

**Comparative Study between the Intralesional
Tuberculin (PPD) and Intralesional Measles, Mumps,
Rubella (MMR) Vaccine in the Treatment of
Molluscum Contagiosum in Children**

Thesis

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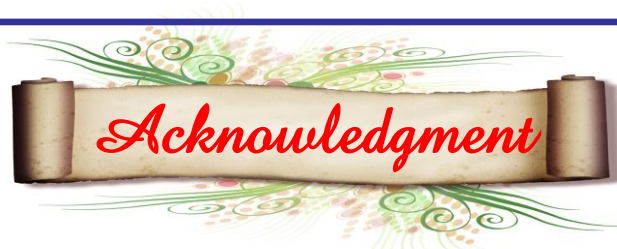
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List of Contents

<i>Title</i>	<i>Page No.</i>
<i>List of Abbreviations</i>	<i>I</i>
<i>List of Tables</i>	<i>III</i>
<i>List of Figures</i>	<i>V</i>
<i>Introduction</i>	<i>1</i>
<i>Aim of the Work</i>	<i>5</i>
<i>Review of Literature</i>	
• <i>Molluscum Contagiosum</i>	<i>6</i>
• <i>Management of MC</i>	<i>24</i>
<i>Patients and Methods</i>	<i>62</i>
<i>Results</i>	<i>68</i>
<i>Illustrative Cases</i>	<i>84</i>
<i>Discussion</i>	<i>99</i>
<i>Conclusion</i>	<i>106</i>
<i>Recommendations</i>	<i>107</i>
<i>Summary</i>	<i>108</i>
<i>References</i>	<i>111</i>

List of Abbreviations

AID	: Acquired Immune Deficiency Syndrome
BCA	: Bichloroacetic acid
BCG	: Bacille Calmette Guerin
BRM	: Biological response modifier
CDV	: Cidofovir
CMV	: Cytomegalovirus
EV	: Enveloped virion
FDA	: Food and drug administration
GAS	: Glycosaminoglycans
HAART	: Highly active anti retroviral therapy
HIV	: Human immunodeficiency virus
HPV	: Human Papiloma Virus
IFNα	: Interferon α
IRIS	: Immune reconstitution inflammatory syndrome
IL	: Interleukin
IQ	: Imiquimod
KOH	: Potassium hydroxide
KTP	: Potassium titanyl phosphate
LN	: Liquid Nitrogen
MC	: Molluscum Contagiosum
MCV	: Molluscum Contagiosum Virus
MMR	: Mumps, Measles and rubella
MV	: Mature virion

List of Abbreviations (Cont.)

MW	: Mycobacterial vaccine
NTM	: Non tuberculosis mycobacteria
PCR	: Polymerase Chain Reaction
PDL	: Pulsed Dye Laser
PPD	: Purified Protein Derivative
T.B	: Tuberculosis
TCA	: Trichloroacetic acid
Th1	: T helper 1
TLR	Toll like receptor
TNF	: Tumor Necrosis Factor
TU	: Tuberculin unit
WV	: Wrapped virion

List of Tables

<i>Table No.</i>	<i>Title</i>	<i>Page No.</i>
Table 1.1:	Differential diagnoses for MC	22
Table 2.1:	The size of tuberculin test induration and significance	52
Table 4.1:	Clinical and demographic data in MMR group.....	70
Table 4.2:	Clinical and demographic data in PPD group.....	73
Table 4.3:	Comparison between MMR and PPD group according to demographic features.	75
Table 4.4:	Comparison between MMR and PPD group according to site of lesions.	76
Table 4.5:	Comparison between mean value of number of lesions and duration of the disease in the two studied groups	77
Table 4.6:	Comparison between MMR and PPD group according to family history and number of sessions	77
Table 4.7:	Comparison between MMR and PPD group according to the induration	78

List of Tables (Cont...)

<i>Table No.</i>	<i>Title</i>	<i>Page No.</i>
Table 4.8:	Comparison between MMR and PPD group according to side effect of treatment	79
Table 4.9:	Comparison between MMR and PPD group according to the outcome.....	80
Table 4.10:	Comparison between MMR and PPD group according to number of responders and non responders	81
Table 4.11:	Correlation between response and induration and number of lesions in MMR group.....	82
Table 4.12:	Correlation between response and induration and number of lesions in PPD group.....	83

List of Figures

<i>Fig. No.</i>	<i>Title</i>	<i>Page No.</i>
Fig.1.1	Histopathological picture of MC.....	17
Fig.1.2	Histopathological picture of MC.....	17
Fig.1.3	Histopathological picture of MC.....	18
Fig.4.1	Graphs for mean induration value of the two studied groups	78
Fig.4.2	Graphs for the side effects of the two studied groups	79
Fig.4.3	Grahs for response of treatment of the two studied groups	80
Fig. 4.4	Graphs for responders and non responders in the two groups	81
Fig. 4.5	Graph for response and iduration in MMR group.....	82
Fig.4.6a	Before treatment with PPD.....	84
Fig. 4.6b	Complete clearence after treatment with PPD.....	84
Fig.4.7a	Before treatment with PPD.....	85
Fig.4.7b	Complete clearence after treatment with PPD.....	85

List of Figures (Cont...)

<i>Fig. No.</i>	<i>Title</i>	<i>Page No.</i>
Fig.4.8a	Before treatment with PPD.....	86
Fig.4.8b	Complete clearence after treatment with PPD.....	86
Fig.4.9a	Before treatment with PPD.....	87
Fig.4.9b	Complete clearence after treatment with PPD.....	87
Fig.4.10a	Before treatment with PPD.....	88
Fig.4.10b	Complete clearence after treatment with PPD.....	88
Fig.4.11a	Before treatment with PPD.....	89
Fig.4.11b	Good response after treatment with PPD	89
Fig.4.12a	Before treatment with PPD.....	90
Fig.4.12b	Good response after treatment with PPD	90
Fig.4.13a	Before treatment with PPD.....	91
Fig.4.13b	Partial response after treatment with PPD	91
Fig.4.14a	Before treatment with MMR.....	92
Fig.4.14b	Complete clearence after treatment with MMR.....	92
Fig.4.15a	Before treatment with MMR.....	93

List of Figures (Cont...)

<i>Fig. No.</i>	<i>Title</i>	<i>Page No.</i>
Fig.4.15b	Complete clearence after treatment with MMR.....	93
Fig.4.16a	Before treatment with MMR.....	94
Fig.4.16b	Good response after treatment with MMR	94
Fig.4.17a	Before treatment with MMR.....	95
Fig.4.17b	Good response after treatment with MMR.....	95
Fig.4.18a	Before treatment with MMR.....	96
Fig.4.18b	Good response after treatment with MMR	96
Fig.4.19a	Before treatment with MMR.....	97
Fig.4.19b	Good response after treatment with MMR	97
Fig.4.20a	Before treatment with MMR.....	98
Fig.4.20b	Partial response after treatment with MMR.....	98

INTRODUCTION

*M*olluscum contagiosum (MC) is a viral infection of the skin or occasionally of the mucous membranes. It is caused by DNA poxvirus called the molluscum contagiosum virus (MCV). MCV has no animal reservoir, infecting only humans. There are four types of MCV, MCV-1 to -4; MCV-1 is the most prevalent and MCV -2 is seen usually in adults and often sexually transmitted (*Hanson and Diven, 2003*).

MCV transmission occurs through direct skin contact between children sharing bath and between athletes sharing gymnasium equipment. MCV may be inoculated along a line of minor skin trauma (e.g. from shaving), resulting in lesions arranged in linear pattern. This process, termed autoinoculation, this also results from manipulation of lesions by the patient (*Connell et al., 2008*).

Three distinct disease patterns are observed in 3 different patient populations: Children, adults who are immunocompetent, and patients who are immunocompromised (children or adult). MC is most common in children who become infected through direct skin to skin contact or indirect skin contact with fomites. Lesions typically occur on chest, arms, trunk, legs, and face. Hundreds of lesions may develop in intertriginous areas, such as axilla. Lesions may rarely occur on mucous membrane of the lip, tongue, buccal mucosa. The palms are spared. Patients with atopic dermatitis may develop

large numbers of lesions. In adult, MC most commonly is sexually transmitted disease. Healthy adults tend to have few lesions, which are limited the perineum, genitalia, lower abdomen, or buttocks. MC in healthy children and adults is usually self limited disease (*Ferry -Blanco et al., 2007*).

MC is contagious until the bumps are gone (which, if untreated, may last up to 6 months or even longer). The time from infection to the appearance of lesions can range up to 6 months, with an average incubation period between 2 and 7 weeks (*Hanson and Diven, 2003*).

Typically, the lesion of molluscum begins as a small, umblicated, painless papule that may become raised up to a pearly, flesh – colored nodule. The papule often has a dimple in the center. These papules are variable in number and may occur in lines, where the person has scratched. Scratching or other irritation causes the virus to spread in a line or in groups, called crops. The papules are small, discrete, waxy, skin coloured, dome shaped and usually 2-5 millimeters in size. There is usually no inflammation and subsequently no redness unless you scratch or dig on the lesions. The skin lesion commonly has a central core or plug of white cheesy or waxy material (*Brown et al., 2006*).

In healthy patients, MC is generally self limited and heals spontaneously after several months. Although treatment is not required, it may help to reduce autoinoculation or transmission to close contact and improve clinical appearance. Intervention may

also be indicated if lesions persist. Therapeutic modalities include topical application of various medications such as (Imiquimod cream, tretinoin), radiation therapy, immune response stimulation therapy, antiviral therapy, and / or surgery (*Hanna et al., 2006*).

Varying degrees of physical trauma to individuals lesions are used and can be performed with cryotherapy, lasers, curettage, electrodesiccation, shave removal or duct tape occlusion (*Weller et al., 1999; Lindau and Munar, 2004*).

Recently, intralesional immunotherapy by different antigens e.g. (MMR, Tuberculin antigen and Candida) has proved effective in treatment of different types of warts (*Gupta et al., 2008*).

Intralesional immunotherapy has the potential advantages of clearance of both treated and untreated distant warts due to development of wide spread cell mediated immunity against human papilloma virus as a response to antigen injection, without scarring and a lower rate of recurrence which is attributed to acquisition of a long term human papilloma virus directed immunity (*Lichon and Khachemoune, 2007; Dasher et al., 2009*).

The exact mechanism of action of intralesional immunotherapy is still obscure. Intralesional immunotherapy employs the ability of immune system to recognize certain viral, bacterial and fungal antigens that induce a delayed type hypersensitivity reaction, not only to the antigen but against the

wart virus, which in turn increase the ability of immune system to recognize and clear human papilloma virus (*Bacelier and Johnson, 2005*).

Recently intralesional injection of Candida antigen is an established and useful therapy for MC in children (*Enns and Evans, 2011*).

Other antigens like measles, mumps, rubella (MMR) antigen and tuberculin (PPD) antigen have not been tried in MC.