International Journal of Research in Dermatology
Ramesh A et al. Int J Res Dermatol. 2019 Nov;5(4):784-791
http://www.ijord.com

DOI: http://dx.doi.org/10.18203/issn.2455-4529.IntJResDermatol20194669

Original Research Article

Overview of axillary dermatoses: case series in a tertiary care institution

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Received: 17 June 2019
Revised: 18 September 2019
Accepted: 19 September 2019

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ABSTRACT

Background: Axillary dermatoses are common skin disorders in the general population. The objective was to find out the age and sex incidence of various skin dermatoses in the axillae in patients attending the outpatient department of dermatology and to find out the various clinical types of axillary dermatoses.
Methods: It was a prospective observational study carried out in a tertiary care hospital, Chennai, Tamil Nadu, India. Patients with skin lesions confined only to the axillae were included in the study thorough history, clinical examination, routine and special investigations like skin biopsy.
Results: Out of 76 patients of our study group, the age ranged from 40 days to 59 years; 55 were males, 21 were females and six children with male to female ratio of 1:1. Most commonly affected age group was 30-40 years (25%). Most common axillary dermatoses in this study was tinea axillaris (21.05 %), followed by pityriasis versicolor (19.73%), erythrasma (9.21%), acanthosis nigricans (6.57%), etc.
Conclusions: This study highlights awareness and the increasing trend of axillary dermatoses with predominance of male predilection. Early detection and treatment of lesions are crucial to decrease the functional and cosmetic disfigurements especially hidradenitis suppurativa. This study highlights the importance of improving awareness among the general population especially the rampant use of cosmetics. Skin biopsy for diagnosis of neurodegenerative disorder, dermatologists plays a crucial role.

Keywords: Axillae, Granular parakeratosis, Lafora disease

INTRODUCTION

Axilla is one of the sites where a distressing dermatosis characterised by severe itching, oozing, which make patients embarrassing situation within self and surrounding. It is the most common dermatoses most prevalent in tropical countries where rise in temperature exist throughout years in addition pollution, overcrowding, poor hygiene etc. In addition, the incidence of axillary dermatoses is rising in the developing countries. Geographical location plays an extremely important role especially in South India in the distribution and frequency of incidence rates. In people with outdoor occupation like drivers, heavy labourers and rampant use of fragrance, axillary sprays among younger and older individuals the frequency of axillary dermatoses are high. In addition, chronic irritation, chronic inflammatory, pre-existing skin lesions other than axillae such as pemphigus, pemphigoid, dermatophytosis, pityriasis versicolor etc., are the various other causal factors.[1-3] Male are most commonly affected than female, axillary dermatoses generally occurs in adults over 30 years of age but it may occur in children and young adults. Special mention about this site is it helps in diagnosing Lafora disease where biopsy from internal organs like brain are inaccessible, skin biopsy from axilla

helps in diagnosis since it is enriched with apocrine glands.[4,5]

METHODS

It was a prospective observational study conducted for a period of one year from July 2017 to June 2018 among patients attending the OPD of Department of Dermatology, Rajiv Gandhi Government General Hospital (RGGGH), Chennai, Tamil Nadu. The number of participants in our study is 76.

Patients with a clinical lesion confined only to axillae are selected for the study, thorough history related to age, sex, occupation and duration of lesion are noted. Specific and relevant history about the lesion, use of fragrance spray, history of medical or surgical intervention are noted. Thorough clinical examination of lesion with reference to site, size, shape, number, colour, surface, border and consistency are noted. Routine investigation like hemogram, random blood sugar, scrapping for fungus in 10% KOH, HIV 1 and 2 antibodies, VDRL and skin biopsy if needed. Using pretested proforma, patients' detail, clinical findings and investigation are recorded. Skin biopsy section stained with H and E and studied in both low and high-power magnification in necessary cases. Data was analysed using SPSS windows software version 17.0.

RESULTS

Sex distribution of axillary dermatoses

Total of 76 patients with axillary dermatoses were included in the study. Out of this, 55 patients were males and 21 patients were female. In axillary dermatoses sex ratio was more common in male than female with a ratio of 2:1.

Age distribution of axillary dermatoses

Age of the patients ranged from 40 days to 59 years. The most commonly affected age group was 31-40 years with 25% patients followed by 41-50 years of age group with 22.3% patients. Hence in our study axillary dermatoses was most common in the age groups of 31-50 years (Table 1).

Table 1: Age distribution of axillary dermatoses.

Age group (in years)	Male	Female	Total	%
0-10	3	3	6	7.8
11-20	4	5	9	11.8
21-30	6	3	9	11.8
31-40	15	4	19	25
41-50	13	4	17	22.3
50-60	14	2	16	21.05

Distribution of axillary dermatoses

Most common axillary dermatoses in this study was tinea axillaris (21.05 %) (Figure 1A), followed by pityriasis versicolor (19.73%) (Figure 1F), erythrasma (9.21%) (Figure 1B), acanthosis nigricans (6.57%) (Figure 4), hidradenitis suppurativa (Figure 2A), bullous pemphigoid (5.26%) (Figure 5) each, SRS with folliculitis (Figure 2A), granular parakeratosis (Figure 3A), scabies (3.94%) (Figure 1C) each. Candidiasis (Figure 1D), psoriasis vulgaris, Dowling-Degos disease (Figure 6), xenodermatosis, becker's nevus (Figure 3B), irritant contact dermatitis each (2.63%), impetigo (Figure 7), Grovers disease, Hailey- Hailey disease, trichomycosis axillaris (Figure 1E), Fox Fordyce disease each (1.31%) (Table 2).

Table 2: Distribution of axillary dermatosis.

Axillary dermatoses	Total	%
Tinea axillaris	16	21.05
Pitryasis versicolor	15	19.73
Erythrasma	7	9.21
Acanthosis nigricans	5	6.57
Hidradenitis suppurativa	4	5.26
Bullous pemphigoid	4	5.26
SRS with folliculitis	3	3.94
Granular parakeratosis	3	3.94
Scabies	2	2.63
Candidiasis	2	2.63
Psoriasis vulgaris	2	2.63
Dowling-Degos disease	2	2.63
Xenodermatosis	2	2.63
Beckers naevus	2	2.63
Irritant contact dermatitis	2	2.63
Impetigo	1	1.31
Grovers disease	1	1.31

Continued.

Axillary dermatoses	Total	%
Hailey-Hailey disease	1	1.31
Trichomycosis axillaris	1	1.31
Fox Fordyce disease	1	1.31

Table 3: Overview of axillary dermatosis.

Disorder of keratinization	Granular parakeratosis
Metabolic	Acanthosis nigricans
Blistering disorder	Pemphigus vegetans, pemphigoid
Tumours	Seborrheic keratosis, Paget's disease
Inflammatory	Hidradenitis suppurativa
Inherited acantholytic disorder	Darrier's disease, Hailley-Hailey disease
Infection	Candidiasis, pityriasis versicolor, erythrasma, dermatophytes, *Molluscum contagiosum*, white (piedra) furunculosis, Trichomycosis axillaris, pyoderma, steptococcal intertrigo blastomycosis like pyoderma, verucca vulgaris balloon like erythema of parvovirus, asymmetric peri flexural exanthemam of childhood.
Infestation	Scabies, pediculosis pubis
Secretion of apocrine, eccrine	Bromhidrosis (odour), secretion of coloured sweat gland-chromhidrosis
Neurology	Lafora disease

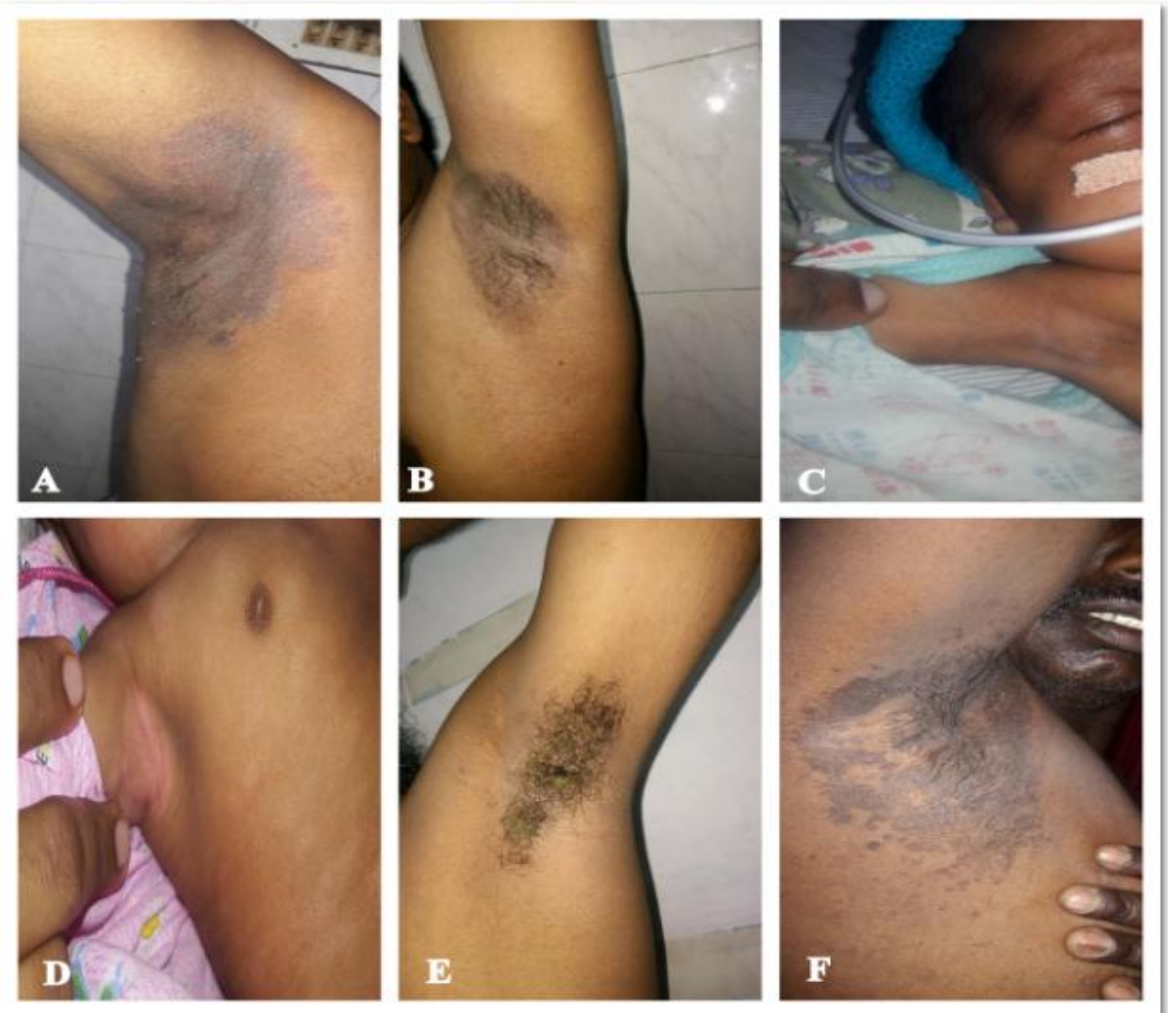

Figure 1: Infections and infestations (A) tinea axillaris; (B) erythrasma (C) scabies; (D) candidiasis; (E) trichomycosis axillaris; (F) pityriasis versicolor.

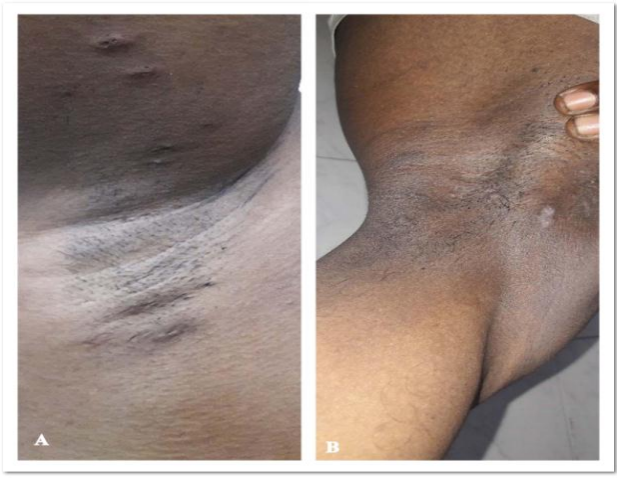

Figure 2: (A) Hidradenitis suppurativa; (B) SRS with folliculitis.

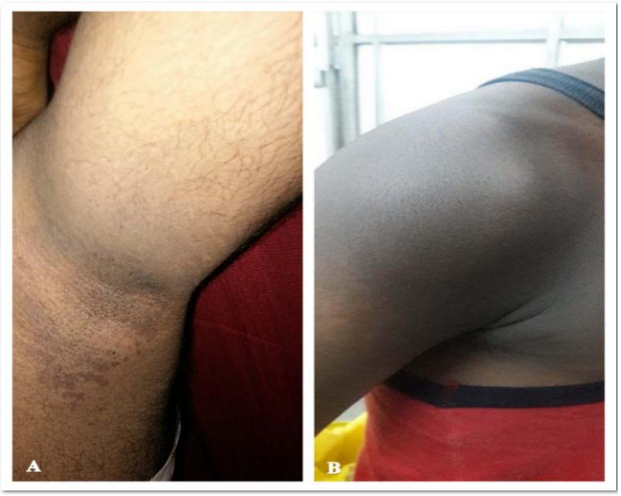

Figure 3: (A) Granuloma parakeratosis; (B) Becker's nevus.

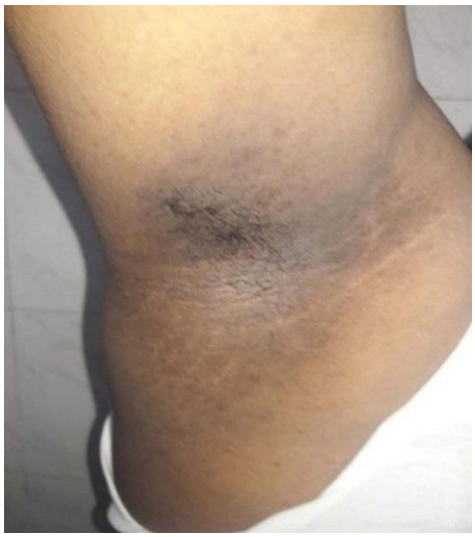

Figure 4: Acanthosis nigricans.

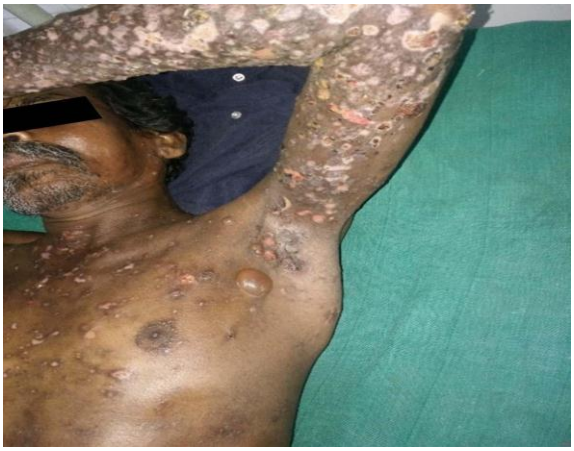

Figure 5: Bullous pemphigoid.

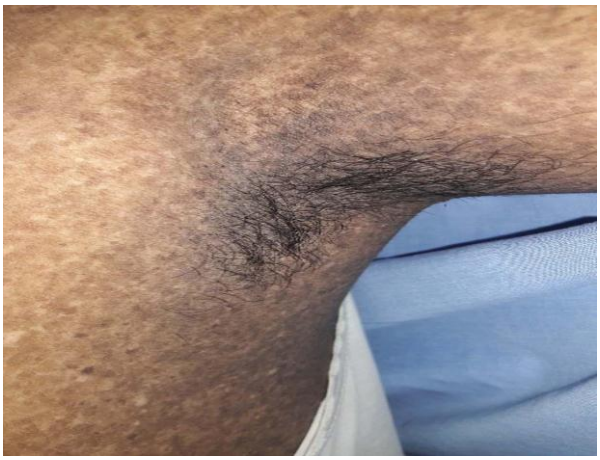

Figure 6: Dowling-Degos disease.

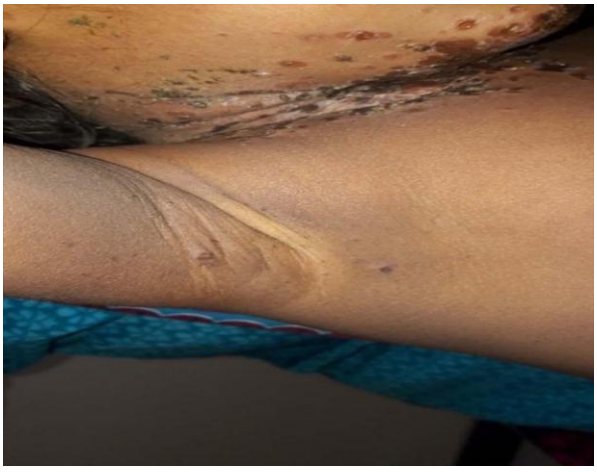

Figure 7: Impetigo.

DISCUSSION

Axilla (armpit) contains high concentration of hair follicles and two sets of sweat glands eccrine and apocrine glands. Eccrine sweat glands are numerous all over the skin, most abundant on palms, soles and forehead, secrete an odourless, clear fluid. It helps the

body to control its temperature by promoting heat loss through evaporation.

Apocrine sweat glands are restricted to a few well-defined areas such as armpits, genital regions, inguinal regions, and mammary areola and chest hair regions, produce a thick, odourless fluid, however when decomposed by bacteria on skin, produces a characteristic potent "body odour". Individual gland is larger than elsewhere, high moisture level, elevated temperature and pH, very high level of bacterial colonization.

Characteristic presentation of skin disorders in axilla- the psoriatic plaque in axillae is red, sharply defined and moist but not thick and scaly. In axilla pemphigus bullae may lead to verrucous, vegetating, malodorous nodules. Differences in axillary skin phenotype and prolonged occlusion may predispose the axillary area to allergic contact dermatitis.

Axillary and inguinal regions, areas behind the external ear, and inframammary areas have thinner epithelia, high moisture level and elevated temperature. Bacterial adhesion is high in axillary region due to skin environment and the hydrophobic nature of bacterial walls promotes sticking of the bacteria to wet environment. Skin tendency to stay moist and wet promotes overgrowth and bacterial infections. Outer surface proteins called adhesins promote adhesion e.g., lipoteichoic acid, which is found in both staphylococci and streptococci. Higher pH in the intertriginous areas, such as the axillae and groin, commensal bacteria overgrowth and colonisation of pathogenic bacteria causes serious infections.

Infection

Furuncles

Most common in adolescence and during early adulthood, especially in men. The infecting strain of *Staphylococcus* isolated from the furuncle is usually also present in the nares or the perineum.[6] Total number of patients were 3 (3.94%) with predisposing factor was sweat retention. Cases usually confused with hidradenitis suppurative, which usually deep seated, rarely ruptures. Pus pointing guides us towards diagnosis of furunculosis. General measures include improvement of hygiene and topical and systemic antibiotics were advised. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Intertrigo

Colonised mostly by many organisms, including bacteria and fungi, cause crusting and fissuring. We come across intertrigo, with sweat retention and furunculosis. Patients were advised general hygiene measures, systemic antibiotic according to pus culture and sensitivity and topical smoothening lotion. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Erythrasma

Chronic, superficial infection of axillary region, inguinal area and toe clefts caused by *Corynebacterium minutissimum*. It presents as asymptomatic, irregular red patches with sharp borders. Total number of patients were 7 (9.21%) in our study. Cases usually confused with chromic pityriasis versicolor but easily diagnosed by demonstrating aseptate hyphae in 10% KOH, coral red fluorescence in Wood's lamp examination speaks in favour of erythrasma.[2] The patients were treated with 2% clotrimazole and systemic erythromycin for a week. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Trichomycosis axillaris

Superficial infection characterised by the formation of yellow, black, or red granular nodules on the hair shaft caused by *Corynebacterium tenuis*.[7] We come across one patient and advised shaving hair and general measures. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Fungal infections of axilla

Dermatophytosis

Dermatophytes restricted to hair, nails and superficial skin, but do not infect mucosal surfaces. Reveal characteristic pattern of inflammation, termed an "active" border.[8] Inflammatory responses usually characterised by degree of redness, scaling at the edge of the lesion, blister formation, presence of central clearing. Total number of patients were 16 (21.05%). In the era of rampant steroid usage, poor hygiene measures, positive family history, multiple site involvement make the physician more responsible in the management. Patients were treated with topical antifungal lotion like clotrimazole or luliconazole for a period of two months. Systemic antifungal for a period of four weeks with general measures. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Pityriasis versicolor

Pityriasis versicolor (PV) is caused by Malassezia yeasts *M. globosa*, *M. sympodialis*, or *M. furfur*, present as hypo or hyperpigmented maculae or patches.[9] Predisposing factors are heat, humidity, sun-tanning products containing oil, and treatment with corticosteroids. In our case series total number of

patients was 15 (19.73%). Advised topical ketoconazole and oral fluconazole as stat along with general measures. Recalcitrant cases treated itraconazole 200 mg for 5 days. Ketoconazole shampooing for two weeks in cases of extensive PV. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Candidal intertrigo

Common in women than men.[10] Risk factors include hot and humid air, tight or abrasive underwear, poor hygiene, and obesity. We had a case of baby with candidiasis. Total number of patients was 2 (2.63%). Treated with topical 2% clotrimazole cream. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Viral infections of axilla

Types of axillary viral infections are verruca vulgaris, baboon-like erythema of the parvoviruses, or baboon syndrome, Asymmetric peri flexural exanthem of childhood (APEC). Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Scabies

Ectoparasitic infection caused in humans by the *Sarcoptes scabiei* var. *homini*. Axilla is the one of the main sites forming circle of Hebra. Other area such as wrist, elbow, groins. Total number of patients was 2 (2.63%). General measures regarding personal hygiene and all family members were treated at the same time with topical scabicide and oral ivermectin 200 µg/kg. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Bullous pemphigoid

Autoantibody against BP180 and BP230, predominantly affect elderly, slight female preponderance, characterized by the cutaneous manifestations of extremely polymorphic lesions followed by tense bullae in the limbs, abdomen, intertriginous area vegetative plaque may occur.[11] Total number of patients were 4 (5.26%). Patients were treated with saline compresses, low dose corticosteroid 30-40 mg per day with topical steroid. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Acanthosis nigricans

Dermatosis that manifests as asymptomatic and symmetrical darkening affecting the skin of intertriginous areas, in particular the axillae, groins, sub mammary folds and neck, commonly associated with obesity.[12] Total number of patients were 5 (6.57%). General measures to tackle metabolic syndrome was advised. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Dowling-Degos disease

An autosomal dominant form of reticulate pigmentary genodermatosis with variable penetrance, usually has a flexural distribution.[13] Onset is usually post pubertal and the reticulate hyperpigmentation is progressive and disfiguring. Total number of patients was 2 (2.63%). Proper genetic advice was given to the patients. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Hailey-Hailey

Hailey-Hailey disease is an autosomal dominant genodermatosis characterized by erosions and blistering, most prominently in the flexures and sites of friction or trauma.[14] Total number of patients were 1 (1.31%). Patient treated with topical antifungal, steroid combination with systemic antibiotics. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Grover's disease

It is a relatively common transient or persistent monomorphous, papulovesicular eruption mainly affecting the trunk which may be pruritic or asymptomatic.

Total number of patients was 1 (1.31%). In Indian scenario patients presented with papulovesicular lesions with fringe of scale over the trunk and extremities mainly during summer season and disease free in winter.[15] We labelled these cases as tropical eczema. General measures and systemic erythromycin for a week will control the condition. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Fox-Fordyce disease (apocrine miliaria)

It is a disorder of the apocrine glands comparable to prickly heat of the eccrine glands, and caused by obliteration of the apocrine duct at the infundibulum. It usually presents with an itchy papular eruption in the axillae, ano-genital area or on the areolae of the nipple. Total number of patients was one (1.31%). Topical soothening agents advised. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Flexural psoriasis (inverse psoriasis)

Psoriasis involving the inguinal creases, axillae, sub mammary folds, gluteal cleft, umbilicus and other body folds is more common in older adults and is associated with obesity flexural plaques are thin, scaling is greatly reduced or absent. Total number of patients was 2 (2.63%). Topical corticosteroid and calcipotriol combination are advised. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Hidradenitis suppurativa

It is a chronic, inflammatory, recurrent, debilitating, follicular disease that usually presents after puberty. There are painful, deep-seated inflamed lesions in the apocrine gland-bearing areas of the body, most commonly the axillary, inguinal and ano-genital regions. Total number of patients were 4 (5.26%). It is a common distressing condition especially in young females, adamant to all forms of topical and systemic therapy like clindamycin, minocycline, metronidazole, isotretinoin etc.. Nowadays TNF, an inhibitor especially adalimumab play a rescue agent. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Becker nevus

Becker nevus is a relatively common hyperpigmented, generally non-linear lesion and is commoner in males than females. It is only rarely congenital, with the majority of lesions appearing in the first two decades, classically at puberty. It is frequently but not always hypertrichotic, and is commonest on the upper trunk. Total number of patients was 2 (2.63%). Q-switched ND-Yag laser is used. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Granular parakeratosis

Disorder of keratinization, typically a pruritic disorder, occurs mainly in axilla and other intertriginous areas.[16] Affected were middle or older age and occurs most commonly in adult woman. Unusual form, the infantile form (due to diaper wearing). It is an acquired keratotic dermatosis due to use of personal hygiene product (deodorants and antiperspirants roll or in stick, mineral salts containing crystals such as natural deodorants and soap used in excess in a susceptible individual). Histopathology shows marked, compact parakeratosis with small bluish granules within the stratum corneum representing keratohyalin granules. In our study the total number of patients was 3 (3.94%). Avoidance of deodorants, topical soothening agents and systemic isotretinoin in recalcitrant cases. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

Lafora disease

Also called Lafora progressive myoclonic epilepsy is a fatal autosomal recessive genetic disorder characterized by the presence of inclusion bodies (Lafora bodies) within the cytoplasm of the cells in the heart, liver, muscle, and skin.[17] Lafora disease is a neurodegenerative disease that causes impairment in the development of cerebral cortical neurons and it is a glycogen metabolism disorder. Most patients with this disease do not live past the age of twenty-five, and death within ten years of symptoms is usually inevitable. There is no cure for this disease but there are ways to deal with symptoms through treatments and medications.

Skin biopsy specimen to confirm the diagnosis of Lafora's disease obtained from calf, forearm, back, axilla. Axillary biopsies are preferable because of higher number of sweat glands whose PAS inclusion bodies can be more easily detected. Lafora bodies not detected in normal, and in other pathological states and in other forms of myoclonus epilepsy. We received cases from our neuro-medicine department for all cases of tonic myoclonic seizure disorder for axillary skin biopsy. Doubtful case PAS was done. We couldn't demonstrate Lafora inclusion bodies in our cases. Since non availability of previous studies we could not compare parameters of the present study in relation to axillary dermatoses.

CONCLUSION

Since we don't have comparative study after thorough search in Pubmed, Medscape, Cochrane review. This is the first case series from tertiary care teaching institution. Our study highlights the importance of improving public awareness about hygiene, avoidance of rampant use of deodorants, in addition, we, the dermatologist, are the receiving end for diagnosis of rare neurodegenerative disorder, Lafora disease.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Ramesh A, Sampath V, Kasiviswanathan P, Babu RD. Overview of axillary dermatoses: case series in a tertiary care institution. Int J Res Dermatol 2019;5:784-91.