Use of Cryotherapy in Dermatology: A Pioneering Experience at the Lagos University Teaching Hospital

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SUMMARY

Introduction: Cyrotherapy is a major therapeutic modality for a wide variety of skin conditions such as viral warts, moles, molluscum contagiosum, lupus erythematosus, solar lentigo, seborrhoeic keratosis and epidermal naevi.

It is an effective, easy to use treatment modality which is not readily available in Nigeria. We report our pioneering experience with the use of cryotherapy in the treatment of common skin diseases in Lagos, Nigeria.

Materials and method: A retrospective study of patients treated with cryotherapy between January 2010 and December 2011 at Lagos University Teaching Hospital. Demographic and clinical data were obtained, and treatment outcome, complications and patient satisfaction were documented.

Results: Twenty six patients were treated with cryotherapy during the period under review. Mean age was 23.38 ± 16.36 years; with an age range of 2-73 years. 21 (80.77%) patients had viral warts, 4 (15.38%) molluscum contagiosum and 1 (3.84%) had an epidermal nevus. 20 patients were seen post procedure and of these, 17 (85%) had resolved lesions, while 3 (15%) had no improvement.

Conclusion: We have demonstrated the effective use of cryotherapy in the management of common dermatological conditions among Nigerian patients. There is need to increase availability and accessibility of this simple, cost

INTRODUCTION

Cryotherapy is the local or general use of low temperatures in medical therapy. It is a major therapeutic modality for a wide variety of benign and malignant skin conditions. Ever since the first clinical application of liquid air in 1889 and commercial availability of liquid nitrogen in the mid 20th century, cryotherapy has been used to treat many skin diseases including lupus erythematosus, herpes zoster, chancroid, warts and epitheliomas[1,2] Cryotherapy is preferred because it is effective, easy to use, and relatively inexpensive and gives good cosmetic results. The mechanism of destruction in cryotherapy is necrosis, which results from the freezing and thawing of cells and treated areas re-epithlialize. Adverse effects of cryotherapy such as bleeding, blister formation, pain, headache and hypopigmentation are usually minor and short-lived.[3] Therefore in developed countries, almost 90% of dermatologists use this procedure in their practice.[4] However, the use of cryotherapy in Nigeria is very limited and this may be related to the absence of reports of its utility and effectiveness among our patients.

Recently, cryotherapy was introduced as a treatment modality in the dermatology unit of Department of Medicine of the Lagos University Teaching Hospital, Lagos, Nigeria and our objectives are to document the utility, effectiveness and outcome for the patients for whom it was used in the treatment of their skin lesions.

MATERIALS AND METHODS

This is a retrospective study over 24 months spanning from January 2010 to December 2011. We reviewed the case records of all patients who were offered cryotherapy as a treatment modality during this period. Those included in the study were all those who were offered cryotherapy as a treatment modality, either alone, or in combination with other treatments.

Demographic and clinical data were extracted using a standard proforma. (Appendix 1) The information included age, sex, presenting complaint, duration of complaint, description of the skin lesion, diagnosis, treatment modality including cryotherapy, complications of treatment and adjunct treatment given. Documented outcome and complications of the procedure were also extracted. Improvement was assessed by self-report on skin lesions by patients and examination by the dermatologist.

CRYOTHERAPY PROCEDURE

For the procedure we used liquid nitrogen (temperature - 196°C) with a cryogun. Various methods have been devised in the use of cryotherapy of lesions. They include the spray freeze technique, the applicator technique, the cryoprobe method, and the thermo-coupler method. We used the spray freeze technique.

The procedure was carried out by the attending dermatologist. All patients were given information sheets and consent for the procedure was obtained. A topical anaesthetic (lidocaine 2.5% and prilocaine 2.5%; Emlar®) was applied to the affected area an hour before the procedure for the children. The skin surrounding the lesion was coated with petroleum jelly and liquid nitrogen was applied using the nozzle from the cryogun (Brymill® Cryogun CRY-AC Model B-700). The nozzle tip of the spray gun was held about 1 cm from the treatment site, and liquid nitrogen sprayed on the lesion until an ice ball was formed. This process was repeated until an ice ball of the desired size was created. The time for which the lesion was frozen is known as the freeze time. This freeze-thaw cycle was repeated, depending on the type of lesion. The size and thickness of the lesion also determined the number of freeze/thaw cycles that was carried out. Warts were treated with two 15-30 second freeze thaw cycles, and for the thicker lesions, we did up to 4 sessions. For molluscum contagiosum 10-15 second cycles were used, with a maximum of 4 treatments (treatments were 2-3 weeks apart). For epidermal naevi 2 cycles at 10-15 seconds each; and 4 sessions were carried out, with a 2-3 week interval between sessions.

Most patients experienced a mild to moderate burning sensation during the procedure and for some period afterwards, and some experienced pain. There was swelling, mild irritation and redness. Patients were counseled that within a few days the blister will gradually dry up and a scab would form. All patients were prescribed with some analgesia (Paracetamol®; Acetaminophen) and advised to use a topical antibiotic (Mupirocin ointment; Bactroban®) if there was ulceration at the site of cryotherapy.

Patients were advised to wash the area gently and to keep the area clean. When the blister dries to a scab, petroleum jelly should be applied and they were told to avoid picking the scab. The scab peeled off after 5 – 10 days and the lesions healed between 1 – 3 weeks. Recovery from the procedure depended on the location and the number of lesions involved. At the end of the procedure, we rewarded the children with a bag of sweets. All subjects were reviewed 3, 6, or 14 days post procedure and any complications were managed. The complications were mainly hypo and hyperpigmentation. Cryotherapy may result in hypopigmentation or a scar, especially when freezing has been deep or prolonged. The patients were informed that the lesion would usually improve with time; however they were also told that the colour change could be permanent.

RESULTS

Eighty five (1.77%) patients were offered cryotherapy with liquid nitrogen as a treatment option. Twenty-six patients (30.6%) consented and received cryotherapy as a treatment modality, either alone or with other treatment. There were 10 (38.5%) males and 16 (61.5%) females. Six (23.1%) did not return for a follow up visit after the first cryotherapy treatment.

The mean age of the patients was 23.38 ± 16.36 years with an age range of 2-73 years. The mean age in the female group was 16.63 ± 10.78 years, while it was 35.58 ± 18.4 years in the male group.

DISTRIBUTION OF DISEASE CONDITIONS

Twenty one patients (80.77%) were diagnosed to have viral warts, 4 (15.38%) patients had molluscum contagiosum and 1(3.84%) patient was diagnosed to have epidermal nevus.

DISTRIBUTION OF IMPROVED LESIONS

Twenty patients were seen on subsequent clinic visits, of these, 17 (85%) had improved skin lesions by days 14 and 28, while 3 (15%) patients had no sign of improvement.

Table 1 describes the outcome for treated patients based on the different skin conditions.

VIRAL WARTS

Twelve (57.14%) out of 21 patients diagnosed with viral warts clinically had complete resolution, while 3 (14.29%) had no improvement and 6 (28.57%) did not return for subsequent evaluation.

MOLLUSCUM CONTAGIOSUM

All four (100%) patients diagnosed with molluscum contagiosum who had cryotherapy had improved or healed lesions.

EPIDERMAL NAEVUS

The only patient had a marginal improvement in the skin lesions

Complications from the procedure were: blisters and bullae (6; 28.6%), post inflammatory hypopigmentation (2; 9.5%)

DISCUSSION

This report documents our experience with cryotherapy using liquid nitrogen as a treatment modality at the dermatology clinic of the Lagos university teaching hospital. Cryotherapy is a commonly used in-office procedure in developed countries and has been reported to be the second most common in-office procedure after skin excision.[3] Studies have documented that 87% of dermatologists use cryotherapy in their practice.[4]

Cryotherapy is the second line treatment for warts in addition to higher concentrations of topical salicylic acid. Approximately 2 million people in the UK will see a General practitioner for cutaneous warts.[5] In this report, even though the procedure was offered to 85 patients; just over a quarter of the patients actually had the procedure. These figures are extremely low compared to the number of patients accessing cryotherapy in the developed world. This emphasizes the fact that this modality of treatment is not accessible and available as part of the armamentarium to dermatologists for optimal care of their patients. We could not ascertain for sure the reasons why the other patients did not avail themselves for the procedure; but some contributing factors could be fear and anxiety, lack of understanding of the procedure, with resultant fear and anxiety, and very possibly, financial constraints.

Although cryotherapy is not widely available in dermatological practice in Nigeria, it is not a new treatment modality. It has been used to treat other conditions. At a sexually transmitted diseases clinic in Ibadan, Okesola et al reported cryotherapy usage of up to 25% in genital warts[6] and Ekweozor et al reported treating patients with anogenital warts and achieved a cure rate of 85%.[7] Studies have also reported the use of cryotherapy in management of cervical dysplasia and sports injuries in Nigeria.[8,9]

The use of cryotherapy in dermatology however, is not widely available and there is paucity of data on its use and efficacy. Constraints to the availability of cryotherapy at most dermatology clinics are not limited to LUTH, as almost all tertiary institutions in Nigeria lack this facility. A few dermatologists in private practice possess the equipment; however there is paucity of data on its use and efficacy.

The use of cryotherapy at the dermatology clinic is new and requires increased awareness and education about the procedure. Collaboration with other healthcare providers, such as physicians in the hospital, particularly the Family physicians, Community health physicians and the pediatricians about this modality of treatment, will ultimately result in improved quality of care for patients with selected skin conditions.

Experience in this environment, is for patients to seek help from other healthcare workers, including pharmacists and general practitioners; with the dermatologist being the last port of call when all remedies used have failed to bring about the desired response.

In our centre, most of the patients with a positive therapeutic outcome from this procedure had viral warts, and this response is in tandem with documented reports.[10,11] At the subsequent visits, most lesions were improved, or had complete resolution. There were very few side effects which included pain and blisters; however these were minor and short lived. Following the procedure, some patients did not return and few had no improvement. It is possible that those that did not return had resolution of their lesion and did not bother returning to the clinic. Where lesions are non-responsive to cryotherapy; an adjunct or alternative treatment may be necessary.

In a review of cryosurgery in the United States, though treatment for verrucae is not the most common use of cryosurgery, it was noted to account for 21% of visits. Dermatologists were noted to have performed 82% of all cryosurgeries, followed by family/internal medicine physicians (13.6%) and paediatricians (2.8%).[12] Among Dutch family physicians, cryotherapy, as well as application of concentrated salicylic acid has been documented as one of the most frequently used mode of treatments.[13]

Those with molluscum contagiosum (MC) had complete resolution; two of them were children who were able to withstand the procedure with the use of mild topical aneasthesia an hour prior to the procedure. Response to cryotherapy in treatment of MC is more rapid but painful and is associated with more side effects. This is corroborated by other studies which have documented cryotherapy and curettage as the top choices for treatment of MC among health care providers; while noting that these techniques can cause scarring, hypo or hyper pigmentation, and can be painful, especially for children.[12,13] The use of a calcineurin inhibitor (imiquimod) is preferred in children because its use is associated with less pain and adverse effects when compared with cryotherapy. However, it can be slightly messy to use, is slower to take effect, and in our setting, is unaffordable to majority of patients. It has been suggested that in treatment of MC, imiquimod is better for smaller lesions, and cryotherapy for larger lesions.[14,15] Cryotherapy has been used successfully in children, though anxiety levels are high and can result in their uncooperativeness. Tey et al in China[16] recently demonstrated that the use of a portable video player significantly reduced pre procedural anxiety in preschool children undergoing cryotherapy. We do not have the facility for this; however we did have a little reward for each child that had the procedure.

Cryotherapy is reportedly effective in epidermal naevi treatment. The patient with epidermal naevi had extensive lesions involving 30% of her total body surface area. She had a total of 3 sessions and also had adjuvant therapy with a topical keratolytic agent (40% sulphur salicylic acid (SSA) ointment). She reported pain for a few days following each of the sessions, in addition to some blistering lesions which gradually resolved. Cryotherapy has been reported to be effective in epidermal naevi[17] and our patient reported a fairly noticeable improvement after 3 sessions, but was subsequently lost to follow up. The extent of the lesions could have resulted in a slow response to therapy, and such a patient would require regular visits over a much longer period. The financial implications and the seemingly poor response could have contributed to the

patient being lost to follow up.

Studies have demonstrated that the most cost-effective treatments for warts were over the counter treatments; either SSA or self-administered cryotherapy kits. This is also applicable in the primary care setting, where treatment with SSA and cryotherapy were delivered by a nurse.[18,19]

CONCLUSION

Cryotherapy results in good response rates and its use should be explored, particularly in our environment where cosmetic disfigurement is of great importance and most patients want an immediate resolution of their lesions. With increased education and awareness among patients and health care providers about the procedure and its benefits, there will be an increased demand for this modality of treatment.

Ultimately, this will lead to improved quality of care and will result in patient satisfaction. Patients and physicians should strike a balance between the adverse effects and the cost effectiveness of treatment. Availability and accessibility of liquid nitrogen is a constraint and this needs to be addressed by public and private health care facilities in order for Nigerians to easily access and benefit from this therapeutic procedure.

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Table 1: Distribution of disease conditions treated with cryotherapy

Skin disease	Frequency of cases (N, %)	Improvement	No improvement	Did not return
Viral warts	21 (80.77%)	12 (57.14%)	3 (14.30%)	6 (28.60%)
Molluscum contagiosum	4 (15.38%)	4 (100.0%)	0 (0.00%)	0 (0.00%)
Epidermal nevus	1 (3.84%)	1 (100.0%)	0 (0.00%)	0 (0.00%)
Total	**26 (100%)**	**17 (65.40%)**	**3 (11.54%)**	**6 (23.06%)**

APPENDIX 1
CRYOTHERAPY FORM

Date: _____

Name: _____ Age_____ Sex: M/ F _____

Diagnosis: _____

Clinical/histological/laboratory/radiological: _____

Other Rx previously Yes/No _____ If yes, specify _____

Cycle

Any complications post cryotherapy Yes/No _____

- Pain Resolved within: 12 hrs / 24 hrs / 48 hrs / >48 hrs
- Blistering Resolved within: 7 days / 10 days / 14 days / >14 days
- Post inflammatory hypo/hyper pigmentation

Review following cryotherapy

- Resolution Yes/No, If yes, is it: Complete _____ / Partial _____
  If no, is lesion: Worse / The Same / Slightly Better?
  Need for repeat cryotherapy Yes ____ / No _____

Review following 2nd cryotherapy

APPENDIX II
DERMATOLOGY UNIT, LUTH
CONSENT FORM

Consent Form for Skin Procedures at Dermatology Outpatient Clinic, Lagos State University Teaching Hospital

You are about to undergo the following procedure(s): Mark appropriate (x)

Skin biopsy	( )	Nail biopsy	( )
Dermal curette.	( )	Intralesional injection	( )
Topical podophylin application	( )	Paring	( )
Cryotherapy	( )		

This is to confirm that I have been informed about the procedure which is both diagnostic and therapeutic; I am aware of possible side effects which may include pain, infections, scars and pigmentary changes. Precautions are being taken to prevent this within the limit of medical knowledge and facilities available. I am giving my consent for this procedure and leaving the extent of possible side effects to the discretion of the doctors.

Thank you

Name: _____ Date: _____

Hospital No: _____ Signature: _____

Tel no: 0810-DERMAT-O (9am – 5pm only

After 5pm SMS only)