

Outcomes of nurse-led cryotherapy treatment for viral warts

Dear Editor,

Cryotherapy is a cost-effective treatment that can be performed by non-dermatologists for viral warts, which are very common.^{1,2} The National University Hospital, Singapore runs a nurse-led wart clinic where nurses are trained to administer cryotherapy. This study reviewed eradication rates and side effects in patients treated at the nurse-led wart clinic.

A review of patients who attended the nurse-led wart clinic from 2015 to 2019 was performed. Patients with viral warts received their first cryotherapy session administered by a dermatologist. Subsequently, treatments were done at the nurse-led wart clinic. The standard treatment protocol consisted of paring, followed by cryotherapy with 2 freeze-thaw cycles. Lesions deemed by nurses to be eradicated would be confirmed by a dermatologist. Patients with ongoing treatment at the end of the study period or who had achieved eradication following the first dermatologist-administered treatment were excluded. Data on previous wart treatment, immunosuppression (conditions/therapies), number of cryotherapy sessions, treatment duration, and treatment postponement due to side effects were recorded.

Following the last cryotherapy session, we recorded the reasons for cessation of cryotherapy as follows: successful eradication, treatment failure, inability to commit to treatment frequency or inability to tolerate side effects. Recurrence was defined as new lesions being detected within 1 year from the last cryotherapy session. Treatment failure was defined as a recommendation by the dermatologist to pursue alternative treatment having

deemed cryotherapy to be ineffective if continued. The recorded disposition for patients who ceased cryotherapy treatment were: given alternative treatment, or provided open-date appointment or referral to another hospital. Data was analysed using the 2-sample t-test and chi-square test.

A total of 703 patients were identified; 377 (53.6%) men, 326 (46.4%) women, 415 (59%) completed or remained on follow-up, and 288 (41%) defaulted follow-up. There were 166 (23.6%) patients who received previous treatment (cryotherapy, salicylic acid, Verrumal [Almirall Hermal, Reinbek, Germany], electrosurgery, or carbon dioxide lasers). There were 37 (5.3%) who were immunosuppressed, 12 (1.7%) had autoimmune disease, 18 (2.6%) were transplant recipients and 7 (1.0%) had active malignancy. Immunosuppressive therapies included prednisolone, azathioprine, mycophenolate mofetil, cyclosporin and chemotherapy.

Among patients who completed or remained on follow-up, 363 (87.5%) achieved eradication. Between cryotherapy sessions, 367 (88.4%) experienced no significant side effects, 12 (2.9%) experienced significant pain and 36 (8.7%) experienced blistering. There were 11 (2.7%) patients who required postponement of cryotherapy due to active blistering or unepithelised erosions. Among patients who achieved eradication, mean number of cryotherapy sessions was 5.82 (95% confidence interval [CI] 5.42–6.23) sessions, mean interval between sessions was 23.6 (95% CI 22.6–24.6) days and mean treatment duration was 144 (95% CI 132–156) days (Table 1). Among the 363 patients who

Table 1. Comparison of key outcomes.

Treatment outcomes	Completed follow-up				Defaulted follow-up	
	Total n=415	Eradication achieved n=363	Eradication not achieved n=52	P value	Total n=288	P value
Cryotherapy sessions, mean, no.	-	5.82	9.6	-	4.94	-
Interval between sessions, mean, days	23.4	23.6	25.2	0.424	22.7	0.198
Treatment duration, mean, days	-	144	233	-	124	-
Side effects, no.						0.546
Nil	367	321	46		255	
Pain	12	8	4		12	
Blistering	36	34	2		21	

achieved eradication, recurrence following eradication was seen in 20 (5.5%) patients of whom 12 (60%) had recurrence over the same body part; 20 (5.5%) were immunosuppressed.

Among the 52 patients who discontinued cryotherapy before achieving eradication, 30 (57.7%) met treatment failure, 18 (34.6%) were unable to commit to treatment frequency and 4 (7.7%) were unable to tolerate side effects. There were 45 (86.5%) patients who requested alternative treatment options, 6 (11.5%) requested for open-date appointments and 1 (1.9%) requested to be referred to another hospital. Mean number of cryotherapy sessions was 9.60 (95% CI 6.70–12.2), mean interval between sessions was 25.2 (95% CI 21.5–29.0) days and mean treatment duration was 233 (95% CI 172–295) days. Among the 52 patients, 5 (9.6%) patients were immunosuppressed. There was no statistical difference in session intervals between patients who achieved eradication and those who discontinued cryotherapy before achieving eradication ($P=0.424$).

Immunosuppressed patients were more likely to fail eradication (odds ratio 3.69, 95% CI 1.58–8.62, $P=0.003$). Among the 288 patients who defaulted treatment, the mean number of cryotherapy sessions was 4.94 (95% CI 4.58–5.31), mean interval between sessions was 22.7 (95% CI 21.3–24.1) days and mean treatment duration was 124 (95% CI 111–138) days. Between sessions, 255 (88.5%) experienced no significant side effects, 12 (4.2%) experienced pain and 21 (7.3%) experienced blistering. No data was available on reasons for default or discontinuation of therapy for these patients. Comparing patients who completed or remained on follow-up and patients who defaulted follow-up, there was no significant difference in the interval between sessions ($P=0.198$) and side-effect profiles ($P=0.546$).

Overall, eradication rate was good (87.5%) and frequency of side effects was acceptable (11.5%). Only a small proportion of patients (2.7%) required treatment postponement. Aggressive cryotherapy has been observed to be more effective though coupled with increased risk of side effects, which may be debilitating to some patients.^{3–7} Balancing treatment effectiveness while minimising side effects is required to ensure patients ultimately benefit from treatment and can tolerate it. The low rate of treatment postponement indicates that our interval between treatment sessions (23.4 days) is appropriate, allowing adequate recovery while maintaining treatment effectiveness.⁸ The mean duration required for eradication was 144 days, comprising about 6 sessions.

Patients who discontinued cryotherapy had received cryotherapy for a mean duration of 233 days, being treated

for an additional 89 days before alternative treatment options were considered or effectiveness of cryotherapy was re-evaluated. Berth-Jones et al. noted that prolonging cryotherapy treatment did not necessarily increase the eradication rate.⁹ To improve resource utilisation and cost savings, reviewing cryotherapy effectiveness around the 7th or 8th cryotherapy session (just beyond the mean duration required for eradication) can be done for consideration of alternative treatment. This may reduce unnecessary cryotherapy beyond the point when it would be considered ineffective.

No statistical differences in the interval between sessions or frequency of side effects were noted between patients who completed follow-up and those who defaulted follow-up to suggest treatment interval as a factor for the default rate (41%). Extrapolated reasons from patients who remained on follow-up but discontinued cryotherapy treatment include inability to commit and treatment frequency. Since multiple sessions are often required to achieve eradication, patient education through adequate counselling on the expected frequency and duration of cryotherapy treatment is important to help patients remain committed to treatment and for better resource utilisation.¹⁰ Otherwise, alternative treatment modalities that require less time to achieve eradication can be offered.¹¹

Nurse-administered cryotherapy remains effective and well tolerated. Dedicated and targeted treatment services or options may allow better streamlining of patients and consolidation of care. Outcomes can be improved by counselling patients on the expected treatment frequency and duration. An additional dermatologist review after a period of treatment when cryotherapy is expected to be successful may reduce unnecessary treatment extension. We suggest for all dermatological centres to upskill nurses to offer this service, which will provide dermatologists the time to manage more complex conditions.

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