression to accelerated phase. This is consistent with data from the ELN registry, which found no disease progression during pregnancy in any of the 87 patients diagnosed with CP-CML during gestation.[4] Among 87 patients with CP-CML diagnosed during pregnancy between 2001 and 2022, normal childbirth occurred in 76%, with elective and spontaneous abortions accounting for 21% and 3%, respectively. Crucially, no disease progression was observed during pregnancy. The low-birth-weight rate of 12% was comparable to the general population. Complete haematological response before labour was achieved in 95% of those treated with imatinib, predominantly administered from the second trimester onwards and in 47% of those managed with interferon-alpha alone. These figures contextualise our patient's outcome: a live birth at term with no neonatal abnormalities and haematological stability, broadly

consistent with the registry experience despite the absence of formal molecular monitoring during gestation.

Indian case reports published in the *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* by Jaiswal and colleagues and by Singhal and colleagues document successful term deliveries of healthy neonates in women with CML managed at Indian tertiary referral centres, underscoring the feasibility of favourable outcomes in resource-limited settings when structured multidisciplinary care is available.[6,8] In the case reported by Jaiswal et al, the patient discontinued imatinib upon refusal of the recommended medical termination of pregnancy, subsequently achieved complete haematological control throughout gestation and delivered a healthy neonate at 36 weeks paralleling the course of our patient in several respects.

Imatinib is known to be excreted in human breast milk, and the infant-to-maternal plasma ratio has been estimated at 0.5 in published pharmacokinetic case data, exposing the neonate to clinically meaningful concentrations.[9] Breastfeeding was therefore contraindicated in this patient, and she was counselled accordingly prior to discharge. Imatinib 400 mg once daily was resumed on postpartum day four, in line with the recommendation that TKI therapy should be restarted promptly after delivery to prevent haematological relapse, particularly in patients who had not achieved deep molecular remission prior to pregnancy.

The concomitant presence of RHD with severe mitral and tricuspid regurgitation in this patient is a notable and underreported comorbidity in the context of CML pregnancy. Severe MR in pregnancy can be complicated by progressive volume overload as cardiac output rises to meet the demands of the fetoplacental unit, potentially precipitating pulmonary oedema or atrial fibrillation. In this patient, the preservation of left ventricular systolic function (LVEF 65%) and the predominantly regurgitant rather than stenotic valvular pathology are favourable haemodynamic predictors. The absence of any documented peripartum cardiac event in this case reflects both the careful monitoring provided and the fact that severe pure regurgitant lesions with preserved systolic function are generally better tolerated during pregnancy than stenotic lesions or those with pre-existing ventricular dysfunction.[7] Digoxin or any other rate controlling medication was not required in our patient in pregnancy and postpartum period.

Several lessons emerge from this case that are of direct relevance to clinicians in tertiary-level practice across India and comparable healthcare settings. First, women of childbearing age diagnosed with CML should receive structured family planning counselling as an integral part of their initial haematological consultation not as an afterthought. The goals should be to achieve at minimum MMR preferably DMR, before any planned conception and to ensure robust contraception in the interim.[2,5] Second, unplanned pregnancy in women on TKI therapy must prompt immediate multidisciplinary engagement, with TKI discontinuation as the default action upon confirmation of pregnancy, regardless of gestational age. Third, the absence of formal IFN-α access should not preclude close haematological surveillance and supportive management; even without pharmacological intervention, our patient maintained sufficient haematological control to permit term delivery. Fourth, perhaps most significant, management of CML in pregnancy in the Indian context is complicated by delayed diagnosis, variable access to molecular monitoring, loss to follow-up and a high background prevalence of RHD. This case underscores the critical importance of integrating obstetric, haematological, and cardiological expertise within a single tertiary care framework capable of managing these intersecting complexities. AIIMS Bathinda, as a newly established AIIMS institution serving the underserved population of southern Punjab, represents an important node in the delivery of such care.

CONCLUSION

In this study, we report successful management of an unplanned pregnancy in a young woman with CP-CML complicated by RHD. Following informed discontinuation of imatinib upon confirmation of pregnancy, the patient progressed to 38 weeks of gestation and delivered a healthy female neonate without congenital anomalies, with haematological stability throughout. This case adds to the growing body of evidence drawn from international registries and Indian case series that favourable maternal and neonatal outcomes are achievable in CP-CML during pregnancy, even without the ability to institute TKI therapy or achieve deep molecular remission before conception. A structured multidisciplinary approach detailed and empathetic patient counselling, and prompt postpartum resumption of targeted therapy remain the cornerstones of optimal care.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Abruzzese E, Mauro M, Apperley J, Chelysheva E. Tyrosine kinase inhibitors and pregnancy in chronic myeloid leukemia: opinion, evidence, and recommendations. Ther Adv Hematol. 2020;11:2040620720966120.
2. Robertson HF, Apperley JF. Treatment of CML in pregnancy. Hematology Am Soc Hematol Educ Program. 2022;2022(1):123–8.
3. Höglund M, Sandin F, Simonsson B. Epidemiology of chronic myeloid leukaemia: an update. Ann Hematol. 2015;94(Suppl 2):241–7.
4. Chelysheva E, Apperley J, Turkina A, Yassin MA, Rea D, Nicolini FE, et al. Chronic myeloid leukemia diagnosed in pregnancy: management and outcome of

87 patients reported to the European LeukemiaNet international registry. Leukemia. 2024;38(4):788–95.
5. Kondo T, Matsuki E, Takaku T, Watanabe N, Yoshida C, Okada M, et al. Outcomes of pregnancy in patients with chronic myeloid leukemia in the era of tyrosine kinase inhibitors. Cancer. 2025;131(1):e35611.
6. Nambiar J. Successful maternal and fetal outcome in a patient with chronic myeloid leukemia on chemotherapy. Int J Reprod Contracept Obstet Gynecol. 2020.
7. Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, Blomström-Lundqvist C, Cífková R, De Bonis M, et al. 2018 ESC guidelines for the management of cardiovascular diseases during pregnancy: the task force for the management of cardiovascular diseases during pregnancy of the European Society of Cardiology (ESC). Eur Heart J. 2018;39(34):3165–241.
8. Singhal M, Meena K, Bharadwaj N, Mundaliya R, Agarwal S. Successful pregnancy outcome in a patient of chronic myeloid leukemia on imatinib therapy. Int J Reprod Contracept Obstet Gynecol. 2016;5(3):913–6.
9. Pye SM, Cortes J, Ault P, Hatfield A, Kantarjian H, Pilot R, et al. The effects of imatinib on pregnancy outcome. Blood. 2008;111(12):5505–8.

Cite this article as: Monika, Goyal LD, Kaur RP. Successful pregnancy outcome in a woman with chronic myeloid leukemia and rheumatic heart disease: a rare case report from northern India and review of literature. Int J Reprod Contracept Obstet Gynecol 2026;15:5091-5.