Our Dermatology Online

Original Article

Epidemiological, clinical, and evolutionary profile of patients treated with cryotherapy at the Bamako Dermatology Hospital (HDB) from January 2021 to December 2023

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ABSTRACT

Background: Cryotherapy is a widely used dermatological treatment for various benign and premalignant skin conditions. However, data on its application, indications, and outcomes in African settings remain limited. This study aimed to describe the epidemiological, clinical, and therapeutic profile of patients treated with cryotherapy at the Bamako Dermatology Hospital (HDB) from January 2021 to December 2023. **Methods:** A retrospective, descriptive, cross-sectional study was conducted on all patients treated with liquid nitrogen cryotherapy during the study period. Data was collected from consultation and treatment records, covering sociodemographic variables, types of lesions, diagnoses, lesion topography, number of cryotherapy sessions, and treatment outcomes. Data was analyzed using SPSS, version 21. **Results:** Out of 43,380 patients consulted, 676 underwent cryotherapy, giving a hospital frequency of 1.6%. Persons with albinism represented 18% of the sample. The mean age of patients was 15.23 years, with a male predominance (54.7%, sex ratio of 1.3). A steady increase in cryotherapy cases was noted, from 150 patients in 2021 to 234 in 2023. The majority of the patients (96.9%) consulted directly at the hospital. The most common elementary lesion was papular (60.9%), and diffuse lesions accounted for 20.1%. The main indications for cryotherapy were molluscum contagiosum (46%), HPV infections such as cutaneous warts (14.5%), Heck's disease (10.9%), and condyloma (7.1%). In 29.7% of the cases, patients received two cryotherapy sessions, with most molluscum and warts resolving within two sessions, whereas Heck's disease and condyloma required up to six. **Conclusion:** Cryotherapy is effective and well-tolerated in the treatment of various benign dermatoses in our context. However, the lack of long-term follow-up and the absence of certain cryotherapy-responsive conditions highlight the need for prospective studies to better assess recurrence rates and optimize treatment protocols in resource-limited settings.

Key words: Cryotherapy, Epidemiology, Clinical Profile, Dermatology, Bamako

INTRODUCTION

Cryotherapy, or cold therapy, is a non-invasive technique that uses cryogenic agents, such as liquid nitrogen, to freeze tissues at extremely low temperatures, leading to the destruction of targeted cells. Liquid nitrogen cryotherapy is a widely adopted therapeutic option in dermatology for the management of various skin conditions, including precancerous lesions, warts, actinic keratoses, molluscum contagiosum, and other dermatological disorders [1,2]. This method offers several advantages, notably the simplicity and speed

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of the procedure, the absence of mandatory local anesthesia, minimal side effects, low cost, and good patient tolerance [2].

In France, in 2018, 53% of actinic keratosis cases were managed solely by physical treatment—predominantly cryotherapy [3]. Similarly, a survey conducted by the American Society for Dermatologic Surgery and published in 1990 indicated that 87% of participating dermatologists regularly used cryotherapy in their practice [4]. In the United States, Damstra and Van Vloten [5] reported a 92% cure rate among 58 patients with condyloma acuminatum after three months of cryotherapy, while Kuflik [6,7] documented a 97.4% cure rate in eighty patients treated for common warts.

Although cryotherapy has become increasingly popular worldwide due to its effectiveness and ease of use, there remains a significant paucity of studies focusing on its long-term outcomes, especially in resource-limited settings such as those found in Africa. Moreover, data on the specific indications, protocols, patient experiences, and recurrence rates within African populations is scarce.

MATERIALS AND METHODS

Study Setting and Location

The study was conducted at the Bamako Dermatology Hospital (HDB), located in the Djicoroni Para neighborhood. The hospital was established under the 2016-2020 National Hospital Map, by Ordinance No. 2019-010/P-RM dated March 27, 2019, ratified by Law No. 2019-022 of July 3, 2019. It resulted from recent reforms by the Ministry of Health, which led to the division of the National Center for Disease Control (CNAM) and the redistribution of its services between two new structures: one with a public health focus, the National Institute of Public Health (INSP), and the other with a hospital focus, the Bamako Dermatology Hospital (HDB).

The Bamako Dermatology Hospital comprises several clinical departments, the main ones being: the dermatology department, medical imaging department, surgery department (Onco-Surgery and Plastic Surgery), physiotherapy and rehabilitation unit, leprology department, and anesthesiology and intensive care unit. The dermatology department is equipped with ten (10) consultation boxes, one (01) minor surgery room, one (01) cryotherapy room, one (01) treatment room, and two (02) hospitalization wards (one for women, one for men). The hospital has a total of seventeen (17) dermatologists and ten (10) nurses.

Type of Study

This was a descriptive, cross-sectional study conducted over a period of three (3) years, from January 2021 to December 2023.

Study Population

The study included all patients treated with liquid nitrogen cryotherapy at the Bamako Dermatology Hospital (HDB) during the study period.

Case Definition

Cases included all patients who received liquid nitrogen cryotherapy during the study period.

Inclusion Criteria

All patients meeting the case definition were included in the study.

Non-Inclusion Criteria

Patients with incomplete medical records were excluded.

This study aims to evaluate the efficacy of cryotherapy in the treatment of dermatological conditions in our context, while also documenting the practical challenges encountered in its application. The findings of this research will contribute to enriching the knowledge base and potentially guiding clinical practice and policy-making in dermatology across African healthcare settings.

Data Collection

Data was collected from the consultation and treatment registers. A data collection questionnaire was designed, which included information on age, sex, marital status, occupation, place of origin, ethnicity, mode of admission, type of elementary lesion, lesion topography, diagnosis, investigations performed, treatment administered, and clinical outcome.

Data Analysis

Data was entered using Microsoft Word and Excel, version 2016, and analyzed with SPSS, version 21.

Ethical Considerations

This was a retrospective study based on the analysis of routinely collected health data. The data collected was anonymized and did not allow for the identification of patients. No blood samples, other biological specimens, or health products were collected or administered. Overall, the study posed no risk to the patients who had already been seen in consultation at the Bamako Dermatology Hospital.

RESULTS

From January 2021 to December 2023, out of 43,380 patients seen in consultation, we collected 676 patient records, among which 124 were persons with albinism, representing a hospital frequency of 1.6%.

Sociodemographic Data of Patients Without Albinism

During the study period, we observed a progressive increase in the number of patients treated with liquid nitrogen, rising from 150 to 234 (Table 1). Children and students accounted for 65.9% of the patients seen. Male patients accounted for 54.7%, which gives a sex ratio of 1.3.

96.9% of the patients consulted directly at the Bamako Dermatology Hospital (Table 2).

During the study period, we observed a progressive increase in the number of patients treated with liquid nitrogen, rising from 150 to 234. The Dermatology Hospital of Bamako has liquid nitrogen containers (Figs. 1 and 2) for the management of certain dermatological conditions that specifically require this therapeutic approach.

Table 1: Distribution of the sample according to year of consultation.

Year	Number of Patients	Percentage (%)
2021	150	27.2
2022	168	30.4
2023	234	42.4
Total	552	100.0

Table 2: Distribution of the sample according to mode of admission.

Mode of Admission	Number of Patients	Percentage (%)
Came on their own	17	3.1
Referred from a consultation box at the hospital	535	96.9
Total	552	100.00

96.9% of the patients consulted directly at the Bamako Dermatology Hospital.

Clinical Data of Patients

The main conditions that motivated cryotherapy were molluscum contagiosum (46%) and HPV infections, including cutaneous warts (14.5%), Heck's disease (10.9%), and condyloma (7.1%) (Table 3).

Among our cases, two sessions of liquid nitrogen application were reported in 29.7% of the patients (Table 4).

DISCUSSION

We conducted a retrospective study on the epidemiological and clinical profile of patients treated with cryotherapy from January 2021 to December 2023 at the Bamako Dermatology Hospital, aiming to evaluate the effectiveness of cryotherapy in managing dermatoses. A total of 676 patients were selected for the study out of 43,380 patients seen in consultation, representing a hospital frequency of 1.6%. Persons with albinism accounted for 124 cases, representing 18% of the sample. The majority of the patients were male (54.7%), with a mean age of 15.23 years. The year 2023 had the highest patient volume, contributing 42.4% of the study sample. Over 93% of the sample came from the city of Bamako. Students and children were the most represented group. The majority of the patients were referred from consultation boxes within the hospital. Papular lesions were the most common elementary

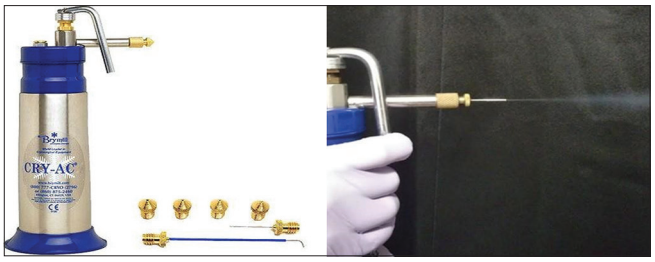

Figure 1: Image of a Cryo Spray, self-pressurized container for liquid nitrogen storage (photo taken at HDB).

Figure 2: The liquid nitrogen containers.

Table 3: Distribution of the sample according to etiology.

Type of Dermatosis	Number of Patients	Percentage (%)
Nuchal cheloid acne	11	2
Other	1	0.2
Condyloma	39	7.1
Callus	60	10.9
Dermatosis papulosa nigra (DPN)	13	2.4
Corn	1	0.2
Epidermodysplasia verruciformis (EDV)	6	1.1
Verrucous hamartoma	7	1.3
Actinic keratosis	4	0.7
Lichenification	13	2.3
Heck's disease	60	10.9
Molluscum contagiosum	254	46.0
Molluscum pendulum	1	0.2
Inflammatory linear epidermal verrucous nevus (NEVIL)	2	0.4
Skin wart	80	14.5
Total	552	100.0

Table 4: Distribution of the sample according to the number of sessions.

Number of Sessions	Number of Patients	Percentage (%)
1.0	82	14.9
2.0	164	29.7
3.0	66	12.0
4.0	74	13.4
5.0	75	13.6
6.0	58	10.5
7.0	27	4.9
8.0	5	0.9
11.0	1	0.2
Total	552	100.0

lesion. Molluscum contagiosum represented 46% of treated lesions, followed by HPV infections, including cutaneous warts (14.5%), Heck's disease (10.9%), and condyloma (7.1%). The number of cryotherapy sessions was typically two (29.7% of cases), with two sessions for molluscum contagiosum and cutaneous warts, and six sessions for Heck's disease and condyloma.

Persons with albinism were mainly treated for ephelides (96%), with an undetermined number of sessions in the majority of cases (38.7%). The study also highlighted a relationship between the type of dermatosis treated and the number of cryotherapy sessions, as well as the relationship between the type of dermatosis and the age of the treated patients.

Limitations of the Study

This study was conducted using patient records, which presents a primary selection bias as some data were missing or lacked follow-up information on the patients' outcomes.

Nonetheless, this study provided valuable insights into the effectiveness of cryotherapy in treating dermatoses.

Epidemiological Aspects

Hospital frequency

During our study period, 43,380 patients were recorded, of which 676 were included, yielding a prevalence of 1.6%, with an average of 255.33 patients seen per year.

Sociodemographic Data

Sex

In our study, 54.7% of the patients were male, giving a sex ratio of 1.3. Our results were similar to those of Helina Fikre [8] in Ethiopia, who reported a predominance of males (71.4%). This higher frequency in males could be random since the indication for cryotherapy is similar across both sexes.

Age

Children under ten years of age were a majority (44.7%), with a mean age of 15.23 years. In the Ethiopian study, Helina et al. [8] reported a mean age of 23 years. The predominance of young patients could be explained by the viral nature of the conditions treated with liquid nitrogen in our context, such as molluscum contagiosum and HPV infections, which are highly common in children and are not immunizing diseases [9].

Origin

Patients from Bamako represented 93.5% of the cases. This result can be explained by the fact that the Bamako Dermatology Hospital is located in the city, making it more accessible to local populations.

Profession

Students and children who are not yet of school age were the most represented groups, accounting for 36.8% and 28% of the cases, respectively. The marked disparity in schooling between children living in urban and rural areas is well documented: for example, in Mali, urban children are significantly more likely to be registered for school and to complete primary education compared to their rural counterparts [10].

Clinical Aspects

Mode of admission

In our study, almost all patients came on their own, representing 96.9% of the cases. This could be

explained by the benign nature of most conditions treated with liquid nitrogen.

Sometimes, transfer cases are overlooked due to the absence of transfer forms.

Type of lesion

Papular lesions were the most common elementary lesions, accounting for 60.9% of the cases (Table 5), followed by verrucous keratotic lesions (24.1%) and keratotic lesions (13.8%). This clinical situation is consistent with the conditions encountered, including molluscum contagiosum and HPV infections.

Lesion localization

All parts of the body were affected by lesions (Table 6). The most common locations were diffuse, facial, and acral areas. According to the literature, there is no absolute contraindication regarding the site for liquid nitrogen application. It is considered a good indication for the excision of certain tumors, such as those in the centrofacial area and at the tip of the nose [11,12].

Type of dermatosis

Cryotherapy is indicated for benign and premalignant lesions. In our series, the main indications were infectious lesions, such as molluscum contagiosum (46%), HPV infections, including cutaneous warts (14.5%), Heck's disease (10.9%), and condyloma (7.1%) (Table 6). This result differs from Fraissenet M. [3] in France, where warts were the main indication for cryotherapy in 99.4% of cases.

Table 5: Distribution of the sample according to the type of lesion.

Type of Lesion	Number of Patients	Percentage (%)
Plaque	1	0.2
Keratotic	76	13.8
Macular	2	0.4
Associated lesion	1	0.2
Nodular	3	0.5
Papular	336	60.9
Verrucous	133	24.1
Total	552	100.00

Papular lesions accounted for 60.9% of our sample

Table 6: Distribution of the sample according to lesion topography.

Lesion Topography	Number of Patients	Percentage (%)
Anal	4	0.7
Oral (buccal)	62	11.2
Scalp	12	2.2
Back	1	0.2
Genital	30	5.4
Lower limbs	90	16.3
Upper limbs	52	9.4
Diffuse	111	20.1
Trunk	84	15.2
Face	106	19.2
Total	552	100.0

Diffuse lesions accounted for 20.1% of our sample

The large difference may be explained by the patient recruitment method.

Calluses and Heck's disease each represented 10%. The high demand for cryotherapy can be attributed to the accessibility of the product and ease of use.

However, our study did not include several pathologies such as leishmaniasis, Kaposi's disease, and small cancerous lesions, which are also indications for cryotherapy. In 2017, Sehdev et al. in India reported that the effectiveness of cryotherapy is comparable to electrocoagulation in treating plantar warts, with a short healing time for cryotherapy [13]. In 2016, a meta-analysis showed that cryotherapy is effective in treating leishmaniasis, with similar efficacy to meglumine antimoniate [14]. For cancerous lesions, such as squamous cell carcinoma or basal cell carcinoma, small lesions under 2 cm are considered optimal indications for cryotherapy according to various authors [15].

CONCLUSION

This study has demonstrated the effectiveness and safety of cryotherapy in treating numerous benign dermatoses, such as molluscum contagiosum and HPV infections, including cutaneous warts, Heck's disease, and condyloma. Molluscum contagiosum and cutaneous warts were cured after two sessions of application, while Heck's disease and condyloma generally required six sessions for treatment. However, the lack of long-term follow-up for our patients and the absence of certain pathologies responsive to cryotherapy in our study should be considered for future research.

Statement of Human and Animal Rights

All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

Statement of Informed Consent

Informed consent for participation in this study was obtained from all patients.

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