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Original Article

Dermatology Section

Clinicoepidemiological Study on Patients with Dermatosis Papulosa Nigras and Acrochordons- A Longitudinal Study

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ABSTRACT

Introduction: Dermatosis Papulosa Nigras (DPNs) and Acrochordons are benign epidermal outgrowths that frequently occur together over face, neck, axilla and other flexures. These are common dermatoses with high cosmetic concerns. Knowledge about the clinicoepidemiological patterns of these dermatoses will help in better management and prevention of recurrence.

Aim: To study the clinicoepidemiological patterns of DPNs and acrochordons, and to evaluate the outcome of treatment with Radiofrequency (RF).

Materials and Methods: The present study was a longitudinal study done on 121 patients in the Out-Patient Department (OPD) of Dermatology from January 2017 to June 2021 with DPNs. and acrochordons who were followed-up for three years. The lesions were treated with RF removal (the number of sessions varied depending on the number of lesions). Data regarding relevant history, complete dermatological examination, and recurrences (if any) were recorded.

Results: Male versus female ratio was 1:1.8. The mean age of the study group was 34.28 years. The most common lesions were papular type DPNs, seen more commonly over face and neck (40%), 35 patients (28.9%) were obese (≥30 kg/m^2), 19 patients (15.7%) had diabetes, and 13 patients (10.7%) had Polycystic Ovarian Syndrome (PCOS). There was a positive association between co-morbidities such as obesity, diabetes and PCOS and occurrence of the lesions. Overall, 70 patients had recurrence, out of which 26 (37.1%) were obese. Fifty-three patients used sunscreen regularly and usage of sunscreen showed significant association with prevention of recurrence, p-value-0.001.

Conclusion: In this study, it was found that females presented with complaints of DPNs and acrochordons more than males. The most common lesions were papular DPNs over face and neck. The most common co-morbidity in patients was obesity followed by Diabetes Mellitus (DM). Majority of patients (71%) who did not use sunscreen after treatment experienced recurrence of lesions.

Keywords: Obese, Radiofrequency, Recurrence, Sunscreen, Treatment

INTRODUCTION

The DPNs are benign epidermal growths. These are common dermatoses found in people with skin of colour: Fitzpatrick skin types III to VI. They most commonly affect people of African and Asian descent [1]. The DPNs are considered to be a variant of seborrheic keratosis. These were first described by Dr. Aldo Castellani in 1925 [1]. The incidence of such lesions range from 10-75% in study populations of individuals of skin type III to VI [2]. These are characterised by small, pigmented, firm papules which can be sessile, pedunculated or filiform, in various sizes and configurations. Females are more commonly affected than males [3,4]. The lesions are more common over the sun-exposed sites [2,5]. The DPNs are considered to be a variant of seborrheic keratosis [6]. Although the exact aetiopathogenesis is unknown, various factors are said to play an aetiological role in the causation of DPNs, viz., genetic factors like mutation in Fibroblast Growth Factor Receptor 3 (FGFR 3) and the PIK3CA (encoding for the catalytic p110 subunit of class 1 phosphatidylinositol 3-kinase) genes [7], family history [3,5], hormonal influence from androgens [8-10], and exposure to Ultraviolet (UV) rays [11,12], etc.

Skin tags or acrochordons or soft fibromas are also benign epidermal growths that present as soft heaped up excrescences. These appear as skin coloured or pigmented lesions, and are seen most common over areas of skin folds like axilla and neck [13]. The prevalence of acrochordons is 46% among the general population [13]. Clinically, there is often an overlap between DPNs and acrochordons. These lesions occur together in same sites, admixed with one another.

The RF removal of DPNs and skin tags is an easy and safe day-care procedure. RF delivers rapidly alternating currents from the probe tip to tissue, which produces a thermal effect on the target by resistive heating i.e., impedance to current flow [14]. The RF (under topical usage of Eutectic mixture of 2.5% Lidocaine and 2.5% Prilocaine in a gel base) is used for removal of smaller version of these dermatoses, while the larger and deep variants and soft fibromas are removed under 2% plain lignocaine injection [14].

The RF removal of these benign lesions is an effective and safe method with minimal adverse effects [15,16]. It is considered as the standard therapy by many dermatologists for removal of benign lesions [17]. However, they often recur irrespective of the treatment modality [1]. Genetic factors, dyslipidaemia, obesity and type 2 diabetes are the associated metabolic conditions that probably play the role in recurrence [18]. More studies are required to understand the complete aetiopathogenesis of the lesions so as to elucidate the cause for recurrence. This study was done to identify the clinicoepidemiological patterns of DPNs and acrochordons over a course of four and half years which included post-treatment follow-up period of three years.

MATERIALS AND METHODS

This longitudinal study was done in the Out-Patient Department (OPD) of Dermatology from January 2017 to June 2021. Institutional Ethics Committee approval was obtained (No. 1902202, dated 02.02.2021). The study group comprised of patients who came to the OPD with complaints of DPNs and skin tags. Informed consent was obtained from all the patients. The diagnosis of the lesions was done clinically.

Inclusion criteria: Those patients who were aged more than 18 years, who came to OPD with complaints of DPNs and skin tags warranting their removal and those who consented to participate in the study and were available for follow-up (3 years).

Exclusion criteria: Those who had active infections at site of lesions, those who were on cardiac pacemakers or blood thinners.

Study Procedure

Disease duration, family history and personal history of the patients were recorded. Data regarding history, co-morbidities, morphology of lesion in the first episode and recurrence (if any), time lapse for recurrence (if any) and sunscreen usage was noted. Data regarding sun exposure was collected based on occupation of patient and duration of exposure per day. Data regarding co-morbidity was accounted based on patient's medical records. Dermatological examination regarding morphology, number and sites of the lesions was done and associated dermatological conditions were recorded. Systemic examination was done, height and weight were measured and Body Mass Index (BMI) was calculated using Quetelet index. Patient was considered as obese if BMI was more than or equal to 30 kg/m^2 [19].

The RF machine model was Megasurg Gold (high frequency radiosurgery unit) Dermaindia. Surface anaesthesia containing lidocaine and prilocaine was applied 45 min before the procedure. The procedure was done using a monopolar, monoterminal RF unit, with a markedly damp (lateral heat spread–medium) and partially rectified waveform (electrodessication). The lesions were touched with a straight needle electrode held at 45 to 60° angle and with an optimum low power of 1 to 2. In a single session, all the DPN lesions were just finely touched with the electrode tip for a second until they whitened due to dehydration. The desiccation caused superficial necrosis and the lesions desquamated in a week's time. The patients were given advice regarding sun protection and regular usage of sunscreen. Patients were given 32% zinc oxide cream and were advised to re-apply it every four hours. Compliance was checked based on history.

Criteria for Adequate Follow-up

Those patients who underwent RF removal of the lesions and who came to the Dermatology OPD at least once a year, for the next three years were selected. The patient was considered to have recurrence if the subject had at least one DPN or acrochordon in the follow-up period. If recurrence occurred, probable triggers for recurrence based on the history given by the patients were noted. The lesions were again treated with RF removal, if the patient warranted it. Total 400 patients were enrolled into the study, 279 were lost to follow-up and 121 patients completed the study.

STATISTICAL ANALYSIS

The statistical analysis was carried out through Statistical Package for the Social Sciences (SPSS) 23.0 version. Descriptive statistics was calculated for all univariable. Inferential statistics was carried out by bivariate and multivariate analysis. Bivariate analysis like Chi-square test and Fisher's-exact test was used to find the association between lesions and co-morbidities. Those variables which are associated in the bivariate analysis were included in the multivariate model. A p-value <0.05 was considered to be statistically significant.

RESULTS

Out of the 121 patients, 43 were males and 78 were females. The mean age was 34.28±10.79 years. The mean duration of lesions was 2.65±0.69 years. [Table/Fig-1] shows demographic details of study group. Majority of the patients were homemakers (24.8%) followed by students (19%). Overall, 52.1% of the patients had positive family history of DPNs or skin tags either in parents, grandparents, siblings or first degree relatives (irrespective of gender). [Table/Fig-2] shows details about site, number and morphology of lesions. The majority of the patients (37.2%) had less than five lesions. The most common morphology of lesions was papular type (21.5%) followed by mixed type of lesions (20.6%).

Variables	n (%)
Gender	
Male	43 (35.5)
Female	78 (64.5)
Age (Mean±SD) (years)	34.28±10.79
Duration of lesions at first presentation (Mean±SD) (years)	2.65±0.69
BMI (Mean±SD) (Kg/m^2)	28.06±3.36
Occupation	
Homemaker	30 (24.8)
Student	23 (19.0)
Farmer	18 (14.9)
IT profession	16 (13.2)
Office	20 (16.5)
Shop keeper	14 (11.6)
Family history	
No	58 (47.9)
Yes	63 (52.1)

[Table/Fig-1]: Shows demographic details of study group.

Variables	n (%)
Lesion	
DPN	84 (69.4)
Soft fibromas	24 (19.8)
Both	13 (10.8)
Morphology	
Papule	26 (21.5)
Mixed	25 (20.6)
Filiform	24 (19.8)
Sessile	21 (17.4)
3 D Pedunculated	15 (12.4)
Flat	10 (8.3)
Count	
1-5	45 (37.2)
6-10	43 (35.5)
>10	33 (27.3)
Site	
Face, neck	48 (40)
Face, neck, axilla and trunk	32 (26)
Axilla	30 (25)
Trunk	11 (9)

[Table/Fig-2]: Shows details about morphology, number and site of lesion.

[Table/Fig-3] shows a patient with mixture of papular, sessile and pedunculated lesions of DPNs and acrochordons. The most common dermatological lesions associated with DPNs and acrochordons were acanthosis nigricans followed by acne vulgaris. [Table/Fig-4] shows lesions of flat and sessile DPNs associated with acanthosis nigricans of neck. [Table/Fig-5] shows lesions of DPNs admixed with acne vulgaris.

[Table/Fig-3]: Shows a patient with mixture of papular, sessile and pedunculated lesions of DPNs and acrochordons. **[Table/Fig-4]:** Shows lesions of flat and sessile DPNs associated with acanthosis nigricans of neck. **[Table/Fig-5]:** Shows lesions of DPNs admixed with acne vulgaris. (Images from left to right)

Patients with co-morbidities: A 28.9% of the patients were obese followed by 15.7% who had DM. Among the hormonal variation associated conditions predisposing to DPNs and acrochordons, the following were noted in the decreasing order of significance: Out of 78 female patients, 13 patients had PCOS, six were pregnant, two patients were on Oral Contraceptive Pills (OCPs) and two patients had hypothyroidism. [Table/Fig-6] shows the Fisher's-exact test clearly connoting that the co-morbidities such as PCOS, obesity and DM were significantly associated with occurrence of lesions.

Associated condition	Lesion n (%)			(Fisher'-exact test) p-value*
	DPN (84)	Soft fibromas (24)	Both (13)	
Pregnancy (n=78)				
No	58 (92.1)	10 (90.9)	4 (100.0)	0.716
Yes	5 (7.9)	1 (9.1)	0	
Total	63 (100)	11 (100)	4 (100)	
OCP (n=78)				
No	62 (98.4)	10 (90.9)	4 (100.0)	0.496
Yes	1 (1.6)	1 (9.1)	0	
Total	63 (100)	11 (100)	4 (100)	
UV exposure				
No	79 (94.0)	23 (95.8)	13 (100.0)	0.362
Yes	5 (6.0)	1 (4.2)	0	
Total	84 (100)	24 (100)	13 (100)	
PCOS (n=78)				
No	52 (82.5)	11 (100)	2 (50.0)	0.041
Yes	11 (17.5)	0	2 (50.0)	
Total	63 (100)	11 (100)	4 (100)	
Obesity				
No	67 (79.8)	13 (54.2)	6 (46.2)	0.006
Yes	17 (20.2)	11 (45.8)	7 (53.8)	
Total	84 (100)	24 (100)	13 (100)	
Diabetes Mellitus (DM)				
No	79 (94.0)	19 (79.2)	4 (30.8)	0.001
Yes	5 (6)	5 (20.8)	9 (69.2)	
Total	84 (100)	24 (100)	13 (100)	

[Table/Fig-6]: Shows data for patients with co-morbidities.
*A p-value <0.05 was considered to be statistically significant. OCP: Oral contraceptive pills; UV: Ultraviolet; PCOS: Polycystic ovarian syndrome

Association between recurrence and triggers: In the follow-up period, recurrence was observed in 70 patients (57.8%)- 44 females and 26 males. Recurrence was observed in first year in 19 patients, second year in 29 patients and third year in 22 patients. The mean time-lapse for recurrence was 1.65±0.69 years. There were a statistically significant association between recurrence and the following triggers for relapse: Obesity (37.1%), OCPs usage (22.7%), pregnancy (20.5%), UV exposure (14.3%), PCOS (13.6%), and DM (10%) (p-value for all <0.05).

Association between sunscreen usage after treatment and recurrence: Finally, majority of the patients did not use sunscreen after the treatment. Only 44% of the patients used sunscreen. [Table/Fig-7] depicts the output of chi-square association test between recurrence and sunscreen usage after treatment. The statistical significance value (p<0.01) indicates that there was a significant association between sunscreen usage after treatment and recurrence i.e., the majority of the patients (71%) who did not use sunscreen after the treatment had recurrence of skin lesions.

Recurrence	Sunscreen usage after treatment		p-value*
	No	Yes	
No	20 (29.4)	31 (58.5)	(Chi-square: 10.329) 0.001
Yes	48 (70.6)	22 (41.5)	
Total	68 (100)	53 (100)	

[Table/Fig-7]: Association between sunscreen usage after treatment and recurrence.
*A p-value <0.05 was considered to be statistically significant

DISCUSSION

In this study, it was found that females presented with complaints of DPNs and acrochordons warranting removal more than males, which was probably due to cosmetic concern. The mean age of the patients was 34.28 years. The mean duration of lesions at the time of first presentation was 2.65±0.69 years. Positive family history was present in 52.1% patients. The most common lesions were DPNs and the most common sites were face and neck. The most common morphology of lesions was papular lesions followed by mixed lesions. Majority of patients had less than five lesions at the time of first presentation. The most common co-morbidity in patients was obesity followed by DM. The patients were treated with RF removal of lesions and were followed-up for the subsequent three years. 57.8% of patients presented with recurrence of lesions in the follow-up period. Majority of patients who did not use sunscreen after treatment experienced recurrence of lesions. The triggers for relapse noted were UV exposure, pregnancy, obesity, PCOS, OCPs usage and DM.

The observations from this study were in concordance with previous studies on DPNs and skin tags by Rajesh G et al., and Bhat RM et al., [4,11] with respect to positive family history, female preponderance and role of sun exposure. The DPN is considered as an epidermal nevus or nevoid developmental defect of the pilosebaceous follicles [20-22]. Acrochordons also have been considered as remnants of melanocytic nevus [18]. Also, the mutations in the genes: FGFR3 and PIK3CA genes in patients with DPNs also play a role in occurrence and recurrence of lesions [23].

Chronic UV exposure play role in pathogenesis of these lesions, as a part of photoaging. Age is a well acknowledged risk factor for DPNs and acrochordons. Amyloid Precursor Protein (APP), which plays an important role in the pathogenesis of age-related Alzheimer's disease, was recently shown to be elevated in these tissues and expression levels were particularly high in UV-exposed skin sites [1,2,5,11,12,24].

In obese and diabetic individuals, increased expression of epidermal growth factors and insulin-like growth factors has been implicated in the occurrence of the lesions [2,8,24]. Likewise, the influence from hormones [9] has been noticed in female patients. During the antenatal period, the pre-existing DPNs and skin tags grew faster in size and also the patients became prone for new ones to come up in sites where they were not present prior to conception [10,25]. Apart from hormonal influence, friction from clothing and jewellery has also been noted to influence the growth of the DPNs and skin tags.

By virtue of the association between obesity, diabetes, hormonal factors and these benign lesions, many other dermatological conditions have also been observed to occur in these patients: acanthosis nigricans, pigmentation of racial or ethnic origin, acne vulgaris and striae etc., [18,24]. In this study, treatment with RF showed good results. There were no major complications. Minor complications observed were transient burning sensation after the procedure and postinflammatory pigmentary changes RF removal causes minimal collateral thermal damage and results in rapid healing and aesthetically pleasant scars. It is an office-based procedure with minimal complications. It has the advantage of having both cutting and coagulation modes of operation and hence making the surgery easy and fast [14,26].

Limitation(s)

Since, this was a hospital-based study, the results cannot be amplified to the general population. The probable triggers for

recurrence of lesions were considered based on history given by patients and could not be proved. Role of sunscreen was the only factor that was evaluated although others like diabetes, PCOS and obesity, genetic factors, hormonal influences, viral infections also are proven contributors in the pathogenesis of DPNs and acrochordons. A further long term study with still meticulous follow-up may throw light on the existing gap in the knowledge of pathogenesis.

CONCLUSION(S)

In this study, it can be observed that there is a strong role of genetic and hormonal predilection and influence of co-morbidities in the occurrence of lesions. As far as recurrence is considered, regular usage of sunscreen does play a role in prevention of relapse. Although these lesions are not completely preventable, they can be effectively managed. Appropriate lifestyle modifications, treatment of predisposing co-morbidities and usage of sunscreen may prevent further recurrences.

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