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Peginterferon Alfa-2a for Chronic Myeloid Leukemia in Pregnancy: A Case Report

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Abstract

Tyrosine kinase inhibitors (TKIs), the standard treatment for chronic phase chronic myeloid leukemia (CP-CML), are generally avoided during pregnancy because of teratogenic risk. Peginterferon alfa-2a may be used when treatment is required, although pregnancy data are limited. This case discusses a 31-year-old woman at 8 weeks' gestation who was diagnosed with CP-CML after presenting with leukocytosis and thrombocytosis. She began peginterferon alfa-2a 90 µg weekly and maintained an adequate hematologic response with mild transaminitis, ultimately delivering a healthy infant. She transitioned to dasatinib postpartum. This case supports peginterferon alfa-2a as a potential option for hematologic control of CP-CML during pregnancy when TKIs are avoided.

CASE STUDY

A 31-year-old female at 8 weeks' gestation presented with persistent leukocytosis of 156 × 10^9/L and thrombocytosis of 1044 × 10^9/L. She had a known history of Crohn's disease, managed with risankizumab. Bone marrow biopsy confirmed chronic-phase chronic myeloid leukemia (CP-CML), with a BCR-ABL polymerase chain reaction (PCR) level of 85.0027% (Figure 1). Baseline laboratory findings were consistent with a proliferative disease process (Table 1) necessitating treatment. Given her pregnancy, the treatment plan was to defer tyrosine kinase inhibitor (TKI) therapy until after delivery, initiate TKI immediately postpartum, and advise against breastfeeding while on a TKI. Based on a comprehensive review of current guidelines, clinical experience, and available literature, the goal during pregnancy was to control the proliferative aspect of her disease by maintaining white blood cell (WBC)

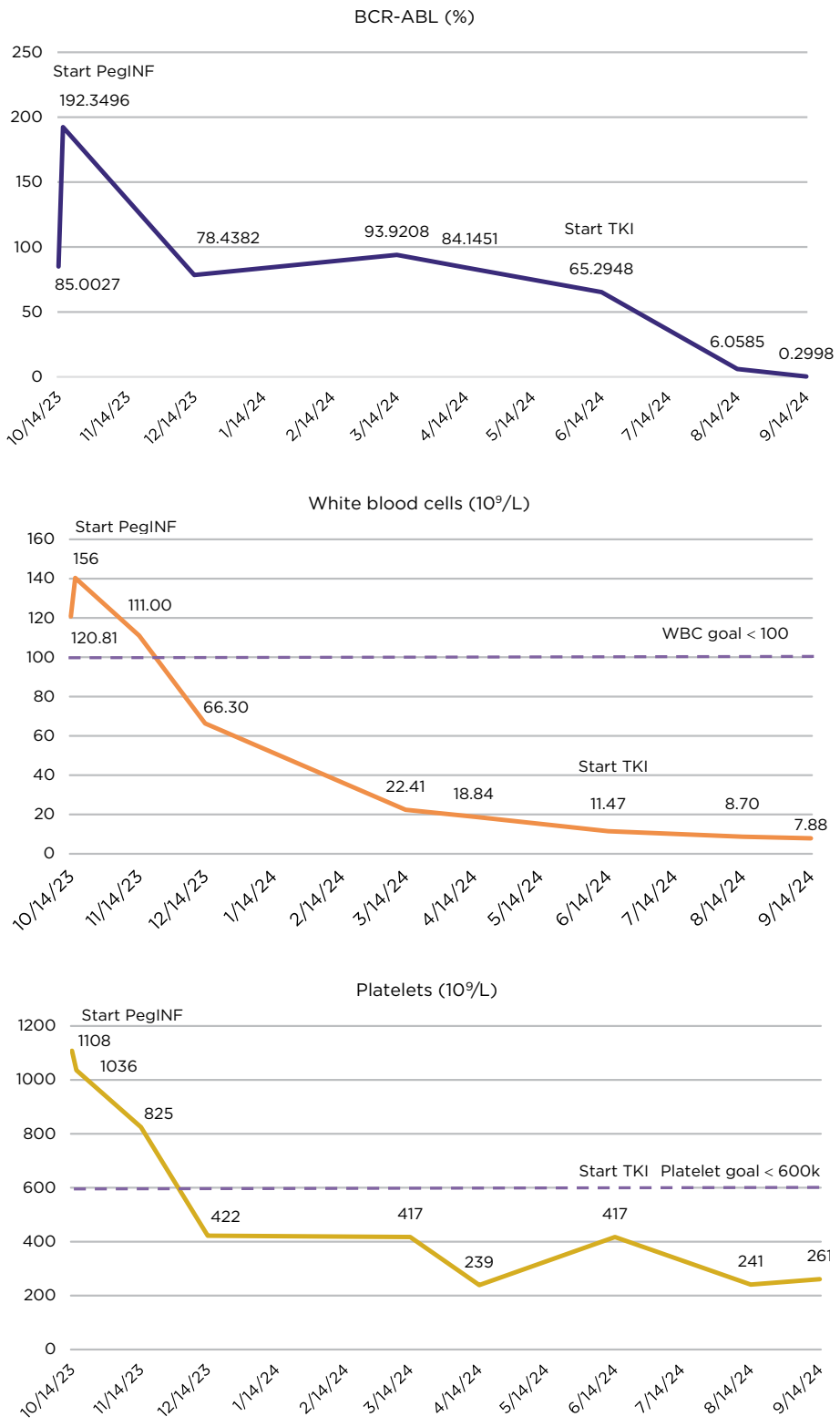


Figure 1. Patient's change in BCR-ABL level, white blood cell count level, and platelet count.
PegINF = pegylated interferon.

count below 100 × 10^9/L and platelet count below 600 × 10^9/L. Cytoreductive options considered to achieve treatment goals included pegylated interferon, hydroxyurea, and leukapheresis. Due to drug accessibility, anticipated adherence, and tolerability, subcutaneous peginterferon alfa-2a was initiated in October 2023 at a dose of 90 µg weekly.

Chronic myeloid leukemia (CML) is a clonal myeloproliferative neoplasm characterized by the presence of the Philadelphia chromosome, resulting from a reciprocal translocation between chromosomes 9 and 22. This translocation leads to the formation of the *BCR-ABL1* fusion gene, which encodes a constitutively active tyrosine kinase that drives leukemic proliferation. Chronic myeloid leukemia exists in three phases: chronic, accelerated, and blast crisis, with the chronic phase being indolent and responsive to therapy. If left untreated, chronic-phase CML can progress from chronic to accelerated and blast phases (Jabbour & Kantarjian, 2025). Pregnancy does not protect against progression. Loss of disease control during pregnancy can result in irreversible transformation to advanced phases that are life-threatening, more difficult to treat, and are associated with significantly worse outcomes for both the mother and fetus (Chelysheva et al., 2024). Blast crisis is a hematologic emergency. Delaying or limiting therapy due to pregnancy can be fatal. Therefore, maintaining disease control during pregnancy is imperative as it preserves future treatment options, including postpartum intensification.

TYROSINE KINASE INHIBITORS

The introduction of tyrosine kinase inhibitors (TKIs) has revolutionized the management of CML, transforming it from a once-fatal disease into one with a near-normal life expectancy. Tyrosine kinase inhibitors specifically target the leukemogenic *BCR-ABL1* fusion gene and are highly effective in achieving hematologic, cytogenetic, and molecular remissions. Functional cure can be achieved in most patients who are adherent to treatment. FDA-approved front-line TKIs for chronic-phase CML include imatinib (Gleevec), nilotinib (Tasigna), dasatinib (Sprycel), and bosutinib (Bosulif). Asciminib (Scemblix), a STAMP inhibitor with a novel allosteric binding mechanism distinct from traditional TKIs, is also now approved for front-line therapy. Although second-generation TKIs are associated with more rapid and deeper remission, they have not demonstrated a clear overall survival advantage over imatinib. Comorbidities, cost, and patient preference strongly impact the choice of TKIs, as well as the distinctive toxicity profiles for each agent (Robertson & Apperley, 2022).

While TKIs are the primary treatment for CP-CML, their teratogenic potential poses significant challenges in pregnancy, as they are contraindicated, particularly in the first trimester, due to risks of fetal malformations and adverse outcomes (Robertson & Apperley, 2022; Pua et al., 2025).

As CML increasingly affects younger individuals, including women of childbearing age, the intersection of disease management and reproductive planning has become a critical issue. In Western countries, the median age at diagnosis is around 57 to 60 years, but in emerging nations, it is often between 30 and 40 years. Consequently, clinicians are increasingly encountering more cases of CML diagnosed during pregnancy or in patients who desire to conceive while receiving TKI therapy (Chelysheva et al., 2018).

Table 1. Baseline Labs

	Prior to peg-INF (10/27/23)	Prior to TKI initiation (6/12/24)
WBC count	156 × 10^9/L	11.47 × 10^9/L
Platelet count	1044 × 10^9/L	417 × 10^9/L
BCR-ABL PCR	85.0027%	65.2948%

Note. peg-INF = peginterferon; PCR = polymerase chain reaction; TKI = tyrosine kinase inhibitor; WBC = white blood cell.

For patients who have achieved a deep and sustained molecular response, treatment-free remission (TFR) may be considered prior to conception. Treatment-free remission is when a patient stops therapy. Successful TFR typically requires a BCR-ABL1 transcript level of ≤ 0.01% (MR4) or ≤ 0.0032% (MR4.5) by quantitative PCR for at least 2 years (Mahon et al., 2024; Dulucq & Mahon, 2016). However, not all patients meet the criteria for TFR, and some pregnancies are unplanned. In such cases, alternative therapies must be considered.

PEGINTERFERON ALFA-2A

Historically, interferon alfa-2a was used during pregnancy because of its favorable fetal safety profile. Following its discontinuation in the United States, pegylated interferon formulations, most commonly peginterferon alfa-2a, have been utilized. All forms of interferon are considered safe during pregnancy as they do not cross the placenta, thereby effectively managing leukocyte counts without harming fetal development (Abruzzese & Chelysheva, 2026). However, interferon may not be the optimal choice for patients with proliferative disease or significant leukocytosis (Haddad et al., 2026). There are still limited data on efficacy and safety in pregnant populations.

Management strategies during pregnancy depend on disease phase, maternal and fetal risks, and patient preferences. Observation may be appropriate for patients with stable disease, low leukocyte (< 100 × 10^9/L) and platelet counts (< 500–600 × 10^9/L). When treatment is needed, interferon-based therapies are preferred. In response to the discontinuation of the production of interferon alfa-2a, guidelines note that pegylated formulations can be used instead of TKIs in pregnancy despite limited data. Bone marrow transplantation and chemotherapy are not used in this setting due to their toxicity (Pua et al., 2025).

There are a growing number of case reports, observational studies, and expert-derived treatment algorithms for managing CML during pregnancy (Abruzzese & Chelysheva, 2026; Haddad et al., 2026; Robertson et al., 2024). Long-term outcomes for both mother and child, particularly regarding developmental effects of in utero exposure to alternative therapies, are still being investigated. This case describes the safe use of peginterferon alfa-2a as an acceptable alternative to TKIs in a pregnant patient with CML.

OUTCOMES AND DISCUSSION

The patient remained on peginterferon alfa-2a and maintained hematologic response throughout pregnancy. Platelet and white blood cell count goals were achieved within 30 days of starting peginterferon alfa-2a. Mild (grade 1) transaminitis, a common side effect of peginterferon, was observed; however, no interventions other than regular close monitoring of liver function were required. Transaminitis resolved once peginterferon alfa-2a was discontinued. She transitioned to dasatinib postpartum and did not breastfeed while on dasatinib. Otherwise, the patient tolerated the therapy well. She had a cesarean section delivery with no complications related to peginterferon alfa-2a. Importantly, the infant was healthy at birth and had no developmental delays at 1-year follow-up.

At diagnosis of CML, von Willebrand factor Ab and von Willebrand factor activity were checked to evaluate thrombocytosis. Based on available labs, she had evidence of von Willebrand factor deficiency, but not von Willebrand disease (Ab negative). In patients with CML with platelet count > 100 × 10^9/L, this was likely secondary to clearance of large von Willebrand factor multimers due to the abundance of platelets with which to interact, suggesting an acquired syndrome. No evidence of gingival bleeding or epistaxis was observed. The patient had intermittent rectal bleeding (occasionally on toilet paper with wiping), which was attributed to Crohn's disease. After initiating interferon and improvement in platelet count, her von Willebrand factor deficiency resolved.

The patient also had a history of severe fistulizing ileocolonic Crohn's disease which was stable, and she remained on risankizumab throughout the pregnancy. Risankizumab has not been shown to be teratogenic, and its use during pregnancy does not confer additional risk for adverse obstetric or neonatal outcomes.

CONCLUSION

This case demonstrates that peginterferon alfa-2a can be safely and effectively used during pregnancy to achieve hematologic control in patients with CP-CML when TKIs are contraindicated. The therapy was well tolerated and did not exacerbate Crohn's disease. Although molecular response was not achieved, BCR-ABL PCR levels decreased consistently. The patient also presented with acquired von Willebrand factor deficiency, which resolved following peginterferon initiation and platelet count normalization.

The absence of adverse interactions with risankizumab and the resolution of von Willebrand factor deficiency support the safety and utility of peginterferon alfa-2a in this context. Transitioning to TKI therapy postpartum is essential for achieving deep molecular response and considering future TKI cessation trials, which are important for family planning. It is important to highlight that men treated with TKIs are not at an increased risk of infertility or fetal malformations; thus, no specific precautions are required for fathering a child while on TKI treatment (Haddad et al., 2026; Assi et al., 2021).

Peginterferon alfa-2a is a good alternative to TKIs during pregnancy for patients with CP-CML given its established safety, while imatinib and nilotinib can be considered after 16 weeks in cases where cell proliferation or PCR are uncontrolled with interferon and leukapheresis. This case supports the use of peginterferon alfa-2a in achieving hematologic control without exacerbating comorbid conditions. Long-term follow-up of infants exposed in utero is warranted. Further research is needed to evaluate the safety and efficacy of pegylated interferons, including ropeginterferon formulations, especially in treatment-naive patients. ●

Disclosure

Dr. Ragon has served on advisory boards for Astellas, Bristol Myers Squibb, and Syndax Pharmaceuticals. The other authors have no conflicts of interest to disclose.

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