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Use of Intra-Lesional Measles-Mumps-Rubella (MMR) Vaccine in the Treatment of Anogenital Warts in Nigerian Children: A Case Series and A Review of the Literature

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Abstract

Anogenital warts are fleshy growths affecting the genital and anal area caused by various strains of human papillomavirus. The condition represents an uncommon manifestation among the paediatric population. It imposes a significant burden and has a profound psychological impact on the affected children. Despite the variety of treatment options documented in the literature, the management of genital warts continues to pose a significant challenge, and there is no broad agreement on the most effective approach. Recently, intralesional immunotherapy utilising various antigens has demonstrated effectiveness in treating different forms of warts. Several treatment modalities are available for treating genital warts. However, most are fraught with complications and recurrences. Immunotherapy through intralesional injection of the Measles-Mumps-Rubella (MMR) vaccine is a promising treatment modality aimed at complete clearance of the lesion and eradication of the virus, thus preventing recurrence. In view of scarce Nigerian reports, we report our preliminary experience with the use of intralesional MMR.

Keywords: *Condyloma acuminata, Genital warts, Human papillomavirus, Immunotherapy.*

Introduction

Genital warts, commonly called anogenital warts (AGW) or condyloma acuminata, are soft growths in the anogenital region caused by infection with human papillomavirus (HPV).¹ Over 200 different HPV subtypes have been recognised, with subtypes 6 and 11 classified as low risk, whereas subtypes 16 and 18 are deemed high risk due to their association with cervical, anal and penile malignancies.^{1,2} Anogenital warts cause considerable physical discomfort/pain, psychological strain and anxiety to children and their parents.³

The incidence of genital HPV infection has risen significantly among adults and children, now becoming the most prevalent sexually transmitted disease globally.⁴ The virus is easily spread through both penetrative and non-penetrative sexual activities (vaginal, anal or oral, regardless of sex), hetero- or auto-inoculation and, occasionally, vertically from mother to child during birth; it could also be transmitted through fomites.⁵ It was once believed that the predominant mode of transmission in childhood was sexual abuse, with HPV types 6 and 11 being the most frequently identified serotypes. However, more recent research indicates that

perinatal infection and auto-inoculation (transfer of the HPV from one site on a person's body to a new site on the same person's body) or hetero-inoculation (transfer of the HPV from one person to another) may be far more common than previously assumed.⁵ Additionally, growing evidence suggests that asymptomatic HPV carriers, especially mothers and other family members, could transmit HPV to children via non-sexual means; thus HPV transmission may encompass both vertical and intrafamilial horizontal transmission. The latter kind of transmission may lead to either temporary or ongoing subclinical HPV infections in infants and children.⁶

AGWs may appear as growths on the skin and/or mucous membranes of the anogenital region as polymorphic, asymmetric or exophytic frond-like growths, particularly in areas subjected to trauma, friction, or shaving. They may also present as papular growths resembling cauliflower or as flat papular lesions.⁷ Although the rate of spontaneous resolution for warts ranges from 65% to 78%, the potential for cosmetic disfigurement, the propensity for spreading, and the accompanying decline in quality of life often necessitate prompt intervention.⁸ The psychological distress associated with AGWs, which sufferers often find difficult to express to others like family and closest friends, frequently overshadows the medical consequences. This psychological distress primarily stems from their effects on daily activities, self-esteem, sexual health, as well as the anxiety and depression they may induce, along with physical discomfort and the risk of further transmission.⁸

Chronic immunosuppression, either primary as in inherited immunodeficiency syndromes or acquired from HIV infection or immunosuppressive therapy, are at increased risk of persistent HPV infections and subsequent HPV-related lesions, including AGWs.⁹ In such

individuals, there is impairment of host immune recognition and the ability to clear viral infections, along with HPV's immune-evasion strategies, resulting in treatment-resistant, refractory, extensive or recurrent warts and, in certain instances, malignant changes.^{9,10} Additionally, HPV strains which are rare in immunocompetent persons have been reported more in immunocompromised persons.¹⁰

The treatment of warts often focuses on removing the warty growths, rather than eradicating the virus.¹¹ The recommended treatments are categorised as either self-administered by the patient, which include cytotoxic agents such as podophyllotoxin and cidofovir, immunomodulators such as oral cimetidine and levamisole. There are also topical agents such as salicylic acid or those provided by a healthcare professional (physical destruction, which includes cryotherapy, surgical removal, and laser vaporization. The use of cytotoxic agents such as trichloroacetic acid (TCA) and podophyllin resin), and either modality may also be associated with complications.¹¹ Recently, the use of immunotherapy with intralesional agents like the measles, mumps, and rubella (MMR) vaccine, purified protein derivative (PPD), and *Mycobacterium w* vaccine (MWV; also known as *Mycobacterium indicus pranii* vaccine), *Candida albicans* antigen, and the Bacillus Calmette-Guérin (BCG) vaccine has demonstrated effectiveness and favourable tolerability in treating warts, particularly those that are resistant to other treatments.¹²

However, there are limited data comparing the effectiveness of these agents.¹³ Moreover, there is a scarcity of reports on AGWs and their management options in Nigeria, especially among children. A retrospective review of pathology records of AGWs at the Ahmadu Bello University Teaching Hospital, Zaria, yielded 27 cases over 10 years; only four were children aged

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below 20 years.¹⁴ The study, however, did not include information on the management and outcome of the cases. Hence, this report is about our preliminary experience with three cases of patients with AGW treated with intralesional immunotherapy using the MMR vaccine. This will serve to increase awareness of this less-known modality of managing challenging cases of AGWs among paediatricians.

Case 1

A 20-month-old girl presented at the Paediatric Dermatology Clinic of the Lagos State University Teaching Hospital with a 2-month history of anogenital cauliflower masses (Figure 1a) which had persisted and became more painful despite prior treatment with topical podophyllin at another facility before presentation in LASUTH. The child's hymen was intact with no evidence of tear,

and no other evidence of sexual abuse was identified. There was also no history of similar illness in the parents or any close contacts. Serological tests for HIV-1 and HIV-2, Hepatitis B and C and VDRL assays were all negative. Her mother was counselled on the available treatment options, including cryotherapy, immunotherapy and topical imiquimod and their complications. She opted for immunotherapy with MMR vaccine. One dose of 0.5 mL of reconstituted MMR vaccine was injected into all the lesions at the clinic, and the child was scheduled for follow-up visits for lesional resolution. Three weeks after treatment, the lesions were observed to have resolved completely (Figure 1b) with no evidence of recurrence after a year of follow-up. No significant adverse effects were reported or observed.



Figure 1a: Anogenital region of Case 1 (Pre-treatment) showing multiple verrucous papules

Case 2

A 2-year-old boy was diagnosed at the Paediatric Dermatology Clinic of the Lagos State University Teaching Hospital with AGW following presentation with an 8-month history of multiple skin-coloured verrucous papules coalesced into plaques over the perianal and anal orifices (Figure 2a). There was no family history of similar illness; however, there was a history of common

warts in one of the handlers at his crèche. There was no history or physical evidence suggestive of sexual abuse. Serological tests for HIV-1 and HIV-2, hepatitis B and C and VDRL assays were all negative. Following counselling on various treatment modalities and their complications, the parents opted for immunotherapy with intralesional MMR vaccine.



Figure 1b: Anogenital region of Case 1 (1-week post-treatment) showing complete resolution of lesions

Thus, 0.5 mL of reconstituted MMR vaccine was injected into the lesions. The child was scheduled for follow-up visits. At the first and second post-treatment 3-weekly visits, there was no observable resolution, necessitating a repeat of the injections at each visit. At each of the subsequent third and fourth post-treatment visits

(Figure 2b), the lesions were noticed to still be present but resolving (suggesting delayed resolution), necessitating repeat injection at each visit. Prolonged follow-up continued until complete lesional resolution (Figure 2c). No significant adverse effects of MMR vaccine were reported or observed.



Figure 2a: Anogenital region of Case 1 (Pre-treatment) showing multiple cauliflower papules

Case 3

A 3-year-old girl presented with a 2-year history of multiple skin-coloured verrucous papules coalesced into plaques over the perianal orifice despite prior treatment with topical podophyllin.

There was no similar lesion in any family or close contacts; neither was there any history or physical examination suggestive of sexual exposure. Serological tests for HIV-1 and HIV-2, anti-HCV, HBsAg, and VDRL assays were all negative. Despite about six 3-weekly

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intralesional administrations of 0.5 mL of MMR vaccine, the lesions persisted with no observable clinical improvement. The parents were counselled on other treatment options, and the

child is currently being followed up at the clinic. No significant adverse effects were reported or observed with the MMR administration.



Figure 2b: Anogenital region of Case 2 showing partial resolution of warty lesions after the 4th dose of intralesional MMR vaccine



Figure 2c: Anogenital region of Case 2 (1-year post-treatment) showing complete resolution of warty lesions



Figure 3a: Anogenital region (pre-treatment) showing multiple verrucous papules coalescing into a plaque



Figure 3b: Anogenital region (post-treatment) showing no significant change after intralesional administration of MMR vaccine

Ethical considerations

Although formal ethical approval was not obtained for this case report, the parents of the children included gave verbal consent for the use of their children's data in this report after due assurance of anonymisation and a plan to use them for educational purposes only.

Discussion

To raise awareness of the use of intralesional injection of MMR as an immunotherapy modality

in the treatment of anogenital warts (AGWs), we present a report of our preliminary experience with three children with AGWs. While one of the children showed complete rapid lesion resolution, a second showed delayed but complete resolution, while the third did not show any observable clinical response to the treatment.

Although AGWs are rare in children, its incidence seems to be increasing.¹⁵ It is caused by various strains of the human papillomavirus

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(HPV). Due to the commonly known sexual route of transmission of the virus, sexual exposure must be carefully excluded in paediatric patients with AGWs. We could not establish any historical or clinical evidence of sexual exposure in any of these three cases. The concept of autoinoculation is also recognised as a potential mode of transmission in children, particularly in female individuals who have never engaged in sexual intercourse.¹⁶

The goal of treatment in AGWs should be to completely clear the lesion and eradicate the virus, irrespective of the preferred treatment modality. In recent times, immunotherapy is becoming more popular in the treatment of warts, especially for genital and refractory warts.¹ Commonly used agents include MMR vaccine, PPD, BCG vaccine and Candida antigen. Among these, the MMR vaccine and PPD are the most effective in achieving complete primary and long-term recovery, reducing the recurrence rate at the same site compared with cryotherapy and other treatment modalities.¹⁷

There are limited studies on MMR vaccine use in children with which to compare our current report. Ulschmid *et al.*,¹⁸ in a retrospective study conducted in the United States, evaluated the use of intralesional MMR vaccine administration following failure of intralesional Candida antigen for the treatment of recalcitrant paediatric warts. They reported complete resolution in eight patients (15.5%), near-complete resolution in six (12%), partial improvement in 19 (37%), no change in 12 (23.5%), and worsening of lesions in six patients (12%). These findings suggest that intralesional MMR vaccine administration for immunotherapy is a feasible treatment for persistent paediatric warts, particularly in children who have not responded to intralesional Candida antigen immunotherapy. However, it also highlighted the fact that not all children respond positively to the MMR vaccine, as observed in our patients.

Similarly, Mahajan *et al.*¹⁹ evaluated the efficacy and safety of intralesional administration of MMR vaccine in 55 children and adolescents aged 5–18 years with verruca vulgaris. Among the 46 participants who completed the 24-week follow-up period, complete clearance of warts was observed in 58.7% of the children studied, while partial clearance was observed in 19.6%. With respect to treatment response timing, complete resolution was achieved after five doses in 32.6% of children and after four doses in 15.2% of the children. Earlier responses were less frequent, with complete clearance occurring after two and three doses in two children each (4.3%), and after the first dose in only one child (2.2%). Additionally, delayed complete clearance occurring eight weeks following the fifth dose was documented in two children (4.4%). No therapeutic response was observed in ten children (21.7%). The authors emphasised that intralesional MMR immunotherapy offers a more effective and safer solution for common warts in children compared to potentially scarring destructive methods like surgery. Nonetheless, larger, well-structured controlled studies are necessary to further validate its efficacy and safety. This study by Mahajan *et al.* may justify the need for prolonged monitoring in patients with seemingly slow response, as in our Case 2.

Reports of MMR use in warts predated experience in children. Al-Qassabi *et al.*¹ in Oman reported AGW that had been recalcitrant to topical 5% imiquimod cream, cryotherapy sessions, electrocautery, and radiofrequency treatments in 23- and 25-year-old males, respectively. The patients were treated successfully with intralesional immunotherapy using the MMR vaccine in combination with cryotherapy to enhance efficacy. The authors proposed that intralesional MMR immunotherapy might lead to lower recurrence rates compared to destructive treatments (such as cryotherapy), as it

boosts the host's immune response against HPV and promotes viral elimination, rather than merely removing the visible lesions. Meena *et al.*³ in a Dermatology and Venerology Clinic in India reported two cases of AGW in two men aged 20 and 50 years, respectively, who were treated with 0.5 mL of reconstituted intralesional MMR vaccine. They observed complete lesion resolution in both patients after one and two doses, respectively.

Immunotherapy offers a less invasive alternative to traditional treatments like cryotherapy and radiofrequency cautery, which have relatively high recurrence rates. A hospital-based, longitudinal study of thirty-five patients between the ages of 17 and 48 years, conducted in Uttarakhand, India by Sharma and Agarwa,¹⁷ reported its findings following intradermal injection of 0.5 mL of the MMR vaccine into the participants' single largest wart. Injections were given every three weeks until a maximum of three injections was achieved. A response rate of 98% after three sessions of treatment was reported.¹⁷ Nofal *et al.*²⁰ demonstrated a remarkably high therapeutic response when evaluating the efficacy and safety of intralesional immunotherapy for common warts. In their study of 135 patients presenting with single or multiple recalcitrant and non-recalcitrant common warts, intralesional injection of the MMR vaccine achieved an 81.4% complete clearance rate, compared with only 27.5% in the placebo group. In a randomised clinical trial evaluating the effectiveness, safety, and tolerability of intralesional therapies, the MMR vaccine was compared with intralesional vitamin D administration. The findings showed a superior therapeutic response with the MMR vaccine, with complete clearance in 80.4% of patients, compared with 66.1% in the vitamin D group.²¹ The study found that intralesional MMR immunotherapy outperforms intralesional vitamin D in wart treatment, although it is linked

to a higher occurrence of generally mild and well-tolerated side effects in the MMR group.

The exact mechanism by which intralesional immunotherapy works in the treatment of AGWs is not entirely understood. It is postulated that it induces a delayed-type hypersensitivity response to different antigens, including wart tissue. This has been linked to the production of T-helper 1 cytokines, which stimulate cytotoxic and natural killer cells to eliminate HPV infection.²⁰ Furthermore, antigen injection is associated with proliferation of peripheral blood mononuclear cells that promotes T-helper 1 cytokine responses to eradicate HPV-infected cells.^{1, 22} Although prior studies on intralesional MMR vaccination for extra-genital warts have documented adverse effects such as injection-site pain, pruritus, erythema, localised oedema, and flu-like symptoms,¹⁸ no significant adverse effects were observed in the three cases presented in our report and in the prior studies reviewed above. In all three patients in this report, the MMR vaccine was administered directly into all identified lesions in the anogenital area; follow-up over several weeks to months revealed no adverse events in all three patients, with no recurrence in the first and second patients.

Limitation

Being an observational descriptive report of just three cases, our experience does not establish cause-and-effect relationships. It neither establishes nor refutes the efficacy or safety of the MMR vaccine for AGW treatment. Thus, it may be argued that the observed complete lesional resolution in the first two cases may have occurred by chance. However, our spectrum of response (complete resolution to non-response) on average mirrors reports from larger-sized observational and experimental studies reviewed above.

Conclusion

Intralesional administration of MMR vaccine was associated with complete resolution of AGW in two of three children treated, with the third showing no resolution after six doses. While this report may suggest a role for MMR vaccine as a safer, less painful option compared to podophyllin or surgery (as supported by observational and interventional studies), it highlights that not all children may benefit from it. However, further observational and interventional studies are required to better understand its potential impact/limitation compared to other immunotherapeutic and non-immunotherapeutic modalities, especially in children in sub-Saharan Africa. The present report may encourage other local practitioners to explore this proven modality, especially when other well-known therapies like podophyllin fail while affected children and their families continue to face increasing pain and psychosocial distress.

Authors' Contributions: LAB and OOO conceived the study while LAB did the literature review, drafted the manuscript and participated in the critical revision of the draft for sound intellectual content. UPO critically revised the manuscript for sound intellectual content. All the authors approved the final version of the manuscript.

Conflicts of Interest: None declared.

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References

1. Al-Qassabi AM, Al-Farsi F. Intralesional Measles-Mumps-Rubella Vaccine for Genital Warts: Report of two cases with a review of literature. *Sultan Qaboos Univ Med J* 2022;22(3):413-416.
2. Tying SK. Human papillomavirus infections: Epidemiology, pathogenesis, and host immune response. *J Am Acad Dermatol* 2000; 43:S18–26.
3. Meena D, Sharma S, Chauhan P. Measles, mumps, and rubella vaccine in genital warts: a case report of two patients. *Indian J Sexually Transm Dis AIDS* 2018;39(2):133-5.
4. Marcoux D, Nadeau K, McCuaig C, Powell J, Oligny LL. Pediatric anogenital warts: a 7-year review of children referred to a tertiary-care hospital in Montreal, Canada. *Pediatr Dermatol* 2006;23(3):199-207.
5. Tomecka P, Karwowska A, Kuźnicki J, Skinderowicz K, Wojno A, Markut K, *et al.* HPV Infection in Children and Adolescents—A Comprehensive Review. *J Clin Med* 2025;14(7):242.
6. Sabeena S, Bhat P, Kamath V, Arunkumar G. Possible non-sexual modes of transmission of human papillomavirus. *J Obstet Gynaecol Res* 2017;43(3):429-435.
7. Steben M, Garland SM. Genital warts, Best Practice and Research *Clin Obstet Gynaecol* 2014;28(7):1063-1073.
8. Mortensen G.L, Larsen H.K. The quality of life of patients with genital warts: a qualitative study. *BMC Public Health* 2010;113(10).
9. Wieland U, Kreuter A, Pfister H. Human papillomavirus and immunosuppression. *Curr Probl Dermatol.* 2014;45:154-65.
10. J. Zampella, B. Cohen, Consideration of Underlying Immunodeficiency in Refractory or Recalcitrant Warts: A Review of the Literature. *Skin Health and Disease* Volume 2, Issue 1, 2022, ski2.98.
11. Thornsberry L, English JC 3rd. Evidence-based treatment and prevention of external genital warts in female pediatric and adolescent patients. *J Pediatr Adolesc Gynecol* 2012;25(2):150-4.
12. Lipke MM. An armamentarium of wart treatments. *Clin Med Res* 2006;4:273–293.
13. Gibbs S, Harvey I, Sterling J, Stark R. Local treatments for cutaneous warts: systematic review. *BMJ* 2002;325(7362):461.
14. Ahmed, Saad Aliyu, Shehu, Mohammed Sani; Abubakar, Murtala; Dauda, Suleiman Eneyamire. Anogenital warts in Northern Nigeria: A ten-year Review. *Niger Med J* 2013;54(5):313-315.

15. Hornor G. Anogenital warts in children: sexual abuse or not? *J Pediatr Health Care* 2004;18(4):165-70.
16. Petca A, Borislavski A, Zvanca ME, Petca RC, Sandru F, Dumitrascu MC. Non-sexual HPV transmission and role of vaccination for a better future (Review). *Exp Ther Med* 2020;20(6):186.
17. Sharma S, Agarwal S. Intralesional Immunotherapy with Measles Mumps Rubella Vaccine for the Treatment of Anogenital Warts: An Open-label Study. *J Clin Aesthet Dermatol* 2020;13(8):40-44.
18. Ulschmid CM, Patel J, Pan AY, Liegl M, Holland KE. Intralesional measles, mumps, and rubella vaccine after failure of intralesional Candida antigen for the treatment of recalcitrant pediatric warts. *Pediatr Dermatol* 2023;40(6):1057-1059.
19. Mahajan VK, Chauhan PS, Sharma A, Mehta KS, Rawat R, Sharma V. Evaluation of Efficacy and Safety of Intralesional Measles-Mumps-Rubella Virus Vaccine for the Treatment of Common Warts in Children and Adolescents. *Indian J Paediatr Dermatol* 2019;20(3):231-5.
20. Nofal A, Nofal E. Intralesional immunotherapy of common warts: Successful treatment with mumps, measles and rubella vaccine *J Eur Acad Dermatol Venereol* 2010;24:1166-70.
21. Sallam M, Awad A, Hamdy S, State A. Intralesional measles, mumps, and rubella vaccine versus vitamin D for treatment of warts: A randomised clinical trial. *Indian J Dermatol Venereol Leprol* 2026;92:278.
22. Chandrashekar L. Intralesional immunotherapy for the management of warts. *Indian J Dermatol Venereol Leprol* 2011;77(3):261-3.