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ORIGINAL RESEARCH

Canadian Consensus Guidelines for the Management of Vitiligo

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ABSTRACT

Introduction: Vitiligo remains a highly burdensome disease associated with significant autoimmune and psychosocial comorbidities. Although the therapeutic landscape has long been dominated by off-label therapy, new treatments are emerging. Limited guidance on how to safely and effectively utilize available therapies poses challenges for healthcare providers. Herein, we provide generally accepted principles, consensus recommendations, and a treatment algorithm for the management of vitiligo, as developed by a panel of ten Canadian dermatologists with expertise in managing vitiligo.

Methods: The three-phase process consisted of identifying themes and research questions;

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conducting a systematic literature review; and discussing/voting on generally accepted principles, consensus statements, and a treatment algorithm using an iterative consensus process.
Results: Experts agreed to 27 generally accepted principles, ten consensus statements, and a treatment algorithm. Education about vitiligo pathogenesis and repigmentation biology can help patients, caregivers, and healthcare providers set realistic expectations for treatment. Treatment should focus on repigmentation or stabilizing progression, rather than on depigmentation. Topical therapies include topical corticosteroids, topical calcineurin inhibitors, and the topical Janus kinase inhibitor ruxolitinib cream. Phototherapy, such as narrow-band ultraviolet B and excimer laser/lamp, can be used as monotherapy or in combination with other treatments. Off-label systemic therapies may be appropriate for patients with unstable or rapidly progressing disease. Surgical therapy may be suitable for patients with localized or stable recalcitrant disease. Maintenance therapy may help mitigate the risk of disease relapse.
Conclusion: Improved clarity around the benefits, risks, and limitations of available therapies has supported the development of robust guidelines and a treatment algorithm for vitiligo. Disease stabilization and repigmentation are goals that can largely be achieved, particularly when patients share a mutual understanding of vitiligo and its treatment options.
A Graphical Abstract is available for this article.

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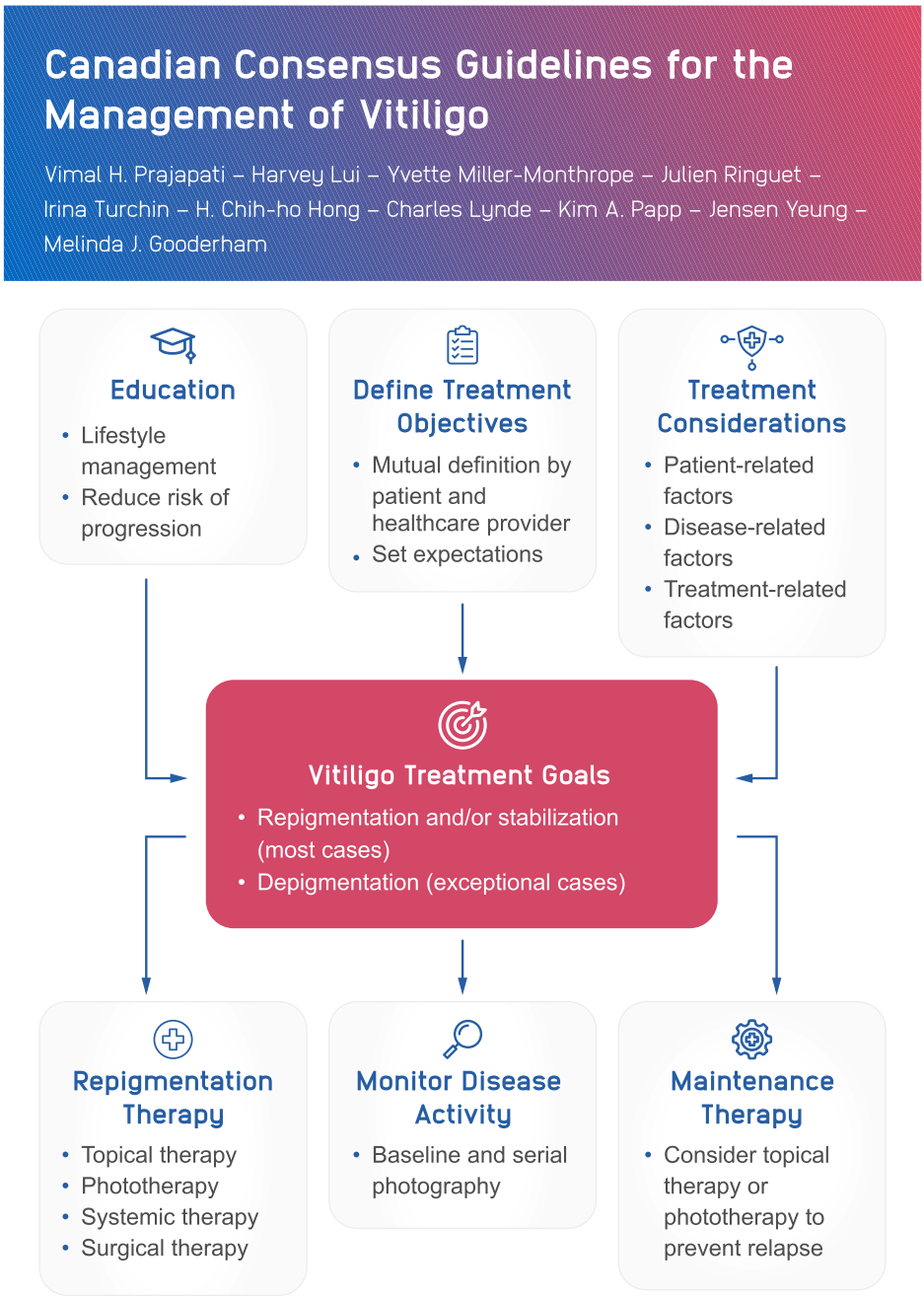

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Keywords: Guidelines; Janus kinase inhibitor; Phototherapy; Topical calcineurin inhibitor; Topical corticosteroid; Vitiligo

Key Summary Points
Why carry out this study?
This study was undertaken to address a lack of guidance on the management of vitiligo with currently available treatment options in Canada.
The study asked how a panel of ten Canadian dermatologists with expertise in managing vitiligo would propose managing the disease.
What was learned from the study?
The panel provided generally accepted principles, consensus recommendations, and a treatment algorithm for the management of vitiligo that reflect the changing vitiligo treatment landscape.
Healthcare providers will have a better understanding of patient disease burden and assessment tools for vitiligo and be better prepared to use a wide variety of treatments in conjunction with education to optimize therapeutic outcomes for their patients.

DIGITAL FEATURES

This article is published with digital features, including a Graphical Abstract to facilitate understanding of the article. To view digital features for this article, go to https://doi.org/10.6084/m9.figshare.28660781.

INTRODUCTION

Vitiligo is a chronic autoimmune disease characterized by melanocyte destruction that leads to skin depigmentation [1, 2]. Vitiligo is associated with autoimmune and psychosocial comorbidities, including stigmatization, which can negatively affect mental health and quality of life (QoL) [3]. The degree of the effect of vitiligo on mental health and QoL can be influenced by factors such as skin tone as well as ethnic and cultural backgrounds [3, 4].

Vitiligo is rarely associated with physical symptoms, such as pruritus and skin pain, that are characteristic of other immune-mediated inflammatory diseases (IMIDs) of the skin [5]. Many persons with vitiligo are underrecognized, misdiagnosed, and undertreated, due in part to misconceptions that there are very limited efficacious therapies and/or that the condition is primarily "cosmetic" [6, 7]. These challenges can cause substantial delays in formal diagnosis and treatment [8], which may lead to worse outcomes.

Various off-label therapies may be prescribed for patients with vitiligo, including topical corticosteroids (TCS), topical calcineurin inhibitors (TCI), phototherapy, and systemic corticosteroids [9, 10]. Emerging treatments include topical and systemic Janus kinase inhibitors (JAKi) [11]; systemic biologics, particularly those focusing on interleukin-15 (IL-15) inhibition, are in the exploratory stages of development [12]. Ruxolitinib cream, a topical JAK1/JAK2 inhibitor, is currently the only approved repigmentation therapy for the treatment of vitiligo in Canada [13], the USA [14], the UK [15], and the European Union [16]. Several systemic JAKi are currently being investigated in phase 3 clinical trials [17–19]. Repigmentation rates vary across all treatments, and the disease will frequently relapse upon discontinuation of treatment [9, 20].

A clear set of consensus treatment guidelines can facilitate optimal management of vitiligo. Herein we provide generally accepted principles, consensus recommendations, and a practical treatment algorithm for the management of vitiligo, as developed by a panel of ten Canadian dermatologists with expertise in managing vitiligo.

METHODS

An expert panel of ten Canadian dermatologists with extensive clinical and research experience in vitiligo developed practical statements and a treatment algorithm based on current scientific

evidence and expert opinion. The process consisted of three phases. In the first phase of the project, themes and clinical questions were proposed at a meeting of all ten experts in November 2022.

In the second phase, a systematic literature review was conducted on the basis of specific clinical questions and population, intervention, control, and outcomes (PICO) terms identified by the experts. It aimed to address the question, "What is the range of disease burden of vitiligo?" (Supplementary Material Table 1). It also aimed to address the question, "What treatment options are available for vitiligo?" (Supplementary Material Table 2). Data extracted from the literature and expert opinion were used to draft generally accepted principles, consensus statements, and a treatment algorithm. These items were developed, validated, and then further refined by a subgroup of five of the experts (VHP, HL, IT, JR, and YM-M) at a meeting in August 2023. After this meeting, additional revisions were made asynchronously, with agreement reached among the five experts. An online survey was conducted for this subgroup to categorize statements as generally accepted principles or consensus statements.

In the third phase of the project, all ten experts attended an in-person meeting in September 2023 to discuss the generally accepted principles, as well as to vote on the final consensus statements and treatment algorithm using an iterative consensus process. Because the generally accepted principles for vitiligo were uniformly considered as foundational aspects of medical care, they were not subjected to voting. For the consensus statements and treatment algorithm, the level of agreement was assessed on a 5-point Likert scale (1, "strongly disagree"; 5, "strongly agree"). Consensus was defined as ≥75% agreement (i.e., a mean Likert score ≥3.75 out of 5). This article is based on previously conducted studies and does not contain any new studies with human participants or animals performed by any of the authors.

RESULTS AND DISCUSSION

Literature Search and Expert Statements

The literature search for the first question ("What is the range of disease burden of vitiligo?") resulted in ten sources for data extraction. The literature search for the second question ("What treatment options are available for vitiligo?") resulted in 57 sources for data extraction. Following discussions and an iterative consensus process, 27 generally accepted principles (Table 1) and ten consensus statements (Table 2) were adopted, details of which are provided in the next sections to guide recommendations for management. The treatment algorithm (Fig. 1) had unanimous (100%) agreement.

General Disease Considerations and Epidemiology

Vitiligo is a heterogeneous disease that is classified into distinct clinical subtypes according to morphology and distribution [2, 21]. The most common subtype included in clinical studies is nonsegmental vitiligo, wherein affected areas are present bilaterally [22]. Within nonsegmental vitiligo, many additional variants exist, including acrofacial, generalized, and mixed [21]. Segmental vitiligo is typically distinguished from nonsegmental vitiligo by its unilateral distribution and clinical stability over time [21].

Current prevalence rates estimate that vitiligo affects approximately 0.5–2.0% of the population worldwide [23, 24]; however, this may be an underestimation of the actual global burden [23]. Many cases likely go underrecognized, undiagnosed/misdiagnosed, and undertreated, due in part to pervasive misconceptions about vitiligo, such as the beliefs that vitiligo cannot be treated effectively and that it is essentially "cosmetic" in nature [6–8]. Patients and their healthcare providers may have limited understanding of the immune processes underlying vitiligo and be unaware that beneficial treatments are available [7, 8].

Table 1 Generally accepted principles for vitiligo

Statement
General disease considerations/epidemiology
Current estimates of incidence and prevalence are likely to underrepresent the actual burden of vitiligo, which tends to be underrecognized/underdiagnosed, undertreated, and poorly understood
It is important to recognize that vitiligo manifests with distinct clinical subtypes and is a heterogeneous disease. Vitiligo (nonsegmental) is the most studied clinical subtype in clinical trials
Understanding the burden of vitiligo should include the consideration of clinical subtypes, age, gender, distribution, skin type, ethno-cultural background, marital status, disease duration, and impact on QoL
Vitiligo is noteworthy among immune-mediated inflammatory diseases as it manifests primarily through changes in the appearance of the skin without physical symptoms yet significantly impacts patients' QoL
Lack of disease recognition, patient validation, and access to treatment add to the burden of vitiligo
Psychosocial, mental health, and QoL impact
Patients with vitiligo experience increased psychosocial, mental health, and QoL impact that is often underrecognized
Patients with vitiligo often experience discrimination; pediatric and adolescent populations can also struggle with teasing, bullying, and feeling self-conscious
Comorbidities
Patients with vitiligo have a higher prevalence of anxiety, depression, and suicidal ideation/behavior
Assessment tools
Although DLQI and CDLQI are health-related QoL assessment tools that have been validated in vitiligo, they do not holistically capture its burden on patients
Notwithstanding the availability of assessment tools that evaluate various quantitative aspects of vitiligo, the patient experience is critical to guiding management
General management considerations
Management of vitiligo is multimodal and should be individualized based on disease extent, location, level, and pattern as well as psychosocial, mental health, and QoL impact
The treatment of vitiligo will not affect associated autoimmune conditions and vice versa, unless the treatment targets a similar pathomechanism
There is a lack of evidence on how well patients with segmental or mixed clinical subtypes of vitiligo will respond to treatment
Affirmation and assessment of psychosocial, mental health, and QoL impact of vitiligo on patients is an essential aspect of the ongoing management
The progression of vitiligo may be rapid or slow, but repigmentation tends to be slow
Patients with vitiligo should be educated about minimizing physical trauma to the skin to avoid Koebnerization
Patients with vitiligo should be encouraged to use sun protection to avoid sunburn and/or minimize contrast between affected and nonaffected areas

Table 1 continued

Statement
Monitoring of disease activity and treatment response for vitiligo can include baseline and serial photography by patient and/or practitioner, if available
Evidence supporting the efficacy and safety of complementary and alternative therapies is insufficient for the treatment of vitiligo
Relapse with vitiligo is common and can be treated by reinitiating therapy
Camouflage may be appropriate as monotherapy or as an adjunctive therapy in patients with vitiligo
Repigmentation and/or stabilization strategies—topical therapies
Physicians should be aware and patients should be informed of the official warning against the concomitant use of topical calcineurin inhibitors and intentional ultraviolet light exposure
Repigmentation and/or stabilization strategies—phototherapy
Narrow-band ultraviolet B phototherapy and excimer laser/lamp therapy are the recommended forms of light treatment for patients with vitiligo
Intentional sun exposure or use of recreational tanning beds are generally not recommended for the treatment of vitiligo
Unlike phototherapy for other dermatoses, phototherapy for vitiligo typically requires a protracted treatment course of ≥ 6–12 months
There are efficacy and safety data to support the use of clinic-based excimer laser/lamp therapy either alone or in combination with other therapies for the treatment of patients with vitiligo
Repigmentation and/or stabilization strategies—surgical therapy
There are efficacy and safety data to support the use of surgical therapy for the treatment of vitiligo in patients with localized stable recalcitrant disease

CDLQI Children's Dermatology Life Quality Index, *DLQI* Dermatology Life Quality Index, *QoL* quality of life

Unlike many other IMIDs of the skin, vitiligo can negatively impact a patient's QoL without physical symptoms in the majority of patients [25]. Some patients may experience pruritus within affected areas early in the disease course, and some patients may experience burning sensations with UV light exposure [6, 26, 27]. The burden of vitiligo and its impact on QoL are largely affected by disease- and patient-related factors. Disease-related factors associated with higher overall QoL burden include longer duration, rapid progression, more extensive affected body surface area, and involvement of visible or sensitive sites, such as the face, hands, and genitals [3, 28]. Patient-related factors eliciting greater QoL burden include age (pediatric versus adult), sex (women versus men), skin tone (Fitzpatrick skin types IV–VI versus I–III), race (non-white versus white), and culture [3, 28–30]. Women often experience greater QoL impairment than men, which may be due to higher perceived stigma as it relates to physical appearance, relationships, and decreased prospects for marriage in some cultures [29, 31]. Lack of disease recognition, patient validation, and access to effective treatments further add to the burden of vitiligo [7].

Comorbidities and Impact on QoL

Patients with vitiligo are more likely to have other autoimmune comorbidities, such as thyroid disease, type 1 diabetes mellitus, alopecia areata, and pernicious anemia (Consensus

Table 2 Consensus statements for vitiligo

Statement	Level of agreement, %	Mean (SD) Likert score[a]
Comorbidities		
1. Patients with vitiligo are at a higher risk of having coexisting autoimmune disorders, including, but not limited to, thyroid disease, type 1 diabetes mellitus, alopecia areata, and pernicious anemia	86	4.3 (1.3)
Assessment tools		
2. Vitiligo-specific assessment tools such as VASI, VESplus, VitiQoL, VIS, and VIPs have been used in clinical trials but are neither essential nor practical in day-to-day clinical patient management	98	4.9 (0.3)
General management considerations		
3. Treatment of patients with vitiligo is directed toward repigmentation and/or stabilization. In exceptional cases, depigmentation may be a therapeutic option	96	4.8 (0.4)
4. Healthcare providers are encouraged to consider screening for concomitant autoimmune and mental health disorders in patients with vitiligo and refer to other healthcare providers when appropriate	96	4.8 (0.4)
5. Maintenance therapy reduces the risk of relapse in patients with vitiligo	84	4.2 (0.7)
Repigmentation and/or stabilization strategies—topical therapies		
6. Topical therapy with corticosteroids, calcineurin inhibitors, and JAKi can be considered as first-line monotherapy for the treatment of any form of vitiligo	100	5.0 (0)
7. The off-label use of topical corticosteroids, calcineurin inhibitors, and JAKi in combination with phototherapy may be used for treating patients with vitiligo	94	4.7 (0.5)
Repigmentation and/or stabilization strategies—phototherapy		
8. Phototherapy can be used alone or in combination with other therapies for the treatment of vitiligo	94	4.7 (0.6)
Repigmentation and/or stabilization strategies—systemic therapy		
9. In exceptional cases, off-label use of systemic immunomodulatory therapies can be considered for patients with unstable or rapidly progressive vitiligo. There are currently no approved systemic therapies for vitiligo	92	4.6 (0.5)
Depigmentation strategies—topical therapy		
10. Although monobenzone (monobenzyl ether of hydroquinone) is approved for depigmentation therapy in the treatment of vitiligo, it should only be prescribed in exceptional circumstances by dermatologists experienced with this therapy	98	4.9 (0.3)

JAKi Janus kinase inhibitor, *VASI* Vitiligo Area Scoring Index, *VES* Vitiligo Extent Score, *VIPs* Vitiligo Impact Patient scale, *VIS* Vitiligo Impact Scale, *VitiQoL* Vitiligo-specific quality of life

[a]Likert scale ranges from 1 to 5, with higher scores indicating more agreement

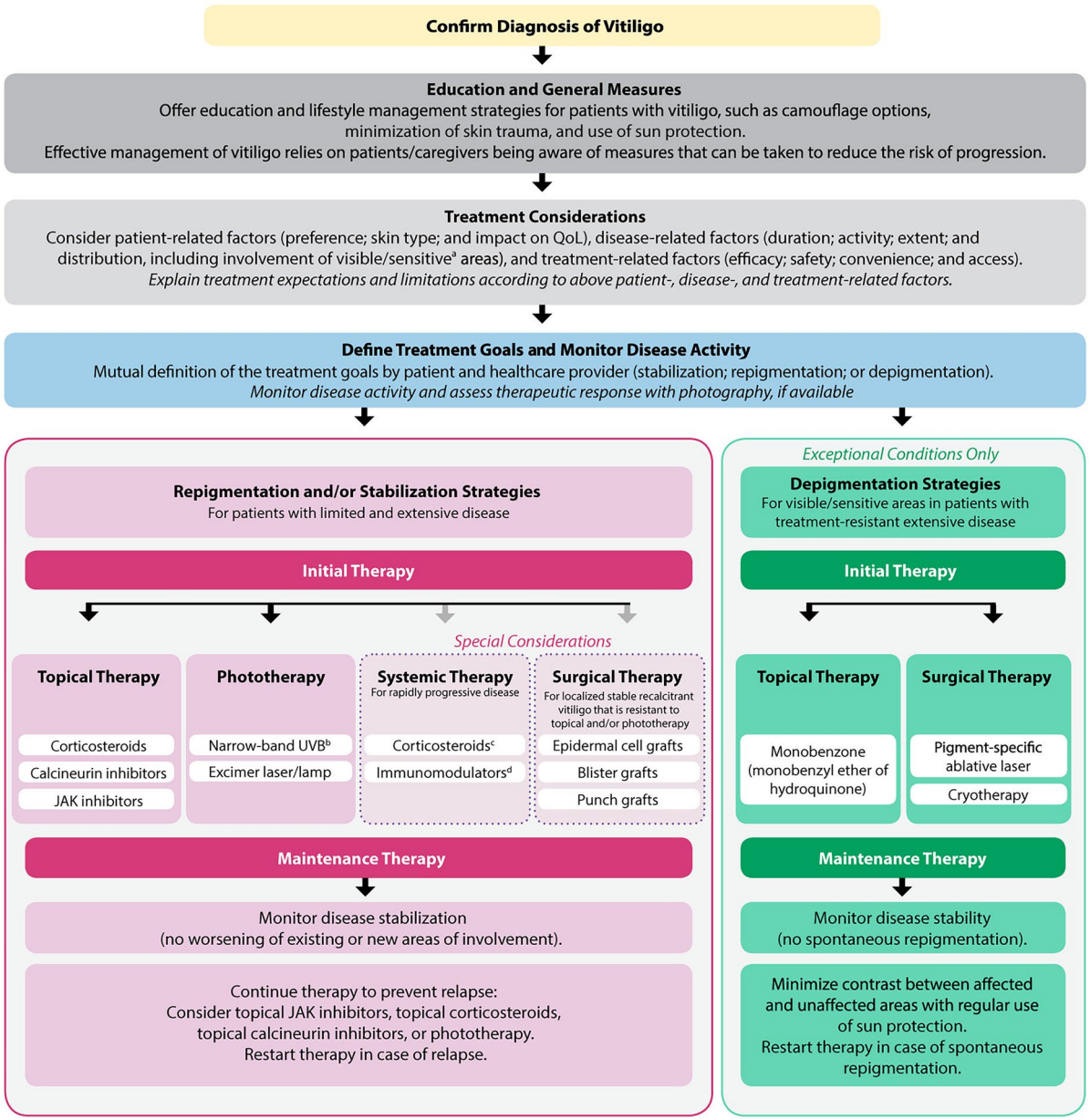

Fig. 1 Algorithm for the management of vitiligo (nonsegmental) in children, adolescents, and adults. [a]Visible/sensitive areas include the head/neck (especially face), hands, axilla/inguinal region, and genital area. [b]Narrow-band ultraviolet B phototherapy alone or in combination with other treatment modalities (e.g., topical corticosteroids, topical calcineurin inhibitors, and topical JAK inhibitors). [c]Corticosteroids as oral mini pulse. [d]Immunomodulators include methotrexate, cyclosporine, azathioprine, minocycline, and JAK inhibitors. *JAK* Janus kinase, *QoL* quality of life

Statement 1 [Table 2]) [32, 33]. Associations between vitiligo and autoimmune comorbidities may result from shared heritability genes [33, 34].

Patients with vitiligo are also at higher risk for psychosocial comorbidities [3, 28]. Prevalence rates of mental health disorders, such as anxiety, depression, sexual dysfunction, and suicidal

ideation/behavior, are higher among patients with vitiligo compared with healthy control groups or those with other skin diseases (e.g., alopecia areata, atopic dermatitis, and psoriasis) [3, 35–39]. The psychosocial, mental health, and QoL burden may be higher with disease-related factors [3, 28], patient-related factors, and discrimination or bullying, particularly in the case of children and adolescents [40]. Anxiety, depression, and impaired QoL have also been reported among caregivers of patients with vitiligo [3, 28], particularly in cases of progressive versus stable vitiligo [41].

Assessment Tools

For healthcare providers to more effectively guide disease management, the patient's perspective must be considered alongside qualitative and quantitative assessment tools (i.e., shared decision-making). In routine clinical practice, clinicians often use rapidity of disease progression, disease extent and distribution (including involvement of visible and sensitive sites), and disease effect on QoL, as well as patient motivations and preferences, to guide management [42].

Vitiligo-specific assessment tools are available for evaluation of physician-rated measures, such as disease extent and progression or repigmentation with treatment (e.g., the Vitiligo Area Scoring Index [VASI] [43], the Vitiligo Extent Score [VES] [44], and VESplus [45]) and patient-reported outcomes (e.g., Vitiligo-specific quality of life [VitiQoL] [25]; Vitiligo Impact Scale [VIS] [46]; Vitiligo Impact Patient scale [VIPs] [47]; and Vitiligo Noticeability Scale [VNS] [48]). Wood's lamp examination of the skin can be a simple and reliable adjunctive tool for visualizing cutaneous depigmentation in vitiligo, particularly in patients with lighter constitutive skin color [49] where affected areas may be less apparent. The Dermatology Life Quality Index (DLQI) [50] and Children's DLQI (CDLQI) [28, 51] questionnaires may also be used to assess QoL in patients with vitiligo [28]. Although these formal assessment tools are often obligatory for clinical trials [52], they may not be practical for everyday clinical practice (Consensus Statement 2). The DLQI and CDLQI, for example, may not sufficiently capture disease burden, despite being validated for use in vitiligo [52].

Patient Education

Effective management of vitiligo can be aided by facilitating patient awareness of measures that can be taken to reduce the risk of progression. Because of the underlying pathomechanisms of vitiligo, repigmentation tends to be a slow process regardless of disease progression speed [53]. This can be a source of frustration for patients [7]. Thus, education about vitiligo pathogenesis and repigmentation biology can help patients, caregivers, and healthcare providers set realistic expectations for treatment.

Lifestyle management strategies may also be helpful for patients. Sun safety, including sunscreen, sun-protective clothing, and sun avoidance is recommended [8]. Not only can these measures reduce the risk of sunburn within areas affected by vitiligo but also they can limit the contrast between depigmented (affected) and pigmented (unaffected) areas, and may prevent new sites of involvement from Koebnerization [54]. Avoiding skin trauma in general is important [54].

Patients can also be educated about adjunctive options to prescribed treatments. Camouflage may be used as monotherapy or an adjunctive therapy option [55]. Coverage of vitiligo with clothing or cosmetics has been found to improve overall QoL, although patients may find some methods ineffective, time-consuming, and/or expensive [55, 56]. Limited data are available regarding the efficacy of other complementary and alternative therapies for vitiligo, such as herbal remedies or dietary supplements [57].

Treatment Considerations

For most patients who desire therapy, treatment will primarily focus on repigmentation and/or stabilizing progression, rather than on depigmentation (Consensus Statement 3). Treatment approaches differ depending on the goal

of therapy, and a variety of factors warranting individualized management of vitiligo should be considered by healthcare providers when recommending a treatment plan [58]. Clinical subtype, as well as disease extent and distribution, vary among patients and can impact QoL; thus, these factors should be considered when determining treatment (Fig. 1). Currently, there is limited evidence regarding response to treatment in patients with segmental or mixed clinical subtypes, although responses may be observed in patients with short disease duration (i.e., <6 months) [59]. Regardless of vitiligo subtype, patients and healthcare providers can monitor disease progression and treatment response by taking baseline and serial photographs of affected skin for direct comparisons over time.

Given increased risks for autoimmune and psychosocial comorbidities in patients with vitiligo, healthcare providers should take into consideration concomitant disorders and refer to other healthcare providers as necessary (Consensus Statement 4). Mental health and QoL impact of vitiligo should be considered for the successful ongoing management of vitiligo. Some patients may not be aware of concomitant disorders and may require additional screening. For vitiligo treatments that specifically target its underlying immunopathogenesis, associated comorbid medical conditions will only be improved or stabilized if they progress through a similar mechanism. Less-targeted treatments, such as systemic corticosteroids, may temporarily abate multiple diseases regardless of pathomechanism [60].

It is common for vitiligo to relapse if treatment is discontinued, often within 2 years after stopping therapy, although the extent and rate of depigmentation may vary [20, 61]. Maintenance therapy may help mitigate the risk of disease relapse (Consensus Statement 5) [42], and there is evidence for some therapies (e.g., ruxolitinib cream [62] and tacrolimus ointment [63]) that this is the case. In many cases, repigmentation occurs again when therapy is reinitiated.

Repigmentation and Stabilization Strategies

Topical Therapy

Historically, first-line monotherapy for treatment of vitiligo has included TCS and TCI (Consensus Statement 6) [58]. Ruxolitinib cream (JAK1/JAK2 selective inhibitor [64]; Consensus Statement 6) is currently the only repigmentation therapy approved for the treatment of nonsegmental vitiligo in patients aged ≥12 years in Canada [13], the USA [14], the UK [15], and the European Union [16]. Twice-daily treatment with 1.5% ruxolitinib cream is generally well tolerated and has demonstrated significant facial and body skin repigmentation versus vehicle within 24 weeks, with continued improvement through 52 weeks [65]. These findings may reflect the key role of the JAK-signal transducer and activator of transcription (STAT) pathway in vitiligo pathogenesis, including the mediation of interferon-γ and IL-15 signaling [66]. In general, topical therapies may be used in combination with phototherapy [42]. Twice-daily treatment with 1.5% ruxolitinib cream combined with narrow-band ultraviolet B (NB-UVB) was well tolerated and effective in a phase 2 study [67]. However, there is an official warning against using TCI in combination with UV light exposure as it is not known whether TCI interferes with the skin's response to UV damage [68]. Off-label use of topical therapies approved for other indications, such as TCS [69] and TCI [70], as well as compounded prescriptions of the topical JAKi, tofacitinib [71], may also be effective in managing vitiligo (Consensus Statement 7), although prolonged or continuous use of some treatments are associated with local and systemic adverse events [58]. Treatment regimens following an intermittent or alternative schedule (e.g., 2 weeks on/2 weeks off) may mitigate safety concerns associated with prolonged TCS use [9].

Phototherapy

Phototherapy can be used as monotherapy or in combination with other treatments (Consensus Statement 8) to achieve greater levels of

therapeutic success [72, 73]. The recommended forms of phototherapy for patients with vitiligo include NB-UVB and excimer laser/lamp, which have been proven to be safer and more efficacious than psoralen UVA (PUVA) or UVA1 [74, 75].

In general, a minimum course of 6–12 months is required for the treatment of vitiligo with phototherapy [76]. Initial therapy should ideally be administered two or three times per week until adequate repigmentation is achieved [61, 76]. Responses should be reassessed periodically with a decision for ongoing maintenance therapy or discontinuation being made only after 6–12 months of phototherapy. Maintenance therapy regimens may vary from once to twice weekly, and treatment can be discontinued if the repigmentation response is deemed adequate [76]. Office-based phototherapy with proper supervision is preferred over home-based phototherapy; however, home-based phototherapy may be acceptable in special circumstances [77, 78], although patients should be closely monitored to prevent misuse.

Patients should be educated on the effects of phototherapy before undergoing treatment. Phototherapy can tan unaffected skin and paradoxically render vitiligo more noticeable [76]. Patients should also be advised that tanning parlor use is not recommended for treatment of vitiligo as it may cause Koebner phenomena if sunburn occurs [54] and can lead to increased risk of skin cancer [79].

Systemic Therapy

Although no systemic therapies are currently approved for the treatment of vitiligo, off-label use of systemic immunomodulators may be appropriate for patients with unstable or rapidly progressing vitiligo (Consensus Statement 9). These agents should be used with caution owing to their risk–benefit profile, and may include corticosteroids (either transient or via pulse therapy) [80], JAKi (currently being investigated in phase 3 clinical trials) [17–19], cyclosporine [81], or methotrexate [82, 83].

Surgical Therapy

In patients with localized or stable recalcitrant vitiligo, efficacy and safety data support the use of surgical therapy as an appropriate treatment option [84–86]. Surgical techniques such as needling, cellular suspension or punch grafts, suction blister grafts, and melanocyte transplantation [87] are suitable for cases of vitiligo that have been stable for ≥ 12 months and are resistant to topical therapy or phototherapy [42] Surgical therapy may be particularly useful in cases of segmental vitiligo, which is often resistant to other forms of treatment [9]. Other clinical characteristics (e.g., disease extent and distribution) should also be taken into account when determining the appropriate surgical technique [9]. However, surgical therapies are not widely accessible in Canada.

Depigmentation Strategies

Although repigmentation to restore a patient's native constitutive skin color is typically the goal of vitiligo treatment, intentional depigmentation may be considered in exceptional cases, such as patients with treatment-resistant extensive disease [9]. Monobenzone (monobenzyl ether of hydroquinone) [88] is approved in certain jurisdictions as a depigmentation therapy for patients with vitiligo; however, it should only be used by dermatologists who are experienced with this type of treatment (Consensus Statement 10). Further, it may be difficult to obtain. Additional depigmentation strategies include pigment-specific ablative laser therapy (e.g., Q-switched ruby, alexandrite, or neodymium-doped yttrium aluminum garnet [Nd:YAG]) and cryotherapy (e.g., liquid nitrogen) [89, 90]. Depigmentation should be considered irreversible, although spontaneous repigmentation may occur and is unpredictable [91].

Limitations

These guidelines are widely applicable but most closely approximate clinical practice in Canada

given that all experts who participated in the study practice in Canada.

CONCLUSIONS

Clinical data and experience support the development of an evidence-based algorithm to guide clinicians in the management of vitiligo. Disease stabilization and repigmentation are treatment goals that can be achieved to a certain extent with appropriate therapies, though factors such as disease duration and sites of involvement may influence the response. As ongoing research efforts evaluate the burden and treatment of vitiligo, new therapeutic options continue to emerge. Healthcare providers are encouraged to discuss new treatment options with patients to develop and facilitate an individualized and realistic treatment plan.

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Declarations

Conflict of interest. Vimal H. Prajapati has served as an advisor, consultant, and/or speaker for AbbVie, Actelion, Amgen, Apogee Therapeutics, Aralez, Arcutis, Aspen, Bausch Health, BioScript Solutions, Boehringer Ingelheim, Bristol Myers Squibb, Canadian Psoriasis Network, Celgene, Celltrion, Cipher, Concert, CorEvitas, Eczema Society of Canada, Eli Lilly, Galderma, GlaxoSmithKline, Homeocan, Incyte Corporation, JAMP Pharma, Janssen, Johnson & Johnson, LEO Pharma, Medexus, Novartis, Organon, Pediapharm, Pfizer, Sanofi Genzyme, Sun Pharma, Tribute, UCB, and Valeant; served as an investigator for AbbVie, AnaptysBio, Arcutis, Arena, Asana, Bausch Health, Boehringer Ingelheim, Bristol Myers Squibb, Celgene, Concert, CorEvitas, Dermavant, Dermira, Eli Lilly, Galderma, Incyte Corporation, Janssen, LEO Pharma, Meiji Pharma, Nektar Therapeutics, Nimbus Lakshmi, Novartis, Pfizer, RAPT Therapeutics, Regeneron, Reistone, Sanofi Genzyme, Sun Pharma, Takeda, and UCB; and received grants from AbbVie, Bausch Health, Janssen, LEO Pharma, Novartis, and Sanofi Genzyme. Harvey Lui has served as an advisor, consultant, investigator, and/or speaker for AbbVie, Incyte Corporation, L'Oréal, Novartis, and Vita Imaging. Yvette Miller-Monthrope has served as an advisor, consultant, and/or speaker for AbbVie, Bristol Myers Squibb, Boehringer Ingelheim, Fresenius Kabi, Galderma, Incyte Corporation, Janssen, Sanofi, Sun Pharma,

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