Histopathological spectrum of pediatric skin biopsies in a rural setup

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Abstract

Prevalence of pediatric skin disorders vary worldwide. In India, geographic variations in pediatric skin disorders is noted by numerous authors from different parts of the country. Dermatoses in children are much more influenced by socioeconomic status, climatic exposure, dietary habits and external environment as compared to adult skin disorders.

Aims and Objectives: The present study was aimed at determining the spectrum of pediatric dermatopathological lesions and correlate the clinical and histopathological diagnosis over a period of 2 years in a tertiary care hospital in a rural setup.

Results: Pediatric skin biopsies constituted 12.41% of all the skin biopsies received at our laboratory during the study period. Study consisted of 115 cases ranging from 1 to 18 years of age with a mean age of 12.02 years. A slight female preponderance (53.91%) was noted. The Biopsies received were categorized into various age groups as follows: Infants, n = 2(1.73%); toddler, n= 4(3.47%); preschool, n = 14(12.17%); school, n= 40 (34.78%) and adolescence, n= 55(47.82%). Papulosquamous diseases, n= 36(31.30%) were the most common cause of skin disorders followed by Genodermatosis (12.17%). Overall, Lichen Planus (8 cases; 6.95%) was the most common dermatoses encountered in the study. Fifteen cases (13.04%) were reported as non-specific dermatitis. A positive correlation with the initial clinical diagnosis was obtained in 95 cases (82.61%).

Conclusion: A combination of good clinical expertise and histopathological confirmation helps in the proper management of the patients. The importance of histopathology as the gold standard in the diagnosis and management of pediatric skin lesions has been documented by our study.

Keywords: Skin biopsy, Pediatric dermatoses, Papulosquamous diseases, Lichen planus, Genodermatoses.

Introduction

Prevalence of pediatric skin disorders vary in different parts of the world. In India, variation in pediatric dermatoses have been noted by various authors from different parts of the country.[1] Dermatoses in children are much more influenced by socioeconomic status, climatic exposure, dietary habits and external environment as compared to adult skin disorders.[2] Previous studies have documented that around 30% of patients attending dermatological clinics belong to the pediatric age group. In addition, skin problems presenting as primary or secondary cutaneous lesions constitute at least 30% of all pediatric out patient visits.[3] Prevalence of pediatric dermatoses range from 8.7% to 35% as per school survey based studies.[4] Pediatric dermatoses require a separate view from adult dermatoses as there are differences in clinical presentation, treatment and prognosis. Skin biopsy is one of the most important, cost effective and simple test done by the dermatologist for diagnosis and management of many skin conditions. The diagnosis offered by the histopathologist not only helps to confirm a diagnosis but also in the management of these disorders. A good clinicopathological correlation is of utmost importance in skin disorders. For this it is important to choose an appropriate site for biopsy and provide relevant clinical information to the reporting pathologist.[5]

Many studies regarding the pattern of pediatric dermatoses have been conducted in different regions of India. However, literature available regarding patterns of pediatric skin biopsies in southern India is limited. Therefore, the data from this study will help for planning future health care, health education and research activities and for elucidating the difference from those reported in other regions.

Aims and Objectives

The present study was aimed at determining the spectrum of pediatric dermatopathological lesions and correlate the clinical and histopathological diagnosis of these cases.

Materials and Methods

All pediatric skin biopsies received at the department of pathology, MVJ Medical College and research Hospital of children over a two year period from April 2016 to March 2018 were included in the study. Relevant data regarding the clinical presentation, site, duration and number of lesions were collected from the request forms. Biopsy specimens were received in 10% formalin. For suspected cases of vasculitis and vesiculobullous disorders needing DIF (Direct Immunofluorescence) study, biopsy was taken from perilesional site and sent in normal saline in addition to the biopsy from lesion. After routine processing and paraffin embedding, 3 to 5µ thickness sections stained with Hematoxylin & Eosin were studied. Frozen sections of 6-8µ thickness were used for DIF study. Special stains were done wherever necessary.

Statistics

Summarization and presentation of qualitative data were done using percentage. Quantitative data was expressed as mean.

Inclusion Criteria

All skin biopsies in pediatric age group (up to 18 years)

Exclusion Criteria

Repeat skin biopsies with same diagnosis

Results

Pediatric skin biopsies constituted 12.41% of all the skin biopsies received at our laboratory during the study period. Study population consisted of 53 (46.08%) males and 62(53.91%) females with a mean age of 12.03±4.96 years.The cases were categorized based on age into 5 groups namely: infants (< one year), toddlers (1-3yrs) preschool (3-6yrs), school going (6-12yrs) and adolescents (13018yrs). (Table 1 & 2 show distribution of broad category of dermatoses according to the sex and age groups respectively).

Papulosquamous Diseases (36 cases; 31.30%) were the most common skin disorders to be biopsied, followed by Genodermatosis (14 cases; 12.17%). Table 3 shows distribution of various lesions under the broad category of dermatoses. Overall the most common dermatoses encountered in the study was Lichen Planus (8 cases; 6.95%) [Fig. 1A] followed by Congenital Ichthyosis (6 cases; 5.21%) [Fig. 2]. The anatomic distribution pattern revealed that the extremities were involved in a majority of cases (61.73%).

A positive correlation with the initial clinical diagnosis was noted in 95cases (82.61%). In five cases (4.34%) a specific diagnosis was offered after reviewing the clinical diagnosis. However, in fifteen cases (13.04%), no conclusive diagnosis could be offered and were reported as Non-specific dermatitis. Enumeration of cases offered a new specific diagnosis & cases reported as non-specific Dermatitis is given in Table 4.

Discussion

Histopathological examination plays a very important role in diagnosing many of the skin lesions due to overlapping clinical presentations. Most of the dermatoses are diagnosed and managed clinically, without the requirement of a skin biopsy,[6] hence, the exact prevalence rates of pediatric dermatoses will not be reflected by histopathological studies like ours. In the literature, there are numerous studies by dermatologists describing the pattern of pediatric dermatoses visiting the OPDs[7-9] however there are very few studies determining the spectrum of skin pathologies from pediatric patients biopsied for various skin disorders.

Our study included 115 pediatric skin biopsies with a slight female preponderance (53.91%) with a M: F of 0.85:1.This was similar to study done by Ozkanli et al[10] and Solanki and Chauhan[11] whereas study by D Costa GF et al[12] showed a higher male preponderance. These differences could stem from geographic variation in the pattern of diseases. In the present study a majority of cases, 31.3% were papulosquamous disorders which have found to be more common among female subjects.[13] Most of the skin biopsies were from school going and adolescent age groups which together constituted 95 cases (82.61%). Majority (50 cases, 47.82%) belonged to adolescent age group. Study conducted by Solanki and Chauhan also revealed a much higher biopsy rate in children above 5 years of age (88.25%).[11] Similar findings were noted by D Costa GF et al where 62.61% of cases belonged to 9 – 12 years[12].Our youngest patient was one year old and oldest patient was 18 years old, with a mean age of 12.03±4.96 years. The least number of cases were in the infants and toddler age group accounting to 5.21% which was similar to other studies.[10,12] The anatomic distribution pattern revealed that the extremities were commonly involved (61.73%) followed by trunk (28.69%). Head & neck was the least common site to be involved (9.56%). In the extremities, lower limbs were more frequently involved (31.30%) compared to the upper limbs (30.43%).

Most common type of dermatoses noticed was Papulosquamous diseases 36 cases (31.30%).However, study conducted by D Costa GF et al, revealed infections (24.29%) to be the commonest cause of dermatoses[12].In our study, infections (Fig were the fourth most common cause of pediatric dermatoses (7.82%) 9 cases. As most of the infections and eczematous dermatitis were treated on OPD basis & biopsies were performed only when there was no substantial improvement on medications, the number of these lesions were much lesser in our study. As our study is done in rural population, the general awareness among parents about health and hygiene is much lesser when compared to urban population. Young children may not be able to communicate subtle symptoms of skin disorders to their parents unless the illness is of a severe degree. Un-education and poverty in rural India further leads to a delay in hospital visit. Genodermatoses (congenital disorders) were the second commonest lesions accounting to 12.17% (14 cases).Consanguineous marriages might have been one of the attributing factors for the higher incidence of genodermatoses as these practices are more common in rural India. This was followed by tumors, cysts & nevi category (8.69%), infections (7.82%) [Fig. 3] & vascular diseases (6.02%) [Fig. 4].

Overall the commonest dermatoses was lichen planus (LP) (9 cases; 7.82%) and constituted 25% of all the papulosquamous diseases. Seven cases were of classic LP, one case each of hypertrophic LP and Lichen PlanoPilaris with a M:F ratio of 1.25:1. Study done by Handa S and Sahoo B also revealed a slight male preponderance (1.1:1)[13] Most of them belonged to school going and adolescent age groups with extremities being the commonest site of involvement. Psoriasis (Fig. 1B) was the second frequent papulosquamous disorder accounting to 16.66% (6 cases). Comparison of our study with other studies is illustrated in Table 5.

Notable interesting cases in the study were, firstly four cases of Dyschromatosis Symmetrica Heriditaria (DSH), a Genodermatosis which was seen occurring in three members of the same family. All the three were females whose age ranged from 6 to 11 years and presented with multiple hypo and hyperpigmented patches on the limbs and trunk. Father was a known case of DSH. We also encountered an isolated 11year old male patient presenting with DSH. Secondly, one case of Xeroderma Pigmentosa (Fig. 5) who presented with multiple ulceroproliferative lesions all over the face and was diagnosed as squamous cell carcinoma. Thirdly, a case of Rhabdoid Melanoma (Fig. 6) which was diagnosed based on histomorphology and IHC findings in a 13 year old male patient presenting as a solitary swelling over the right eyelid.

A positive correlation with the clinical diagnosis was obtained in 95 cases (82.61%). In five cases, a final histopathological diagnosis was given only after reviewing the clinical diagnosis and discussing thoroughly the case with the dermatologist, which again highlights the importance of clinicopathological correlation in diagnosing skin lesions. As far as contribution of histopathology to the diagnosis is concerned, it gave a confirmatory diagnosis in maximum number of cases 100 (86.95%). Study by GF Costa et al had positive correlation with the clinical diagnosis in 56.07% of the cases while a new clinical diagnosis was given in 26.16% cases and noncontributory in 17.75% cases. They reported that histopathology contributed to the diagnosis in 82.23% which was similar to our study.

Among the fifteen nonspecific dermatitis cases (13%), we had three cases of clinically suspected autoimmune disorders for which DIF was done. However, in all the three cases DIF study was negative and hence no specific diagnosis could be given. There were three suspected cases one each of Scabies, Molluscum Contagiosum and Mycobacterial/fungal infection for which special stains were non-contributory. Six cases of clinically suspected papulosquamous diseases and one case each of porokeratosis, dermatitis artefacta and chondrodermatitis nodularis helices did not show any specific histopathological features. Solanki and Chauhanin 2016 from Ahmedabad have similarly reported that there were no specific histopathological findings in 5.88% out of the 85 cases they studied. Graph 1 Illustrates consistency between clinical diagnosis and histopathological diagnosis.

Table 1: Distribution of broad category of dermatoses based on the sex of the patient

Diagnosis	Male	Female	Total
Papulosquamous diseases	16	20	36
Genodermatoses	6	8	14
Tumors, Cysts and Nevi	4	6	10
Infections	6	3	9
Vascular Diseases	2	5	7
Metabolic diseases of the skin	3	2	5
Benign pigmentary lesions &Pigmentary disorders	1	3	4
Skin appendageal diseases	2	1	3
Noninfectious vesiculobullous and vesiculopustular diseases	2	1	3
Connective tissue diseases	-	3	3
Eczema	-	2	2
Photosensitivity	1	1	2
Noninfectious granulomas	1	-	1
Others - Hypertrophic scar	-	1	1
Nonspecific dermatitis	9	6	15
Total	53 (46.08%)	62 (53.91%)	115 (100%)

Table 2: Distribution of broad category of dermatoses based on the age group of the patient

Diagnosis	Infants (0-1yr)	Toddler (1-3yrs)	Preschool (3-6yrs)	School (6-12yrs)	Adolescence (12-18yrs)	Total
Papulosquamous diseases		1	4	12	19	36
Genodermatoses	1		3	4	6	14
Tumors,Cysts and Nevi				4	6	10
Infections			1	2	6	9
Vascular Diseases			1	2	4	7
Metabolic diseases of the skin			3	1	1	5
Benign pigmentary lesions &Pigmentarydisorders				3	1	4
Skin appendageal diseases				3		3
Noninfectious vesiculobullous and					3	3

vesiculopustular diseases						
Connective tissue diseases				1	2	3
Eczema				1	1	2
Photosensitivity			1		1	2
Noninfectious granulomas			1			1
Others- Hypertrophic scar					1	1
Nonspecific dermatitis	1	3	1	5	5	15
Total	2 (1.73%)	4 (3.47%)	14 (12.17%)	40 (34.78%)	55 (47.82%)	115 (100%)

Table 3: Types of various lesions encountered in the broad category of Dermatoses

Dermatoses	Types	Number of cases
Papulosquamous diseases n= 36(31.30%)	Lichen Planus Psoriasis Vulgaris Pustular psoriasis Pityriasis Rubra Pilaris Pityriasis lichenoides chronica Ashy dermatoses PityriasisRosea Prurigo Simplex Prurigonodularis Lichen nitidus Lichen striatus	9(7.82%) 5(4.34%) 1(0.86%) 5(4.34%) 3(2.60%) 2(1.73%) 3(2.60%) 2(1.73%) 3(2.60%) 2(1.73%) 1(0.86%)
Genodermatosis n = 14 (12.17%)	Congenital Ichthyosis Dyschromatosis Symmetrica Hereditaria Palmoplantarkeratoderma Erythrokeratoderma Xeroderma Pigmentosa	6(5.21%) 4(3.47%) 2(1.73%) 1(0.86%) 1(0.86%)
Tumors, cysts & nevi n=10 (8.69%)	Lymphangiomacircumscriptum Capillary hemangioma Syringocystadenomapapilliferum Dermatofibroma Rhabdoid melanoma Nevus comedonicus Lentigenous nevi Compound nevus	2(1.73%) 2(1.73%) 1(0.86%) 1(0.86%) 1(0.86%) 1(0.86%) 1(0.86%) 1(0.86%)
Infections n=9(7.82%)	Tuberculosis verrucosa cutis Borderline tuberculoid leprosy Borderline lepromatous leprosy Verruca Plana Verruca plantaris	2(1.73%) 2(1.73%) 2(1.73%) 1(0.86%) 2(1.73%)
Vascular diseases n= 7 (6.08%)	Leucocytoclasticvasculitis Henoch-SchonleinPurpura Sweet's syndrome	3(2.60%) 3(2.60%) 1(0.86%)
Metabolic Disorders n=5 (4.23%)	Xanthomas Mucinosis Phrynoderma	2(1.73%) 2(1.73%) 1(0.86%)
Benign pigmentary lesions & Pigmentary Disorders n = 4 (3.47%)	Freckles BeckersMelanosis Postinflammatoryhyperpigmentation Vitiligo	1(0.86%) 1(0.86%) 1(0.86%) 1(0.86%)
Skin appendageal diseases n=3(2.60%)	Alopecia areata Keratosis Pilaris Trichotillomania	1(0.86%) 1(0.86%) 1(0.86%)

Noninfectious vesiculobullous and vesiculopustular diseases n=3(2.60%)	Dermatitis Herpetiformis Subcornealpustulardermatosis Steven Johnson Syndrome	1(0.86%) 1(0.86%) 1(0.86%)
Connective tissue Diseases n= 3 (2.60%)	Morphea Atrophoderma of pasini	2(1.73%) 1(0.86%)
Photosensitivity n=2(1.73%)	Polymorphous light eruption	2(1.73%)
Eczema n=2(1.73%)	Acute spongiotic dermatitis Eczematous dermatitis	1(0.86%) 1(0.86%)
Noninfectious granulomas n=1(0.86%)	Granuloma annulare	1(0.86%)
Others n=1(0.86%)	Hypertrophic Scar	1(0.86%)
Non Specific dermatitis n=15 (13.04%)	-	-

Table 4: Enumeration of cases offered a new specific diagnosis & cases reported as non-specific dermatitis

Clinical Diagnosis	**Number of cases**	**New Specific diagnosis on histopathology**
Erythema multiforme	1	Sweets syndrome(neutrophilicdermatosis)
Alopecia Areata	1	Possibility of Lichen Planopilaris
Linear Lichen planus	1	Eczematous Dermatitis
Annular Lichen planus	1	Granuloma Annulare
Lichen Nitidus/ Tuberculids	1	Follicular mucinosis
	Total = 5	
Details of cases reported as Non Specific dermatitis		
Clinical diagnosis	**Number of cases**	**Special stains (if any)**
Autoimmune (N= 3) SLE Dermatitis Herpetiformis	 1 2	 DIF for IgA, IgM& C3- Neg
Papulosquamous Diseases (N=6) Psoriais Vulgaris Lichen spinosis Lichen planus Psoriasis PapularPityriasisrosea	 1 1 1 1 2	
Infections(N=4) Scabies Molluscumcontagiosum Atypical mycobacteria /Deep fungal/Mycobacterial TB Pityrosporum folliculitis/fungal folliculitis	 1 1 1 1	 AFB, Fitefaraco& PAS negative
Miscellaneous (N=2) Dermatitis artefacta Chondrodermatitisnodularis helices	 1 1	
	Total = 15	

Graph I: Consistency between clinical diagnosis and histopathological diagnosis

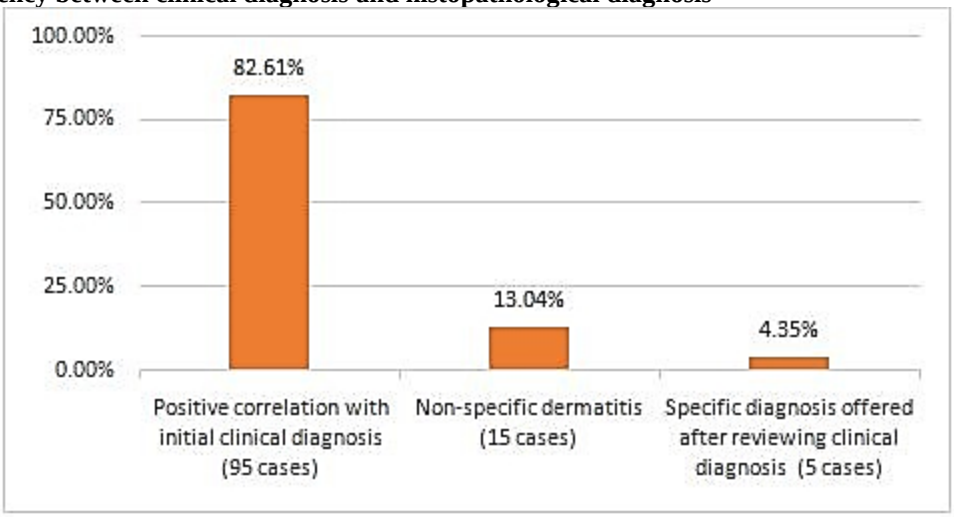

Table 5: Comparison of our study with other studies

	Present study	Solanki and Chauhan[11]	D Costa GF et al[12]
Papulosquamous diseases	31.30%	15.29%	20.56%
Genodermatosis	12.17%	1.18%	3.73%
Tumors (including cysts and nevi)	8.69%	18.82%	5.6%
Infectious diseases	7.82%	23.52%	24.29%
Benign pigmentary lesions & Pigmentary disorders	3.47%	2.35%	6.54%
Noninfectious vesiculobullous and vesiculopustular diseases	2.60%	4.7%	3.73%
Eczematous diseases	1.73%	2.35%	6.54%
Non specific dermatitis	13.04%	5.88%	17.75%

Microphotographs

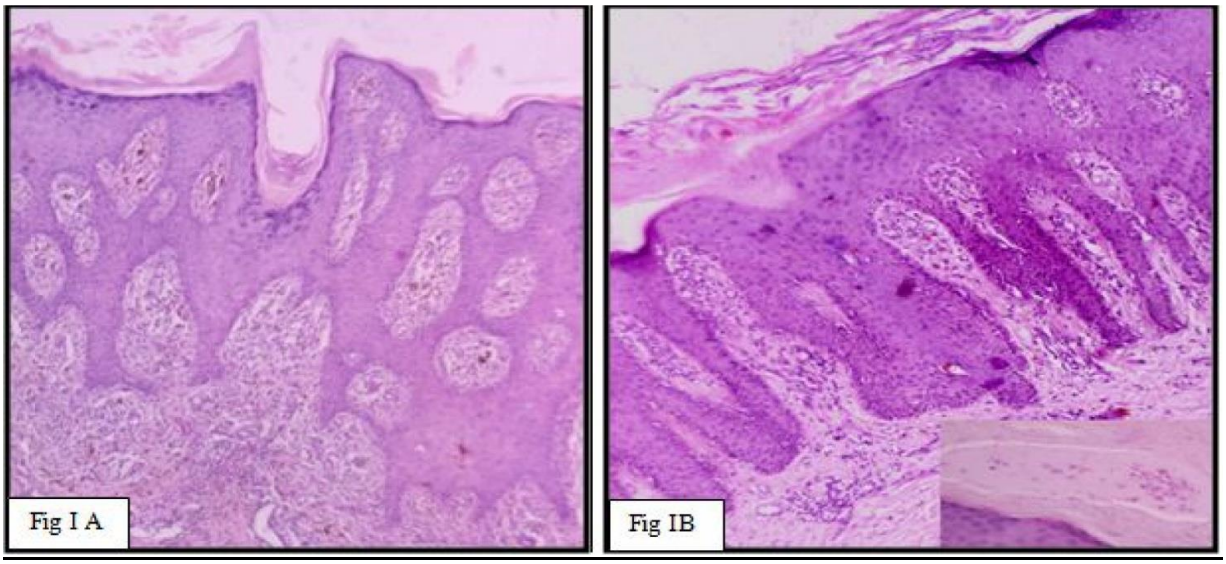

Fig. 1A: Hypertrophic Lichen Planus: Shows hyperkeratosis, parakeratosis, wedge shaped hypergranulosis and irregular acanthosis. Also seen is interface dermatitis and pigment incontinence. Superficial dermis shows band like lymphocytic infiltrate. (H & E, 10x); 1B: Psoriasis Vulgaris: Shows parakeratosis, acanthosis, hypogranulosis, downward elongation of reteridges with supra papillary thinning. Dermis shows perivascular lymphocytic infiltrate. (H & E, 10x) Inset shows: a foci of micromunro abcess in the stratum corneum. (40x)

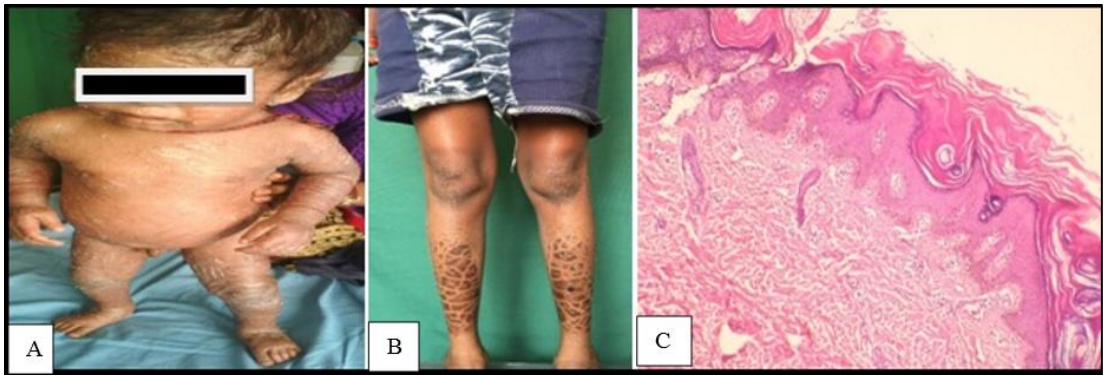

Fig. 2: Congenital Ichthyosis; A: Thick pigmented adherent scales present all over the body; B: Lamellar Ichthyosis: Thick, dark, brownish, adherent scales present over both legs; C: Lamellar Ichthyosis: Epidermis shows hyperkeratosis. Upper dermis shows a mild perivascular lymphocytic infiltrate (H&E, 10x)

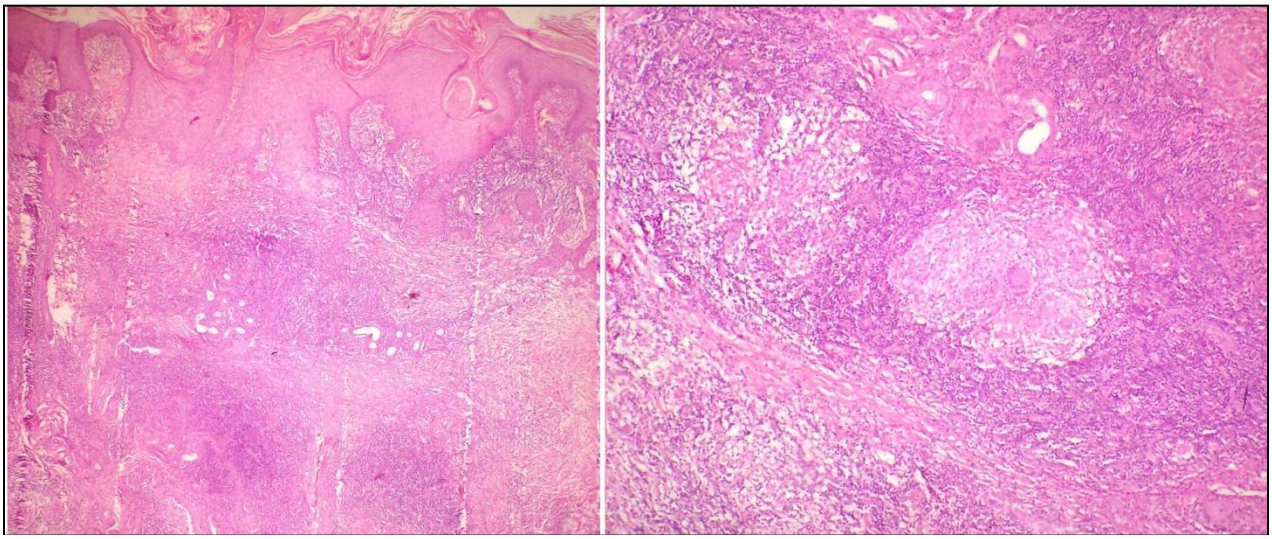

Fig. 3: Tuberculosis Verrucosa cutis, A: Epidermis shows hyperkeratosis with irregular acanthosis. Mid dermis shows infiltration by chronic inlammatory cells surrounding granulomas; B: Highlights well-formed epithelioid granulomas with langhans giant cells. (H& E, 4x, 10x)

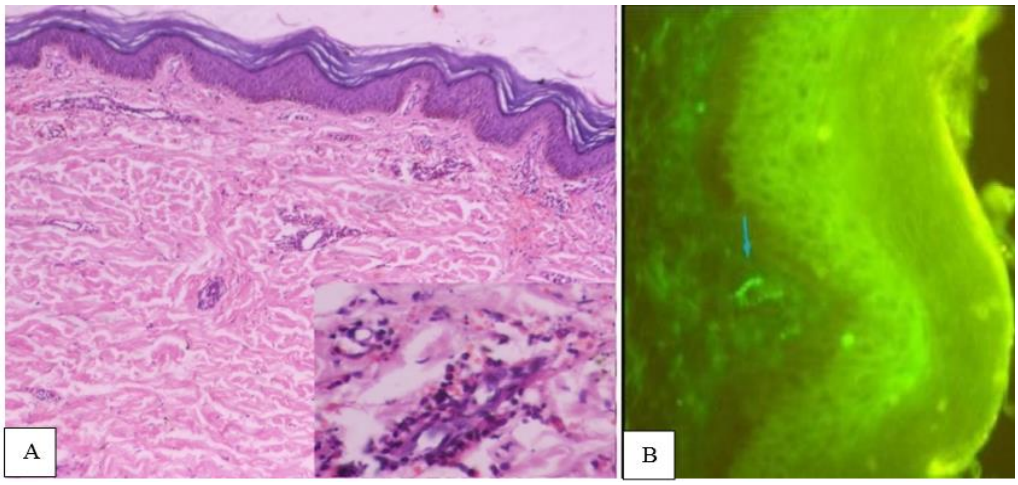

Fig. 4: Henoch Schonlein Purpura: A: Shows skin with upper dermis showing perivascular mixed inflammatory cell infiltrate composed of eosinophils, neutrophils and lymphocytes causing destruction of vessel wall accompanied by extravasation of RBCs. (H &E, 10x). Inset highlights inflammation of the vessel wall. (H&E,40x); B: DIF showing IgA positivity along the wall (with 3+ intensity) in superficial dermal blood vessel wall.

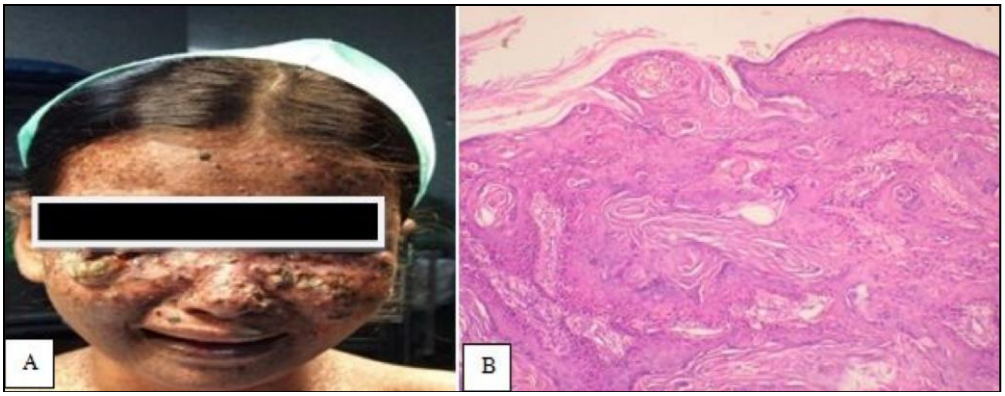

Fig. 5: Xeroderma Pigmentosa, A: Shows multiple ulceroproliferative growths on the face; B: Shows a Well differentiated Squamous cell carcinoma (H&E,10x)

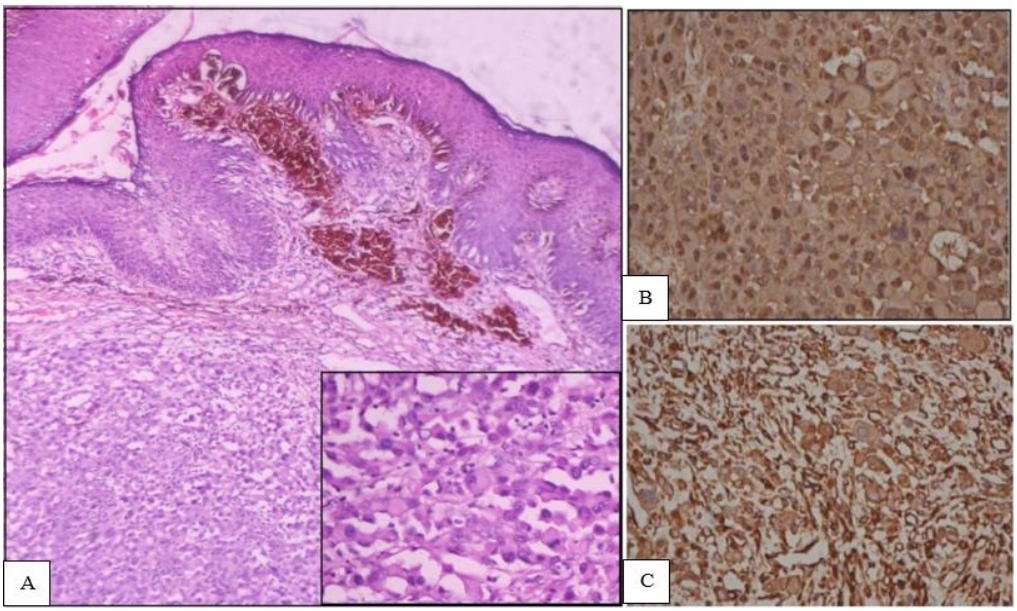

Fig. 6: Rhabdoid Melanoma; A: Shows epidermis displaying increased basal melanocytes with pigmentation dermis showing a tumor composed of sheets & nests of large cells having abundant eosinophilic cytoplasm, pleomorphic eccentric nuclei with prominent nucleoli. (H&E,10x) Inset shows cells with rhabdoid morphology; B & C: Tumor cells positive for S 100 and Vimentin (IHC,20x)

Conclusion

A combination of good clinical expertise and histopathological confirmation helps in the proper management of the patients. The importance of histopathology as a gold standard in the diagnosis and management of skin lesions has been documented by our study. Inspite of all efforts as pathologists, there are some limitations, wherein a few cases have to be categorized as non-specific. Follow up and rebiopsy from a representative site could overcome this limitation. The results of our study are similar to a few studies in literature where biopsies had been performed more often in the school going and adolescent age group and papulosquamous disorders being the most common disorder in this age group to be biopsied. Further studies are necessary to identify both intrinsic and extrinsic factors like study population, environment, genetics and socioeconomic status in the pathogenesis of pediatric skin diseases.

Conflict of Interest: None.

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