Clinical Practice Recommendations for Myelofibrosis Management in the Asia-Pacific Region: The APAC-MF Alliance

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ABSTRACT

PURPOSE Myelofibrosis (MF) is a complex and clinically heterogeneous myeloproliferative neoplasm, presenting significant challenges for patient care and clinical decision making. Although global guidelines exist for MF management and continue to evolve with the advent of novel therapies, they do not consider regional variations in drug accessibility nor the availability of diagnostic tools and resources. The notable gap in regional guidance for managing patients with MF in the Asia-Pacific (APAC) region has led to regional disparities in patient care practices. To bridge this gap, a steering committee (SC) of 14 expert hematologists from the APAC region collaborated to develop evidence- and consensus-based consensus statements (CSs) for MF management in the APAC region.

MATERIALS AND METHODS On the basis of evidence from a systematic literature review and their own clinical experience, the SC drafted 13 clinical practice recommendations across four consensus themes: (1) defining the thresholds for anemia and when to initiate or modify treatment; (2) defining when to initiate or modify treatment for thrombocytopenia; (3) defining Janus kinase inhibitor failure and what would warrant switching treatment; and (4) defining the most appropriate risk stratification model for MF in the APAC region. The SC and an extended faculty (EF) of 47 hematologists and two patients voted on the CSs in a modified Delphi process using a 9-point scale (1 = strongly disagree, 9 = strongly agree), with consensus achieved when 75% agreed within the range of 7-9.

RESULTS Following amendments to align with EF feedback, consensus was achieved for all 13 CSs.

CONCLUSION These CSs offer pragmatic guidance tailored to the MF landscape in the APAC region, which aims to enhance the quality of patient care and outcomes. The CSs in this study are formally endorsed by the Asian Myeloid Working Group.

ACCOMPANYING CONTENT

Data Supplement

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INTRODUCTION

Myelofibrosis (MF) is a classical Philadelphia chromosome-negative myeloproliferative neoplasm (MPN) characterized by hematopoietic abnormalities and bone marrow fibrosis, leading to splenomegaly, cytopenias, and constitutional symptoms.[1] The most common driver mutation in MF is *JAK2* V617F, followed by mutations in *CALR* and *MPL*, which all cause constitutive activation of Janus kinase (JAK)/signal transducer and activator of transcription signaling.[2]

Allogeneic hematopoietic stem cell transplantation (allo-HSCT) is currently the only curative treatment for MF, but JAK inhibitor (JAKi) therapies offer treatment options to control spleen size and symptoms, while improving health-related quality of life (HRQoL).[1,3] Ruxolitinib was initially approved by the US Food and Drug Administration (FDA) in 2011 and the European Medicines Agency (EMA) in 2012 on the basis of data from the COMFORT studies, and it currently represents the most widely available and commonly used JAKi in the Asia-Pacific (APAC) region.[4-7] More recent approvals include fedratinib (FDA, 2019; EMA, 2021), pacritinib (FDA, 2022), and momelotinib (FDA, 2023; EMA, 2024).[8-12] Although spleen responses and reduced symptom burden are observed with ruxolitinib and fedratinib, the most common hematologic adverse events are anemia and thrombocytopenia.[6,7,13,14]

CONTEXT

Key Objective

What are the optimal clinical management strategies for myelofibrosis (MF) in the Asia-Pacific (APAC) region?

Knowledge Generated

The APAC-MF alliance synthesized expert opinions in the APAC region to bridge evidence gaps where MF management guidance and/or evidence is limited or evolving. A steering committee of 14 expert hematologists representing nations from the APAC region developed 13 clinical practice recommendations across four consensus themes. All recommendations reached a high level of consensus, following a modified Delphi voting process that included an extended faculty of 47 hematologists and two patients.

Relevance

These recommendations contribute to MF management guidance in the APAC region, with specific considerations for variations in drug access and local practices where global guidelines may not always be feasible to implement. Endorsed by the Asian Myeloid Working Group, this work aims to enhance clinical management of patients with MF in the APAC region.

The more recent approvals of pacritinib and momelotinib provide options for achieving spleen and symptom responses and additionally have proven benefit in treating patients with MF with anemia; both can be used in patients with low platelet counts ($<50 \times 10^9$/L).[10-12,15-17]

Although national and international guidelines exist for MF management, there is a current need for APAC region-specific guidance owing to drug accessibility, reimbursement criteria, clinical practice, and health care/population scenarios varying across the APAC region. To address this, a steering committee (SC) of 14 expert hematologists from APAC nations (Australia, Hong Kong, Japan, Republic of Korea, Singapore, Taiwan, and Thailand) developed consensus questions across themes including the management of patients with anemia and thrombocytopenia, JAKi therapeutic considerations, and prognostication. Consensus statements (CSs) were drafted to answer the consensus questions, with the aim that they may contribute to future management guidance in the APAC region.

MATERIALS AND METHODS

Modified Delphi methodology was used to generate consensus between October 2023 and April 2024, comprising SC meetings, offline review rounds, and a voting process involving the SC and an SC-nominated extended faculty (EF) of 47 hematologists and two patients (Data Supplement, Fig S1, online only). Funding was provided by GSK, who had no other involvement in the consensus process. The SC identified 13 clinical questions across four consensus themes (Fig 1):

1. Defining the thresholds for anemia and when to initiate or modify treatment
2. Defining when to initiate or modify treatment for thrombocytopenia
3. Defining JAKi failure and what would warrant switching treatment
4. Defining the most appropriate risk stratification model for MF in the APAC region

A systematic literature review (SLR) was conducted following the Population, Intervention, Comparison, Outcome, Study Design, Timeframe framework (Data Supplement, Tables S1 and S2 and Fig S2). The SC reviewed key findings from the SLR in a summary report and used these, along with their clinical experience, to draft CSs to answer the clinical questions. The SC and EF voted on the CSs, using a 9-point scale (1 = strongly disagree, 9 = strongly agree), to obtain agreement scores for each, with consensus achieved if ≥75% of respondents agreed within the range of 7-9 (Tables 1-4).

RESULTS

Two voting rounds took place, and consensus was achieved for 12/13 recommendations after round 1. The SC reviewed voter feedback and, further to revising the CS that did not reach consensus (CS6), felt that valuable feedback was received for five other CSs (CSs 2-4, 11, and 12) that could further strengthen them. Original and revised CSs, voting round 1 results, and anonymized, verbatim feedback can be found in the Data Supplement (Tables S3-S9). Consensus was achieved for all CSs following voting round 2; 12/13 CSs achieved consensus in the range of 90%-100%, with the lowest achieving 87.72% (Tables 1-4). Below, we present key evidence and considerations that emerged during the consensus process. While these CSs are not intended to replace, modify, or update current MF management guidelines, they provide important regional context to address specific needs and challenges in the APAC region.

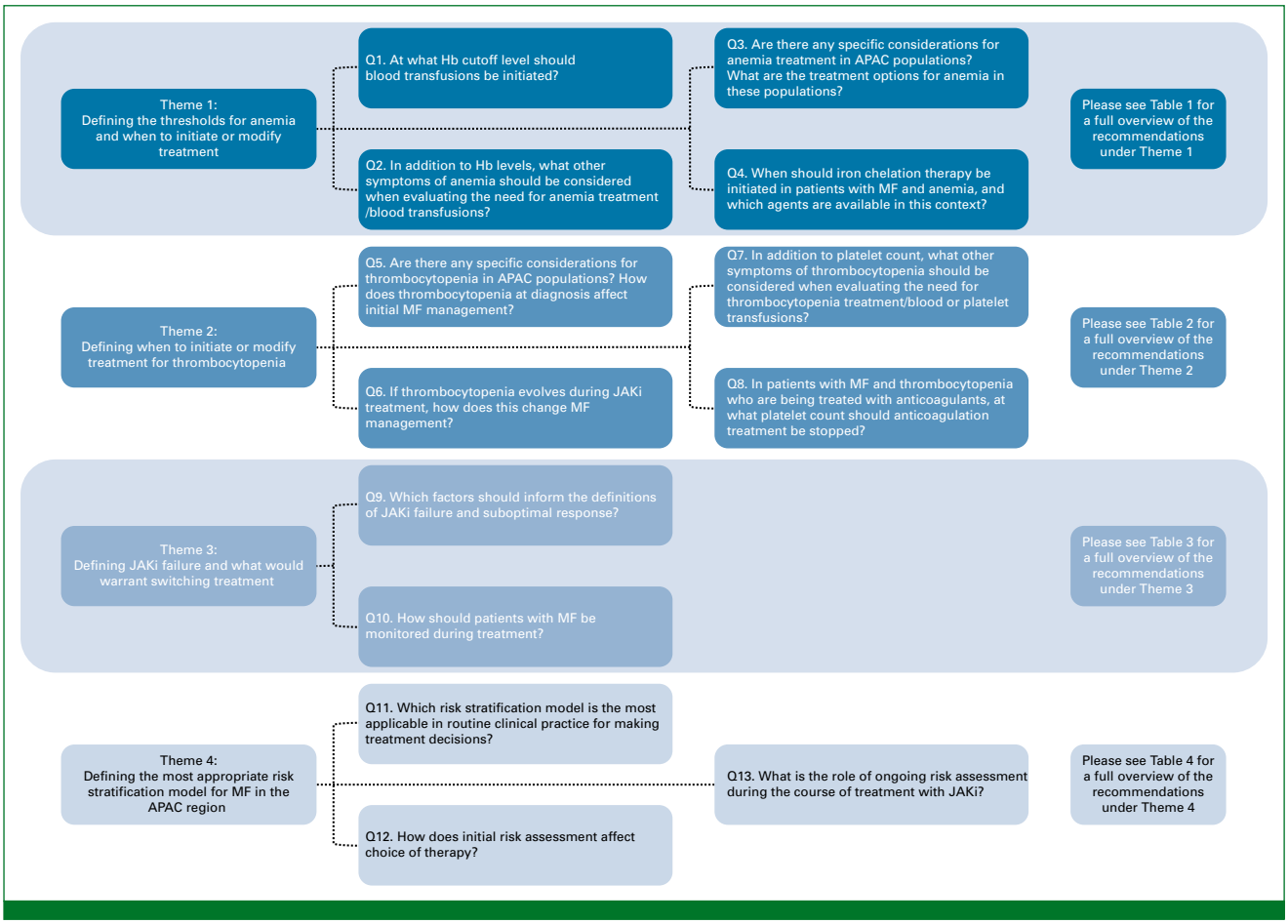

FIG 1. Consensus themes and questions. APAC, Asia-Pacific; Hb, hemoglobin; JAKi, Janus kinase inhibitor; MF, myelofibrosis; Q, question.

Defining the Thresholds for Anemia and When to Initiate or Modify Treatment

CSs for this theme are presented in Table 1.

Question 1. At What Hemoglobin Cutoff Level Should Blood Transfusions Be Initiated?

The threshold for initiating blood transfusions is variable in the literature, although country-specific guidelines within the APAC region advise hemoglobin (Hb) cutoff levels of <7 g/dL or <8 g/dL. When initiating blood transfusions, the symptomatic burden of anemia in patients should be considered; for example, patients with significant anemia symptoms such as severe fatigue, shortness of breath, or dizziness may benefit from a higher Hb threshold. For patients with comorbidities such as cardiovascular disease or pulmonary conditions, a higher Hb threshold may mitigate the risk of exacerbations. However, the burden of transfusions must also be considered, given their detrimental impact on HRQoL.[18] Transfusion dependency is also associated with an increased risk of progression to acute myeloid leukemia and iron overload, and reduced overall survival (OS).[18] Personalizing transfusion strategies and carefully balancing with clinical need will enhance patient care and well-being.

Question 2. In Addition to Hb Levels, What Other Symptoms of Anemia Should Be Considered When Evaluating the Need for Anemia Treatment/Blood Transfusions?

Symptoms of anemia can vary between patients, and Hb levels do not always correlate with clinical presentation; patients with low Hb levels may be asymptomatic, whereas those with higher Hb levels can experience symptoms that significantly affect their HRQoL. Regularly using validated symptom assessment tools, such as the Myelofibrosis Symptom Assessment Form (MF-SAF)[19] or 10-item Myeloproliferative Neoplasm Symptom Assessment Form Total Symptom Score (MPN-SAF TSS),[20] can help avoid overtreatment in patients with asymptomatic anemia and allow the effectiveness of treatment to be monitored in patients being treated for symptomatic anemia; persistent anemia symptoms indicate that the treatment plan requires adjustment.

TABLE 1. Theme 1 CSs: Defining the Thresholds for Anemia and When to Initiate or Modify Treatment

CS	Strength of Recommendation,[a] Median Score (Mean Score)	Level of Consensus[b,c]
Q1. At what Hb cutoff level should blood transfusions be initiated?		
CS1: For MF- and treatment-related anemia, consider the following Hb cutoff levels for blood transfusion initiation: • <7 to 8 g/dL for all patients in accordance with the local institutional practice The level at which blood transfusions are initiated should be individualized. If the patient is symptomatic or has comorbidities that may be exacerbated by anemia (eg, ischemic heart disease), a higher Hb cutoff level (eg, <9 to 10 g/dL) for blood transfusion initiation may be considered.	9 (8.36)	96.61% n/N = 57/59
Q2. In addition to Hb levels, what other symptoms of anemia should be considered when evaluating the need for anemia treatment/blood transfusions?		
CS2: Anemia-related symptoms that affect a patient's quality of life and should be considered include: • Fatigue • Shortness of breath • Poor appetite Tools such as the MF-SAF or the 10-item MPN-SAF TSS should be used to assess these symptoms at each visit in patients being considered for anemia treatment.	8.5 (8.18)	94.64% n/N = 53/56
Q3. Are there any specific considerations for anemia treatment in APAC populations? What are the treatment options for anemia in these populations?		
CS3: Specific considerations for anemia in APAC populations include drug availability and reimbursement criteria. Where available, momelotinib or pacritinib may be considered for patients with anemia, particularly momelotinib if the patient has anemia at presentation. Country-specific restrictions may affect the use of agents such as ESAs. In patients receiving ruxolitinib, dose reduction may be considered but should be balanced against its benefits on symptom burden and splenomegaly. Other clinically available treatment options for anemia in this context, either alone or in combination with JAKi, include: • ESAs • Danazol • Thalidomide Candidates for anemia-directed therapy (ESAs, danazol, or thalidomide) or considerations for an alternative JAKi (momelotinib or pacritinib, depending on availability) include the following: • Patients who are transfusion dependent • Symptomatic patients with Hb <9 to 10 g/dL In cases where splenomegaly and anemia occur together, and splenomegaly remains refractory to JAKi, low-dose splenic irradiation or splenectomy may be considered. However, splenectomy has considerable surgical risk and must be evaluated on an individual basis. Furthermore, the effects of splenic irradiation on anemia improvement may be short lived.	8 (8.09)	98.25% n/N = 56/57
Q4. When should iron chelation therapy be initiated in patients with MF and anemia, and which agents are available in this context?		
CS4: No MF-specific guidelines currently exist for iron chelation therapy. As a practical approach, the 2021 Thalassaemia International Federation guidelines for transfusion-dependent thalassemia can be used. For patients with MF who are transfusion dependent and may have the option of chelation therapy:[d] • SF concentration should be measured at least every 3 months • An SF threshold of >1,000 μg/L is recommended for initiating therapy Iron chelation therapy should be considered for patients with iron overload who are planned for allogeneic-HSCT. The SF threshold to initiate iron chelators, such as deferoxamine, deferiprone, and deferasirox, may be individualized based on the clinical judgment of the physician. For example, a threshold of <2,000 μg/L may be used if the patient is transfusion independent or in a stable state. Furthermore, prescription of iron chelation therapy should take into account the prognosis, age, and probable life expectancy of the patient.	8 (7.68)	87.72% n/N = 50/57

Abbreviations: APAC, Asia-Pacific; CS, consensus statement; ESAs, erythropoietin-stimulating agents; Hb, hemoglobin; HSCT, hematopoietic stem cell transplantation; JAKi, Janus kinase inhibitor; MF, myelofibrosis; MF-SAF, Myelofibrosis Symptom Assessment Form; MPN-SAF TSS, Myeloproliferative Neoplasm Symptom Assessment Form Total Symptom Score; Q, question; SF, serum ferritin.

[a]Median score on a 1-9 scale (mean score in parentheses).

[b]Percentage of votes with 7-9 on a 9-point scale. Participants were provided with the voting option not applicable for recommendations outside their area expertize; this option was selected by some patients.

[c]Results from the first voting round can be found in the Data Supplement (Table S3).

[d]Reimbursement criteria for iron-chelating agents may vary between countries within the APAC region.

TABLE 2. Theme 2 CSs: Defining When to Initiate or Modify Treatment for Thrombocytopenia

CS	Strength of Recommendation,[a] Median Score (Mean Score)	Level of Consensus[b,c]
Q5. Are there any specific considerations for thrombocytopenia in APAC populations? How does thrombocytopenia at diagnosis affect initial MF management?		
CS5: Specific considerations for APAC populations include drug availability and reimbursement criteria. Access to newer JAKis like momelotinib and pacritinib varies across the region. Low-dose ruxolitinib is recommended for the treatment of patients with MF and a platelet count of 50 to 100 × 10^9/L. In cases where grade >3 thrombocytopenia is observed (platelet count <50 × 10^9/L), management options are limited. In general, ruxolitinib treatment should be interrupted until platelet count recovers to ≥50 × 10^9/L. Alternatively, in very symptomatic patients with splenomegaly, the dose of ruxolitinib may be reduced for spleen size and symptom control while stabilizing platelet count. Although not available in all countries within the APAC region, momelotinib and pacritinib are JAKi options, with data supporting their use in patients with MF and a platelet count of <50 × 10^9/L.	8 (7.95)	98.21% n/N = 55/56
Q6. If thrombocytopenia evolves during JAKi treatment, how does this change MF management?		
CS6: There are no optimal agents for increasing platelet count in MF. Optimize JAKi dose as a first step. If platelet count remains low after JAKi treatment, the following agents may be considered: • Alternative JAKi (if available) • Danazol • Low-dose corticosteroids, alone or in combination with IMiDs Splenectomy may help improve platelet count but is associated with significant morbidity, and predicting which patients will benefit remains a challenge. Nevertheless, it may be considered, in extreme cases, in regions with restricted access to JAKi therapies.	8 (7.67)	90.91% n/N = 50/55
Q7. In addition to platelet count, what other symptoms of thrombocytopenia should be considered when evaluating the need for thrombocytopenia treatment/blood or platelet transfusions?		
CS7: Patients with MF and thrombocytopenia are at increased risk of hemorrhage and should be regularly assessed. Clinically relevant bleeding, including mucocutaneous bleeding and gross hematuria, is a concern in this population. Bleeding events should be managed promptly to avoid potentially life-threatening major bleeding; antiplatelet and anticoagulant treatment should be withheld in patients who are bleeding with a platelet count of <50 × 10^9/L. Platelet transfusions may be administered to patients with MF and thrombocytopenia with clinically significant bleeding. However, patients with MF may have a higher risk of refractoriness to platelet transfusion (eg, due to splenomegaly); consider performing platelet increment studies in these patients to assess the response to transfusion.	8 (8.09)	96.49% n/N = 55/57
Q8. In patients with MF and thrombocytopenia who are being treated with anticoagulants, at what platelet count should anticoagulation treatment be stopped?		
CS8: For patients with MF and thrombocytopenia being treated for venous thromboembolism, the risk of bleeding must be weighed against the risk of thrombosis: • Full-dose anticoagulation should be administered for platelet counts >50 × 10^9/L • Consider dose reduction to 50% for platelet counts ≥25 to 50 × 10^9/L (eg, apixaban 2.5 mg twice daily) • Therapy should be discontinued for platelet counts <25 × 10^9/L Individual bleeding risk should be evaluated before initiating treatment, particularly in patients with impaired renal function.	8 (7.96)	98.18% n/N = 54/55

Abbreviations: APAC, Asia-Pacific; CS, consensus statement; IMiDs, immunomodulatory drugs; JAKi, Janus kinase inhibitor; MF, myelofibrosis; Q, question.

[a]Median score on a 1-9 scale (mean score in parentheses).

[b]Percentage of votes with 7-9 on a 9-point scale. Participants were provided with the voting option not applicable for recommendations outside their area expertize; this option was selected by some patients.

[c]Results from the first voting round can be found in the Data Supplement (Table S4).

TABLE 3. Theme 3 CSs: Defining JAKi Failure and What Would Warrant Switching Treatment

CS	Strength of Recommendation,[a] Median Score (Mean Score)	Level of Consensus[b,c]
Q9. Which factors should inform the definitions of JAKi failure and suboptimal response?		
CS9: Existing criteria for ruxolitinib used in clinical trials focus on spleen response; in clinical practice, it may be difficult to distinguish exactly between JAKi intolerance and relapse. A clinical definition of JAKi failure may be divided into: 1. Resistance • Increasing spleen size, either relapsed or refractory to JAKi • Worsening symptoms • Worsening cytopenia ○ Later emergence of cytopenia on a stable dose is more likely to represent progression (or an unrelated cause) 2. Intolerance • Worsening cytopenia ○ Cytopenia following the starting dose, or dose increase, of a JAKi is likely to represent intolerance • Opportunistic infections[d] 3. Progressive disease • Progression to accelerated-phase (≥10% blasts) or blast-phase (≥20% blasts) MF[e] If ruxolitinib provides a benefit in one or more aspects of disease, treatment should continue; the degree of resistance or intolerance at which treatment should be switched depends on the treatment options available. When available, patients with a suboptimal response to JAKi should be offered enrollment in clinical trials.	8 (8.11)	94.55% n/N = 52/55
Q10. How should patients with MF be monitored during treatment?		
CS10: There are two aspects to monitoring patients with MF during treatment: 1. Major treatment needs • Spleen size (volumetry or palpation) • Symptoms (validated symptom scoring tool) 2. Treatment intolerances • Cytopenia (complete blood count with leukocyte differential) • Opportunistic infections (eg, hepatitis B virus reactivation)[d] A move toward volumetric assessment of spleen size is encouraged, if available (ultrasound/magnetic resonance imaging). At present, molecular monitoring (NGS, cytogenetics) varies in availability. NGS is recommended for transplant-eligible patients and at progression to accelerated- or blast-phase MF.	8 (8.14)	94.74% n/N = 54/57

Abbreviations: CS, consensus statement; JAKi, Janus kinase inhibitor; MF, myelofibrosis; NGS, next-generation sequencing; Q, question.
[a]Median score on a 1-9 scale (mean score in parentheses).
[b]Percentage of votes with 7-9 on a 9-point scale. Participants were provided with the voting option not applicable for recommendations outside their area expertize; this option was selected by some patients.
[c]Results from the first voting round can be found in the Data Supplement (Table S5).
[d]Primary or secondary prophylaxis for opportunistic infections should be considered.
[e]Genetic factors should be assessed on disease progression.

TABLE 4. Theme 4 CSs: Defining the Most Appropriate Risk Stratification Model for MF in the APAC Region

CS	Strength of Recommendation,[a] Median Score (Mean Score)	Level of Consensus[b,c]
Q11. Which risk stratification model is the most applicable in routine clinical practice for making treatment decisions?		
CS11: Multiple different risk models are used in the APAC region, depending on reimbursement criteria and the availability of NGS/cytogenetic data (Fig 1). MYSEC-PM, DIPSS-plus, and MIPSS70+ version 2.0 are suitable prognostic models in patients with post-PV/-ET MF. Multiple different models are available for primary MF (eg, IPSS, DIPSS, DIPSS-plus, MIPSS70+ version 2.0, and GIPSS). Models including NGS/cytogenetic data are most useful when making transplant decisions but also provide important information for predicting treatment responses and outcomes in transplant-ineligible patients.	8 (8.11)	97.87% n/N = 46/47
Q12. How does initial risk assessment affect choice of therapy?		
CS12: Intermediate-2 risk and high-risk categories, as described by conventional risk stratification models, are largely reimbursement criteria for ruxolitinib treatment in the APAC region. For transplant decisions, age (<70 years) and high-risk categorization (based on molecularly integrated models) are the key considerations, balanced with comorbidity index. There is no standard of care for patients with lower-risk MF (prefibrotic primary MF or asymptomatic), although cytoreduction may be required in certain cases. In patients with low-/intermediate-1 risk MF with symptomatic splenomegaly, JAKi may be considered.	9 (8.88)	100% n/N = 57/57
Q13. What is the role of ongoing risk assessment during the course of treatment with JAKi?		
CS13: Ongoing risk assessment is important for the long-term, individualized management of patients; new risk factors or comorbidities that develop during the course of treatment help inform decisions about the duration and dose of JAKi. Spleen size and symptom score should be measured at each visit, and using the RR6 score is recommended to provide patients with information regarding their prognosis. It is especially important to monitor transplant-eligible patients, as their risk increases, to inform the decision to switch from drug treatment to transplant.	8 (8.15)	98.15% n/N = 53/54

Abbreviations: APAC, Asia-Pacific; CS, consensus statement; DIPSS, Dynamic International Prognostic Scoring System; ET, essential thrombocytopenia; GIPSS, Genetically Inspired Prognostic Scoring System; IPSS, International Prognostic Scoring System; JAKi, Janus kinase inhibitor; MF, myelofibrosis; MIPSS70+, Karyotype- and Mutation-Enhanced International Prognostic Score System for Transplantation-Age Patients With Primary Myelofibrosis; MYSEC-PM, Myelofibrosis Secondary to PV and ET-Prognostic Model; NGS, next-generation sequencing; PV, polycythemia vera; Q, question; RR6, Response to Ruxolitinib After 6 Months.

[a]Median score on a 1-9 scale (mean score in parentheses).

[b]Percentage of votes with 7-9 on a 9-point scale. Participants were provided with the voting option not applicable for recommendations outside their area expertize; this option was selected by some patients.

[c]Results from the first voting round can be found in the Data Supplement (Table S6).

Importantly, these tools are validated for overall symptom monitoring and treatment response in patients with MF, but not specifically for evaluating anemia or transfusion requirement.[19,20] Without a specific assessment tool for anemia management, caution should be used when using these tools for this purpose, especially considering the multifactorial nature of symptoms such as fatigue and poor appetite in patients with MF.[21]

Question 3. Are There Any Specific Considerations for Anemia Treatment in APAC Populations? What Are the Treatment Options for Anemia in These Populations?

A key consideration for anemia treatment in patients with MF and anemia in the APAC region is the availability of newer JAKi therapies such as pacritinib and momelotinib. Pacritinib was approved by the FDA for treatment of intermediate- or high-risk MF in adults with a platelet count $<50 \times 10^9$/L on the basis of data from PERSIST-2.[10,22] PERSIST-2 demonstrated that pacritinib was more effective than best available therapy (including low-dose ruxolitinib) for spleen and symptom responses in patients with MF and thrombocytopenia, and reduced transfusion requirements at 24 weeks. On the basis of data from SIMPLIFY-1 and MOMENTUM, momelotinib was approved in the United States by the FDA and in Europe by the EMA, and in Japan by the Ministry of Health, Labor, and Welfare in 2024 for treatment of intermediate- or high-risk MF in adults with anemia.[11,12,17,23,24] In SIMPLIFY-1, 88% of patients had Hb levels of ≥8 g/dL, and 24% were transfusion dependent at baseline. This study demonstrated that momelotinib was noninferior to ruxolitinib for spleen response (but not symptom response), and all anemia end points improved (transfusion dependence, transfusion independence, and transfusion rate); fewer events of anemia were reported for patients treated with momelotinib for 24 weeks versus those treated with

ruxolitinib.[23] In MOMENTUM, treatment with momelotinib resulted in significantly improved spleen and anemia responses compared with danazol.[17] Notably, both SIMPLIFY-1 and MOMENTUM included patients with MF and constitutional symptoms and/or splenomegaly.[17,23] The role of momelotinib in treating primarily symptomatic anemia without other disease features remains to be fully established.

Where available, both pacritinib and momelotinib can be considered for patients with MF and anemia. However, all JAKi therapies, including pacritinib and momelotinib, can cause treatment-related anemia,[4,5,8-10,17] and in patients receiving ruxolitinib a drop in Hb levels upon treatment initiation (reaching a nadir between 8 and 12 weeks) is to be expected.[6,7] Although, treatment-related anemia may not compromise spleen response or survival; in COMFORT-1, patients with new-onset anemia receiving ruxolitinib treatment exhibited similar symptom improvements and spleen responses to patients without anemia.[6]

REALISE demonstrated the efficacy of an alternative dosing strategy for ruxolitinib in patients with MF and anemia, comprising 10 mg twice daily for the first 12 weeks before dose escalation as tolerated. This regimen avoids delaying or withholding ruxolitinib treatment in patients with MF- or treatment-related anemia while maintaining therapeutic response.[25]

While the erythropoietin-stimulating agents danazol and thalidomide are not approved for use in this setting, anecdotal reports have noted their routine use for the treatment of anemia in the APAC region. Splenectomy is another option for patients with splenomegaly and anemia, but it carries risks including bleeding, thrombosis, and infection susceptibility, and so should be considered on an individual basis.[26]

Question 4. When Should Iron Chelation Therapy Be Initiated in Patients With MF and Anemia, and Which Agents Are Available in This Context?

There are currently no guidelines for iron chelation therapy in patients with MF. Furthermore, no iron chelation therapies have been specifically approved for use in this population. This represents an unmet need and, at the time of writing, there is a paucity of clinical trials in this context.

The most recent National Comprehensive Cancer Network (NCCN) guidelines for MPNs note that the role of iron chelation remains unclear in patients with MF, while stating that iron chelation may be considered in patients who have received >20 transfusions and/or have a serum ferritin (SF) level of >2,500 μg/L in patients with lower-risk MF.[27] CS4 outlines our considerations for iron chelation therapy in patients with MF, and we recommend using the 2021 Thalassemia International Federation guidelines for transfusion-dependent thalassemia in the absence of specific guidance for MF.[28] We recommend using an SF level of >1,000 μg/L for initiating therapy in patients with MF who are transfusion dependent (or <2,000 μg/L if the patient is transfusion independent or in a stable state). Although these are useful reference values, any of these may be used depending on local practices and the clinical judgment of the physician. Furthermore, measuring the trend of SF level over time is more informative for treatment decision making, rather than a single value at a specific time point.

Defining When to Initiate or Modify Treatment for Thrombocytopenia

CSs for this theme are presented in Table 2.

Question 5. Are There Any Specific Considerations for Thrombocytopenia in APAC Populations? How Does Thrombocytopenia at Diagnosis Impact Initial MF Management?

The restricted availability of pacritinib and momelotinib in the APAC region at present may preclude their use; if available, they are JAKi options with data supporting their use in patients with MF and thrombocytopenia. PERSIST-2 and PAC203 included patients with MF and severe thrombocytopenia (platelet counts ≤50 × 10^9/L) and demonstrated that pacritinib twice daily improved splenomegaly and symptoms, while maintaining an acceptable safety profile.[22,29] Furthermore, the results of three randomized phase III trials including patients with thrombocytopenia (MOMENTUM [baseline platelet count ≥25 × 10^9/L], SIMPLIFY-1 [baseline platelet count ≥50 × 10^9/L], and SIMPLIFY-2 [no restriction on baseline platelet count]) indicated that momelotinib is an effective treatment option for patients with MF and moderate-to-severe thrombocytopenia, with a safety profile in thrombocytopenic subgroups consistent with the overall study population.[30] However, owing to the small number of patients enrolled in these trials with baseline platelet counts of <50 × 10^9/L (n/N = 47/783 overall),[30] further investigation is needed to establish the efficacy of momelotinib in this subgroup.

Where pacritinib and momelotinib are unavailable, ruxolitinib and fedratinib can be used in patients with MF and thrombocytopenia. EXPAND provided evidence supporting a starting dose of ruxolitinib at 10 mg twice daily for patients with platelet counts of 75 to 99 × 10^9/L, with reported adverse events consistent with known safety profile of ruxolitinib.[31] Conversely, the INCB 18424-258 open-label phase II study supported a lower starting dose of ruxolitinib (5 mg) with gradual up-titration in patients with platelet counts of 50 to 100 × 10^9/L.[32] For fedratinib, data from JAKARTA-2 suggested that 400 mg once daily is as effective in patients with platelet counts of 50 to <100 × 10^9/L as in patients with platelet counts ≥100 × 10^9/L, without requiring dose adjustments based on platelet counts.[14]

Question 6. If Thrombocytopenia Evolves During JAKi Treatment, How Does This Change MF Management?

Ruxolitinib treatment can cause thrombocytopenia, which can be managed by dose reduction or interruption.[6,7] Alternatively, pacritinib and momelotinib can be used in patients with platelet counts <50 × 10^9/L.[11,12] Pacritinib was approved on the basis of data from PERSIST-2, which included patients with platelet counts <50 × 10^9/L[10,22]; the approval of momelotinib was based on data from MOMENTUM, which enrolled patients with platelet counts ≥25 × 10^9/L.[17] Notably, danazol increased mean platelet counts in patients in MOMENTUM, whereas momelotinib did not.[17] Splenectomy may also increase platelet count, but the risks must be considered, as discussed under Question 3. Collaborative care is essential around major decisions such as splenectomy; primary care practitioners and any relevant allied health professionals should be consulted for comorbidities and psychosocial aspects to ensure the best interests of the patient are front of mind.

Prednisone, alone or in combination with immunomodulatory drugs, may be considered to manage thrombocytopenia in patients previously treated with JAKis. However, corticosteroid treatment is associated with side effects such as metabolic complications (especially hyperglycaemia), iatrogenic Cushing syndrome, opportunistic infections, and psychiatric disturbances.[33,34]

Platelet transfusions are not recommended for patients with thrombocytopenia without evidence of bleeding or platelet count <10 × 10^9/L because no studies have demonstrated long-term benefit—they are a short-term measure to increase platelet count in patients with severe bleeding.[35]

Question 7. In Addition to Platelet Count, What Other Symptoms of Thrombocytopenia Should Be Considered When Evaluating the Need for Thrombocytopenia Treatment/Blood or Platelet Transfusions?

In patients with MF and thrombocytopenia, hemorrhage risk is increased. We define major bleeding using the definition provided by the Control of Anticoagulation Subcommittee of the International Society on Thrombosis and Hemostasis[36]:

1. Fatal bleeding, and/or
2. Symptomatic bleeding in a critical area or organ, such as intracranial, intraspinal, intraocular, retroperitoneal, intra-articular or pericardial, or intramuscular with compartment syndrome, and/or
3. Bleeding causing a 2 g/dL drop in Hb level or leading to transfusion of two or more units of whole blood or packed red cells

At the time of writing, no platelet cutoff levels for platelet transfusions have been tested in MF, representing an unmet need.

Question 8. In Patients With MF and Thrombocytopenia Who Are Being Treated With Anticoagulants, at What Platelet Count Should Anticoagulation Treatment Be Stopped?

Our recommendation is adapted from the practice suggestions described in Wang et al.[37] At the time of writing, there is no MF-specific guidance for anticoagulation treatment, representing an unmet need.

Defining JAKi Failure and What Would Warrant Switching Treatment

CSs for this theme are presented in Table 3.

Question 9. Which Factors Should Inform the Definitions of JAKi Failure and Suboptimal Response?

Existing criteria, such as the stringent criteria for ruxolitinib failure used in the reanalysis of JAKARTA-2, PAC203, and FREEDOM, are focused on spleen response.[38] However, in clinical practice, physicians should individualize treatment goals in consultation with their patients. Of note, reactivation of latent infections of particular relevance in the APAC region include hepatitis B, herpes zoster, and tuberculosis, for which patients receiving JAKi therapy may require screening and prophylaxis. We have outlined our proposed clinical definition of JAKi failure in Table 3 as a framework to support physicians' judgment. Furthermore, clinicians should monitor for toxicities associated with JAKi therapy that may diminish patient HRQoL; for example, gastrointestinal toxicity has been reported during pacritinib, fedratinib, and momelotinib treatment.[13-17,23]

Question 10. How Should Patients With MF Be Monitored During Treatment?

Although measuring spleen via palpation is the standard of care in many APAC countries, clinical practices vary across the region; we recommend a move toward volumetric assessment to increase the reliability of measurements. Magnetic resonance imaging and ultrasound are more objective, with greater accuracy and reliability than palpation, and strong agreement has been demonstrated between their measurements, along with high predictive performance.[39] Of the two, ultrasound may be the more practical and cost-effective option.[39]

Molecular monitoring is not routinely performed outside of clinical trials, but it is important if leukemic transformation is suspected and for assessing allo-HSCT candidacy. Leukemic transformation is associated with poor prognosis; ongoing monitoring for high-risk mutations should be undertaken to enable timely intervention.[40]

Decisions regarding the appropriateness and timing of allo-HSCT are informed by the risk of disease progression, disease phase, and patient-related factors such as age, lifestyle,

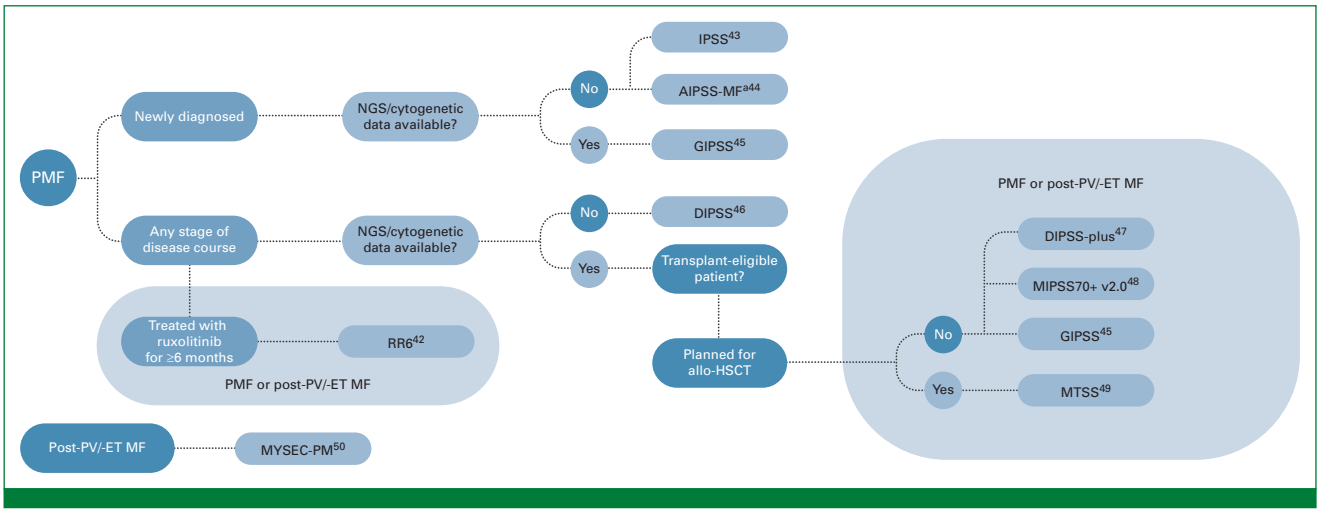

FIG 2. Prognostic score selection for MF.[42-50] [a]Model designed to provide personalized predictions of overall survival and leukemia-free survival. AIPSS-MF, Artificial Intelligence Prognostic Scoring System for Myelofibrosis; allo-HSCT, allogeneic hematopoietic stem cell transplantation; DIPSS, Dynamic International Prognostic Scoring System; ET, essential thrombocytopenia; GIPSS, Genetically Inspired Prognostic Scoring System; IPSS, International Prognostic Scoring System; MF, myelofibrosis; MIPSS70+, Karyotype- and Mutation-Enhanced International Prognostic Score System for Transplantation-Age Patients With Primary Myelofibrosis; MTSS, Myelofibrosis Transplant Scoring System; MYSEC-PM, Myelofibrosis Secondary to PV and ET-Prognostic Model; NGS, next-generation sequencing; PMF, primary myelofibrosis; PV, polycythemia vera; RR6, Response to Ruxolitinib After 6 Months.

and comorbidities; molecular monitoring provides additional information beyond clinical and morphologic criteria. In MF, risk factors of leukemic transformation include age >70 years; circulating blasts ≥3%; *ASXL1*, *IDH1*, *IDH2*, *SRSF2*, and *TP53* mutations; moderate/severe anemia; and thrombocytopenia.[40,41]

As previously mentioned, monitoring for reactivation of latent infections (hepatitis B virus, herpes zoster, tuberculosis, and other locally prevalent infections) represents an important aspect of patient management in the APAC region.

Defining the Most Appropriate Risk Stratification Model for MF in the APAC Region

CSs for this theme are presented in Table 4.

Question 11. Which Risk Stratification Model Is the Most Applicable in Routine Clinical Practice for Making Treatment Decisions?

Figure 2 presents our proposed algorithm for selecting an appropriate risk stratification model for patients with primary MF or post-polycythemia vera/essential thrombocythemia MF. However, certain APAC countries have requirements to use specific models for reimbursement purposes.

Although models incorporating next-generation sequencing/cytogenetic data are mostly used in clinical trials, these models provide information that is useful for counseling patients regarding their predicted treatment outcome. Patients with ≥three additional mutations are more likely to experience ruxolitinib failure and have a shorter time to treatment discontinuation because these factors likely represent more aggressive disease.[51] Such patients should be considered for enrollment in clinical trials, if available. To provide a more comprehensive assessment of risk, calculating more than one risk score using different models is encouraged.

Question 12. How Does Initial Risk Assessment Affect Choice of Therapy?

Initial risk assessment stratifies patients into risk categories that determine treatment approach.[52] Patients with asymptomatic low-/intermediate-1 risk MF may not require immediate treatment; symptom management should be prioritized.[27] If treatment is required, there are data supporting the use of ruxolitinib in patients with intermediate-1 risk MF. In the ruxolitinib-MF real-world study, although spleen response was only numerically higher in patients with intermediate-1 MF versus patients with intermediate-2/high-risk MF (26.8% *v* 23.3%), duration of response was significantly longer (2.1 *v* 0.46 years, respectively; $P = .004$).[53] Furthermore, OS rate was significantly higher in intermediate-1 patients compared with intermediate-2/high-risk patients (66.9% *v* 38.1%; $P < .001$), although this may be related to lower disease burden and more favorable hematologic status for lower risk patients at baseline.[53]

Patients with higher-risk MF have a poorer prognosis than patients with lower-risk MF.[52] JAKi therapy aims to reduce spleen size and symptoms, but allo-HSCT in transplant-eligible candidates is considered the only curative option.[52] Therefore, accurate up-front assessment of MF-related risk

is crucial to identify patients who are candidates for transplant.[52]

Transplantation decisions are complex and should be guided by close collaboration between the transplant team and the patient. As a basis for transplant decisions, the NCCN guidelines may be used, although country-specific guidelines may differ.[54]

Question 13. What Is the Role of Ongoing Risk Assessment During the Course of Treatment With JAKi?

Spleen size should be measured and symptoms assessed using the MF-SAF or MPN-SAF TSS at every patient visit. It is important to explain prognosis to patients, for which the Response to Ruxolitinib After 6 Months model can be a useful tool.[42] Transplant-eligible patients initially categorized as intermediate-1/2 risk should be carefully monitored, as early allo-HSCT may be considered, especially for patients harboring high-risk gene mutations.

Patient Perspective

It is essential for patients to have the opportunity to actively participate in their own care. The patient EF members of this program fed back on the importance of their involvement, which reassured them that the patient perspective was considered and valued. Patients emphasized the importance of HRQoL and that this should be a key consideration during clinical decision making, something that patients are better placed to provide a holistic perspective on than clinicians. Regarding symptoms and comorbidities, patients noted the importance of a multidisciplinary approach, including recognizing mental health issues that may be MF related, such as fatigue and anxiety, and making appropriate referrals. Patients also noted the necessity of keeping informed about emerging data relevant to their disease, but this can be challenging. A specific example highlighted in a recent study was the increased risk of developing nonmelanoma skin cancer after treatment with ruxolitinib and the requirement for close dermatologic monitoring while on treatment.[4,5,55]

Overall, patients felt that the recommendations developed during this consensus process would provide them with peace of mind, knowing that clinicians without extensive knowledge of MF would have an up-to-date resource for guiding appropriate clinical decision making in the context of the evolving MF treatment landscape. Going forward, patients expressed that they would like to see health care professionals better equipped to advise patients on optimizing their own wellness, including actions they can take in their daily lives.

DISCUSSION

Within the context of international MF management guidelines, a need was identified for region-specific guidance for APAC populations. To address this, an SC representing APAC nations used modified Delphi methodology, including hematologists and patients to vote on the CSs to achieve robust consensus. The aim of the CSs presented herein is to supplement existing guidance, considering APAC-region specific nuances.

There is growing recognition that involving patients in shared decision making regarding their own care improves patient outcomes and HRQoL. Additionally, including patients in broader health care activities, such as clinical trial design, drug development, and other programs, enhances the robustness, effectiveness, and real-world relevance of these efforts. In this consensus process, we have included patients and advocate for broader patient inclusion in similar initiatives.

Refining MF treatment in the APAC region will improve patient care quality, health outcomes, and the patient experience while optimizing the use of available resources. Although only a single CS did not achieve consensus after the first round of voting, we chose to revise a total of six CSs, based on voter feedback, for the second voting round to maximize the comprehensiveness, real-world applicability, and credibility of the CSs. After two voting rounds, strong consensus was achieved across all 13 recommendations.

Although consensus in health care is important for standardizing clinical practice, the consensus process typically does not encompass all issues, leaving areas where consensus is still required. For example, a consensus initiative focusing on transplantation, including transplant specialists in the SC and EF, would be beneficial going forward. Furthermore, implementing consensus recommendations can be challenging in the real world because they may not align with country-specific policies, regulations, or practices, and therefore approaching this requires careful navigation on the part of practising physicians. We have taken a forward-looking approach in this consensus; although all the agents discussed are not available consistently across the APAC region and reimbursement criteria differ, we believe these CSs will prepare physicians to effectively navigate the APAC-MF therapeutic landscape at the time of writing and in the future, with the anticipated availability of novel therapeutic agents for the treatment of MF.

In conclusion, an expert panel of hematologists and an EF of hematologists and patients achieved a high level of consensus on CSs specifically tailored to MF treatment in the APAC region. The CSs address numerous questions in the evolving MF treatment landscape, including how to manage cytopenias and treatment failure, aiming to help standardize MF care while taking into account complex region-specific nuances.

We believe the CSs can contribute to future MF management guidance.

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All data generated or analyzed during this study are included in this published article and its Data Supplement.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Clinical Practice Recommendations for Myelofibrosis Management in the Asia-Pacific Region: The APAC-MF Alliance

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Winnie Z.Y. Teo
Consulting or Advisory Role: GlaxoSmithKline, BMS
Speakers' Bureau: Pharmaessentia, Novartis
Travel, Accommodations, Expenses: AstraZeneca, Pfizer

Harinder Gill
Honoraria: Novartis, Pharmaessentia, BMS, Astellas Pharma, Otsuka, GlaxoSmithKline, MSD
Consulting or Advisory Role: GlaxoSmithKline, PharmaEssentia
Research Funding: MSD, Pharmaessentia, Bristol Myers Squibb/Celgene, Novartis
Patents, Royalties, Other Intellectual Property: Compositions and methods for fast multiplexed screening and monitoring of NPM1 mutations (International publication number: WO 2023/011624 Al), The University of Hong Kong currently holds two United States (US) patents (7,521,071 B2 and 8,906,422 B2), one Japanese patent (4786341) and one European patent (EP 1562616 B1) for the use of oral arsenic trioxide in the treatment of leukemias and lymphomas (Inst)
Travel, Accommodations, Expenses: Novartis, Pharmaessentia, Pfizer, MSD, Jacobson Pharma Corporation (Hong Kong), BMS, Otsuka

No other potential conflicts of interest were reported.