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Narrow-band UVB phototherapy—Australian consensus-based recommendations

INTRODUCTION

Phototherapy is the use of ultraviolet light to treat various skin dermatoses.[1] In particular, the use of narrowband UVB (NBUVB) phototherapy has been demonstrated as an effective treatment for several cutaneous diseases including psoriasis, eczema and vitiligo.[1] Due to the efficacy, safety and cost-effectiveness of NBUVB phototherapy, there has been an international directive to establish consensus-based guidelines for its use, as evidenced in the American,[2] European[3] and global working groups.[4] To date, there has been no Australian consensus statement on phototherapy recommendations.

With an increasingly diverse racial population in Australia,[5] dermatologists are posed with a challenge to cater for a wide range of skin phototypes, which may not be adequately represented within international phototherapy guidelines. There has previously been a call to action with an Australian study highlighting the variation in phototherapy practice among Australian dermatologists.[6] To establish whether this variation was still present, an online survey was performed of phototherapy practices from Australian dermatologists ($n = 52$), which revealed great variation in operator, dosing regime and protocols used for NBUVB phototherapy use (see Supporting Information S1). The aim of this study was to develop a consensus approach for the use of NBUVB phototherapy in the management of psoriasis, eczema and vitiligo.

MATERIALS AND METHODS

A panel of nine Australian dermatologists (from New South Wales, Victoria, Queensland and Western Australia, see Supporting Information S1) with expertise in NBUVB phototherapy was invited to discuss current NBUVB phototherapy practices and to develop consensus guidelines for psoriasis, eczema and vitiligo. Panellists were sent 32 questions 1 week prior to the discussion date (see Table S1). The meeting took place via the video conferencing platform Zoom (Zoom-Video-Communications, Inc. USA) due to national COVID-19 restrictions. A modified Nominal Group Technique (NGT) was used, connecting panellists via Zoom, as panellists could not meet in person.[7] It was moderated by a single coordinator, who did not participate in the survey. Consensus was defined as 100% of all panellists agreeing on the statement. Following the NGT, each panellist was able to express their views and provide further clarification, if required. Since it was a modified NGT held online, the discussion was recorded (with the consent of participants) to facilitate transcription.

RESULTS

There were eight panellists that provided answers to all 32 questions and participated in the NGT discussion (one dermatologist was unable to attend but contributed to the final document). By the end of the NGT and subsequent refinement, agreement had been reached on 30 complete statements and 1 partial statement, supporting the proposed guidelines on the management of NBUVB phototherapy (Table 1). There were two questions where consensus was not reached by all panellists. These questions were related to serum folate levels in at-risk females during or prior to pregnancy, and subsidy for Medicare (see Supporting Information S1 for further details).

TABLE 1 Australian narrow-band UVB consensus recommendations

Consensus recommendations
1. The Australian Guidelines should be derived from customised Australian guidelines
2. The starting dose for NBUVB phototherapy should be determined by Fitzpatrick Skin Phototype (SPT).
(Minimal erythema dose [MED] is not commonly used in Australia as it is quite cumbersome to perform. There is no difference in outcomes using SPT compared to MED protocols. Furthermore, erythema may be difficult to interpret in darker SPTs.)
3. The starting dosage for NBUVB phototherapy is: a. Psoriasis: SPT I-II: 100 mJ/cm^2, SPT III-IV: 200 mJ/cm2, SPT V-VI: 300 mJ/cm^2. b. Eczema: SPT I-II: 100 mJ/cm^2, SPT III-IV: 200 mJ/cm2, SPT V-VI: 300 mJ/cm^2. c. Vitiligo: SPT I-II: 100 mJ/cm^2, SPT III-IV: 200 mJ/cm2, SPT V-VI: 300 mJ/cm^2.
4. The therapeutic dosage for NBUVB phototherapy is: a. Psoriasis: On average, the therapeutic dose is approximately 50% of the maximum recommended dose. b. Eczema: On average, the therapeutic dose is approximately 50% of the maximum recommended dose. c. Vitiligo: On average, the therapeutic dose is approximately 50% of the maximum recommended dose.
5. Dose increments for NBUVB phototherapy can be linear or percentage based: a. Linear increments of 50–100 mJ/cm^2 per visit for all skin types. b. Percentage: 20% for psoriasis and vitiligo, 15% for eczema.
6. The maximum dosage be for NBUVB phototherapy is: a. Psoriasis: SPT I-II: 2000 mJ/cm^2, SPT III-IV: 3000 mJ/cm^2, SPT V-VI: 4000 mJ/cm^2. b. Eczema: SPT I-II: 1500 mJ/cm^2, SPT III-IV: 2500 mJ/cm^2, SPT V-VI: 3500 mJ/cm^2. c. Vitiligo: SPT I-II: 2000 mJ/cm^2, SPT III-IV: 3000 mJ/cm^2, SPT V-VI: 4000 mJ/cm^2.
7. There should be a variable maximum dosage for NBUVB phototherapy for different body regions: a. Hands and feet: SPT I-II: 3000 mJ/cm^2, SPT III-IV: 4000 mJ/cm^2, SPT V-VI: 5000 mJ/cm^2. b. Face: SPT I-II: 1000 mJ/cm^2, SPT III-IV: 2000 mJ/cm^2, SPT V-VI: 3000 mJ/cm^2. c. Body: SPT I-II: 2000 mJ/cm2, SPT III-IV: 3000 mJ/cm2, SPT V-VI: 4000 mJ/cm2. d. Other: Extra dosing is required for the extremities as this area is a less responsive site. Lower dosing is required for the face as this is a more responsive site.
8. There should be disease-based protocols. Eczema protocol tends to have more gentle escalation and lower maximal dose.
9. Ideally, NBUVB phototherapy should be carried out thrice a week during the treatment phase, but less frequently for maintenance.
10. Outcomes should be assessed: a. Psoriasis: ~18–24 sessions after initiation, then every 24–36 sessions. b. Eczema: ~18–24 sessions after initiation, then every 24–36 sessions. c. Vitiligo: every 36 sessions.
11. The expected outcomes of NBUVB phototherapy and how should they be measured/assessed: a. Psoriasis: 60%–75% of patients achieve PASI 75 at week 12 (Yanovsky et al., 2020*). PASI to establish baseline. b. Eczema: 68% reduction in eczema clinical severity score was verified in 21 patients after 12 weeks of treatment three times weekly (George, et al. 1993*). EASI or PGA to establish baseline severity, then at 12 weeks. c. Vitiligo: 35.7% patients can expect a greater than 75% degree of repigmentation at 12 months (Zubair, et al. 2020*). A meta-analysis of 35 studies consisting of 1428 patients receiving NBUVB treatment found mild responses (≥25%) in 74% and marked responses (≥75%) in 19% of patients at 6 months with the greatest response at the face and neck (Bae, et al. 2017*). Serial photography to establish baseline severity, disease stability and response to treatment. Validated scoring systems, such as the Vitiligo Area Scoring Index may be used.
12. Maintenance therapy should be determined by the dermatologist if they feel it is necessary. Based on dermatologist opinion, patient convenience and disease activity, maintenance phototherapy may be considered to maintain response and minimise risk for relapse. Due to seasonal changes in UV radiation in Australia, interruption over summer may be considered due to increased ambient exposure.
13. Phototherapy should be ceased if it is not working at: a. Psoriasis: 36 sessions. b. Eczema: 36 sessions. c. Vitiligo: 75 sessions.

TABLE 1 (Continued)

Consensus recommendations
14. The maximum duration of phototherapy for a patient:
a. Psoriasis: Uncapped, based on patient profile and disease. Continued until doctor and patient feel it is effective and is being delivered safely.
b. Eczema: Uncapped, based on patient profile and disease. Continued until doctor and patient feel it is effective and is being delivered safely.
c. Vitiligo: Uncapped, based on patient profile and disease. Continued until doctor and patient feel it is effective and is being delivered safely.
15. The following should be monitoring guidelines for the use of NBUVB phototherapy:
a. Full skin checks after 150 sessions or annually, whichever reached earlier.
b. DLQI, PASI, EASI, BSA/photographs
16. NBUVB clinic-based phototherapy should be delivered to the patient by a doctor, nurse or receptionist, not by the patient themselves.
17. There should be mandatory training for the person in charge of delivering UVB phototherapy. There is a need for developing consistent phototherapy resources for this purpose.
18. The following infection control measures should be implemented whilst delivering NBUVB phototherapy:
a. Ensure cleanliness of the phototherapy equipment. The phototherapy units should be vacuumed regularly. The metal bars and door handles are wiped with Clinell (or equivalent) universal wipes after every patient use.
b. Patients are advised to bring their own UV-protective sunglasses or purchase their own face shields.
c. UV booths will need to be terminally cleaned (removing all detachable objects, cleaning lighting and all surfaces and cleaning everything downwards to the floor) after infectious patient use (i.e. patients with skin infections).
d. During COVID-19 safety measures: consider whether self-administered phototherapy is an option to help with social distancing—cleaning between treatments & staffing need thought.[†]
e. During COVID-19 safety measures: Ensure staff are provided with and wearing appropriate personal protective equipment as per local policies (e.g. mask/gloves/gown/visor). Advise patients to wear masks whilst attending and waiting.[†]
f. Additional note: Avoid sharing of protective equipment at all times. Patient to bring their own or practice to provide clean equipment.
19. Patients with current, previous or at risk of developing, skin cancer (i.e. Keratinocyte tumours or melanoma) can be prescribed phototherapy. Whilst NBUVB is not proven to increase risk of skin cancer, informed consent should be sought from patients with a history of melanoma and/or are at a high risk of developing melanoma, as the risk of developing primary melanoma is high even without UVB therapy.
Note: Patients with significant actinic damage should cover risk areas during treatment that do not require treatment (i.e. face and hands).
20. Children can be prescribed phototherapy. The youngest age for a child is the age at which the child can stand in the booth unsupported, tolerate being inside the booth independently, and use the prescribed protective equipment.
21. The elderly can be prescribed phototherapy, as long as the patient can stand unsupported in the booth and use prescribed protective equipment.
22. Women wanting to become pregnant can be prescribed phototherapy. It would be prudent to add pregnancy planning for females to the phototherapy questionnaire and check on their folate intake.
23. Pregnant and lactating women can be prescribed phototherapy. Nursing staff should be aware that a distended abdomen may be at increased risk of burning, as well, pregnant women may have the tendency to experience light-headedness. The face should preferably be shielded in pregnant and lactating women with darker phototypes due to the risk of developing melasma.
24. The phototherapy protocol for missed treatments should follow the LVH protocol. However, with the experienced patient/user, the 2–3-week reduction may apply even for longer breaks.
1 week—HOLD at previous dose (except for burns).
2 weeks—REDUCE dose by 25%.
3 weeks—REDUCE dose by 50%.
4 weeks—Review by the doctor, start over.
25. Upon completing a short break, for example Christmas holidays, resumption of treatment, should start at half of the previous dose and increase rapidly.

(Continues)

TABLE 1 (Continued)

Consensus recommendations
26. Protection:
a. If a patient can be relied on to shut their eyes during the treatment, especially if the periorbital areas are affected, UVB may be allowed without the use of eye protection. Though eye protection should be offered.
b. The application of sunscreen to the areolae and helices of the ears is not recommended.
c. The genital areas should be protected in both genders.
d. Protection of previously radiotherapy treated sites should be undertaken.
27. Geographical variation—The same protocol should not be used all around Australia.[‡]
28. There is no role for outcome-based protocols as it may be too confusing for users.
29. Phototherapy combinations—topical therapies
a. Corticosteroids—Yes
b. Calcineurin inhibitors (tacrolimus, pimecrolimus)—Yes
c. Vitamin D analogs—Yes
d. Retinoids—Yes
e. Psoralens—Yes
f. Dithranol—Yes
30. Phototherapy combinations—systemic therapies
a. Corticosteroids—Yes
b. Methotrexate—Yes
c. Cyclosporine A—No
d. Azathioprine—No
e. Mycophenolate Mofetil—No
f. Biologics—Yes
g. Retinoid—Yes, patients may experience photosensitivity with systemic retinoids and care needs to be taken with dosage increments.
31. The dose of NBUVB phototherapy should be adjusted following servicing and recalibration of the equipment. Adjustments should follow the manufacturers' and maintenance servicer's guidelines.

Abbreviations: BSA, body surface area; DLQI, Dermatology Life Quality Index; EASI, Eczema Area and Severity index; LVH, Liverpool Hospital (Sydney); NBUVB, narrow-band ultraviolet B light; PASI, Psoriasis Area Severity Index.

*References included in Supporting Information S1.

[†]For further information regarding COVID-19 recommendations for phototherapy, please refer to the Australasian College of Dermatologists COVID-19 Taskforce guidelines.

[‡]Due to variability in the ultraviolet index across Australia.

DISCUSSION

Given the likely diversity of opinion that dermatologists may display when considering the management of NBUVB phototherapy, a formalised technique was chosen to allow for subjective judgement. The NGT was selected as the development method, as it has been shown to be an effective method for identifying key quality markers in clinical practice, whilst only requiring one discussion round.[8] Furthermore, the NGT allows for discussion, accommodating multiple viewpoints from Australian dermatologists and allowing consideration for the final recommendations.

Even though a modified NGT was applied due to the use of a video conferencing platform, the serial character of the meeting is comparable to the Delphi method, as consensus was obtained through evaluation of written documents at the meeting and then sending the recommendations back and forth among participants until consensus was reached. This technique was reasonable given that dermatologists had the opportunity to discuss their ideas and learnt practical approaches to an objective moderator who was then able to systematically collate these into guidelines.

Overall, the discussion was successful, and all questions were adequately addressed, providing dermatologists with a sound list of recommendations for NBUVB phototherapy. A limitation of the validity was that not all Australian States were represented on the consensus group.

There is now a resource available to Australian dermatologists and practices to ensure efficacy and consistency

of NBUVB phototherapy delivery. Whilst this is a recommendation, it is not meant to be prescriptive and should be identified as an opportunity to increase knowledge from those proficient in the use of phototherapy for dermatoses. This study addresses a gap in dermatological practice across Australia, and the recommendations contribute a reference framework for the phototherapeutic care specifically tailored for Australian residents.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

HSK completed the data collection and write-up of the manuscript. JC provided guidance throughout the data collection and manuscript writing. HSK and JC transcribed the consensus document. BD critically revised the final manuscript for publication. MG provided guidance on the direction of the project and its development and reviewed all manuscripts. MG also moderated the discussion for the consensus.

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SUPPORTING INFORMATION

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