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Approach Towards Patients Presenting with "Red Face": A Retrospective Study

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ABSTRACT

Background: Facial erythema (red face) is a common clinical finding, evident even to the untrained eye; however, a red face does not represent a single cutaneous disease. Red face can be caused by many different underlying conditions of varying severity, including infectious causes such as lupus vulgaris, dermatomyositis, lupus erythematosus, lupus pernio, allergic contact dermatitis, drug-induced erythema, and acne vulgaris.

Materials and Methods: However, this is not a classification method used in western dermatology. The files of the patients who applied to the Department of Dermatology between February 15 and May 15, 2022, were retrospectively analyzed. In this study, it was aimed to determine the distribution of diseases with red face in patients who applied to our center, to evaluate which skin findings are observed in these diseases and the treatments used in these patients.

Results: Two hundred sixty-two patients were included in the study. According to our results the mean age of the patients was 30.01±11,943 (2-89). In the study the distribution of the patients by sex included 94 men and 168 women. The mean age of the men in the study was 27.38±12,632 (2-89), and the mean age of the women was 31.48±11,313 (17-70). The distribution of the patients by Fitzpatrick skin type was assessed. Accordingly, Type 3 (n=92, 35.1%) skin type was the most common and type 1 (n=24, 9.2%) skin type was the least frequent. As a result, acne (n=73, 27.9%) and rosacea (n=100, 38.2%) were the most common in patients presenting with a red face.

Conclusion: "Red face" is a very common finding in dermatology clinics. Red face often due to changes in skin blood flow and sometimes accompanying inflammation a situation that arises. Wide differential diagnosis in patients presenting with a "red face" has a range.

Keywords: Red face, Facial erythema, Acne, Rosacea, Lupus erythematosus

Introduction

The term red face is used for lesions predominantly on the face that result due to the changes in cutaneous blood flow triggered by many different conditions. Facial erythema may also be a sign of other diseases. There are various diseases in the differential diagnosis of patients presenting with a red face. Diagnosis is based on lesions characteristics, features of the erythema, functional findings, and associated systemic manifestations. In most cases, the cause of a red face is a benign disease such as rosacea, contact dermatitis, photodermatosis, and climacterium, and a detailed history and physical examination are sufficient to make the diagnosis. Facial erythema may also present as a manifestation of drug allergies, heart disease, carcinoid syndrome, pheochromocytoma, mastocytosis, and anaphylaxis. Further laboratory testing, radiological or histopathological examination, may detect some rare causes such as medullary carcinoma of the thyroid, pancreatic islet cell tumor, and renal carcinoma. In this study, the differential diagnosis and approach to various conditions that cause "red face"

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are discussed. Dermatological diseases are classified according to a standard etiological approach (e.g. papulosquamous diseases, bullous dermatoses, pigmentation disorders, connective tissue diseases, etc.) [1,2,3].

Materials and Method

The files of the patients who applied to the Department of Dermatology between February 15 and May 15, 2022, were retrospectively analysed. Patients were given written consent forms before the study. In this study, it was aimed to determine the distribution of diseases with red face in patients who applied to our center, to evaluate which skin findings are observed in these diseases and the treatments used in these patients.

Patient age, gender, and Fitzpatrick skin score were evaluated from demographic data. Diseases to be included in the red face category were determined as acne, rosacea, connective tissue diseases, sarcoidosis, pseudolymphoma, pigmentation disorders, dysplastic lesions, inflammatory dermatoses, infections, cutaneous lymphomas, bullous diseases and vascular malformations. Undiagnosed red face patients were excluded from the study. The diseases were subgrouped and evaluated. Cutaneous findings of patients with red face were evaluated. The cutaneous findings include erythema, lichenification, papules, pustules, atrophy, macules, scales, nodules, patches, erosions, vesicles, hyperpigmentation, hypopigmentation and telangiectasia.

The approval of Istanbul Univeristy-Cerrahpasa, Cerrahpasa Faculty of Medicine Ethics Committee was taken before initiating the study (number: E-83045809-604.01.01-371606, date: 26.04.2022).

Statistical Analysis

For statistical analysis SPSS 25.0 windows program was used. Numbers and percentages for categorical variables in descriptive statistics; in numeric variables mean and standard deviation in normally distributed data, and in non-normally distributed data median, largest (maximum) and smallest values (minimum) were used. The limitations to our study were the number of patients taken into our study and due to the number referred patients to our clinic we had more rheumatology patients then usual.

Results

Two hundred sixty-two patients were included in the study (Figure 1). According to our results the mean age of the patients was 30.01±11,943 (2-89). In the study the distribution of the patients by sex included 94 men and 168 women. The mean age of the men in the study was 27.38±12,632 (2-89), and the mean age of the women was 31.48±11.313 (17-70) (Table 1). The distribution of the patients by Fitzpatrick skin type is shown in Table 2. Accordingly, Type 3 (n=92, 35.1%) skin type was the most common and Type 1 (n=24, 9.2%) skin type was the least frequent.

The distribution of diseases accompanying a red face is given in Table 3. As a result, acne (n=73, 27.9%) and rosacea (n=100, 38.2%) were the most common in patients presenting with a red face, meanwhile sarcoidosis (n=2,0.8%) and dysplastic lesions (n=2, 0.8%) were the least detected. There was no cases of pseudolymphoma and vascular malformation.

In our study 73 patients with acne were identified. Forty-four patients had acne vulgaris and 12 had nodulocystic acne (Figure 2). One hundred patients were identified with rosacea. Accordingly, 68 of these patients had erythematotelangiectatic type, 30 had papulopustular type, and 2 had phimatous type (Figure 3). Thirty-four patients with connective tissue disease were identified 12 patients had acute cutaneous lupus, 10 had systemic sclerosis, 8 had discoid lupus erythematosus (DLE) and lupus tumidus were detected in 4 of them (Figure 4).

Erythema was observed in all 73 (100%) acne patients, accompanied by erythema in 70 (95.9%), papules, pustules in 60 (82.2%) patients and nodules in 28 (38.4%). In rosacea, erythema was observed in all 100 patients (100%), papules in 44 (95.9%), pustules in 28 (82.2%) and nodules in 90 (91.8%) patients (Table 4). In connective tissue diseases, erythema was observed in all 35 patients (100%), 17 (51.5%) had telangiectasia, in 16 (46%) patients atrophy was observed, in 10 (29%) patients hyperpigmentation, in 8 (23%) patients hypopigmentation and papules were observed in 1 (2.9%)

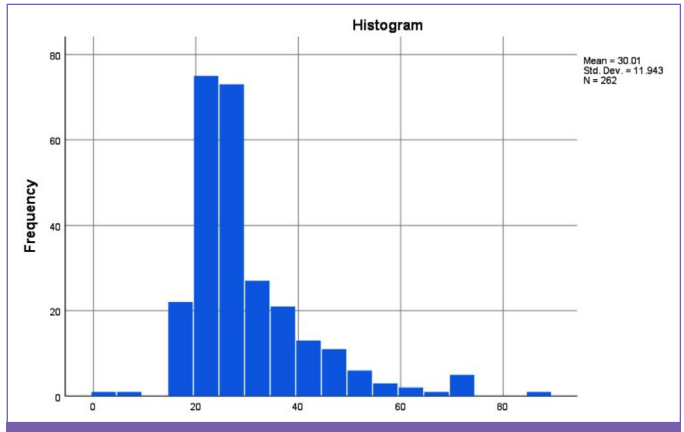

Figure 1. Distribution of frequency and age

Table 1. Mean ages of male and female patients

	Number (n)	Minimum	Maximum	Average	Standard deviation
Male	94	2	89	27.38	12,632
Female	168	17	70	31.48	11,313

patient (Table 5). In papulosquamous dermatoses, erythema was observed in all 28 patients (100%), scales were observed in 24 (85.7%) patients, lichenification and hyperpigmentation in 4 patients (14.3%), hypertrophy in 2 patients, macules and patches (7.1%) were not found. The distribution of skin findings in sarcoidosis is shown in Table 6. According to the results, erythema, nodules, patches and telangiectasia were observed in all 2 patients (100%). Skin findings observed in pigmentation disorders is shown in Table 7. All 8 patients (100%) had hyperpigmentation, 6 patients had hyperpigmentation patches and a maculae were observed in 2 patients. The distribution of skin findings observed in dysplastic lesions is shown in Table 8. Accordingly, hyperpigmentation, lichenification and telangiectasia were observed in all 2 patients (100%). The distribution of skin findings observed in inflammatory dermatoses is shown in Table 9.

Table 2. Distribution of the patients by Fitzpatrick skin type

	Frequency (n)	Percentage (%)
Type 1	24	9.2
Type 2	66	25.2
Type 3	92	35.1
Type 4	80	30.6
Total	262	100

Table 3. Distribution of diseases accompanying a red face

	Frequency (n)	Percentage (%)
Acne	73	27.9
Rosacea	100	38.2
Connective tissue diseases	35	13.4
Sarcoidosis	2	0.8
Pigmantation disorders	8	3.1
Dysplastic lesions	2	0.8
Inflammatory dermatosis	28	10.7
Infections	6	2.3
Cutaneous lymphomas	4	
Bullous diseases	6	

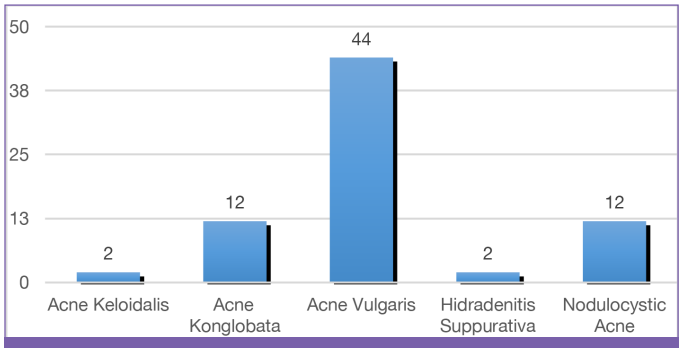

Figure 2. Distribution of acne subtypes

Erythema was observed in all 28 (100%) patients, and scales in 24 (85.7%) patients, lichenification and hyperpigmentation in 4 patients (14.3%), hypertrophy was observed in 2 patients (7.1%), macules and patches were not found. The distribution of skin findings observed in infectious diseases is given in Table 10. The distribution of skin findings observed in cutaneous lymphomas is shown in Table 11. Accordingly, in all 4 patients (100%), erythema, scales, nodule, patch and erosions were detected, hyperpigmentation was found in 2 (50%) patients. Accordingly, erythema in all 6 patients (100%), papules in 4 (67%), lichenification, pustules, macules, scaling and vesicles were detected in 2 of them (33%). The distribution of skin findings observed in bullous diseases is shown in Table 12. Accordingly, erythema and erosion were detected in all 6 patients (100%) and scaling in 4 patients (67%).

Discussion

Red face is a very common finding in dermatology clinics. Red face often occurs due to changes in cutaneous blood flow and sometimes accompanies inflammation [4]. Wide range of differential diagnosis is observed in patients presenting with a red face. The diagnosis of red face is often established with the history of the disease, the morphology of the erythema, clinical findings and accompanying systemic symptoms together. established by the evaluation. Sometimes to confirm the diagnosis in these patients

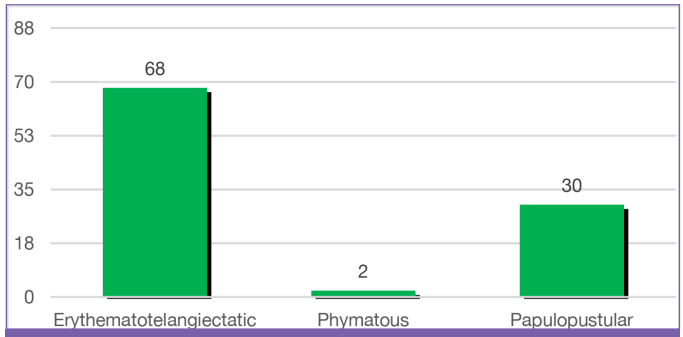

Figure 3. Distribution of rosacea subtypes

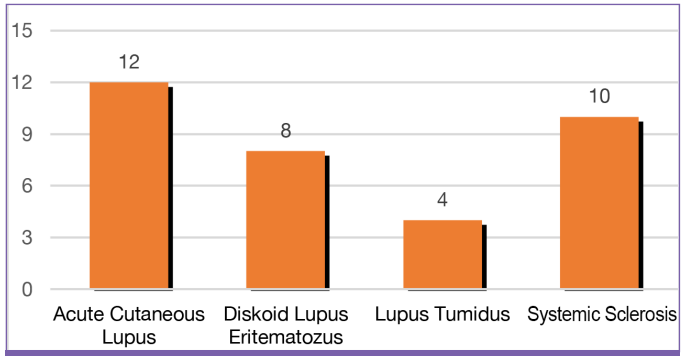

Figure 4. Distribution of subtypes of connective tissue diseases

laboratory tests or histopathological examination may be required. "Red face" or facial erythema may be a manifestation of non-dermatological systemic diseases such as neuroendocrine tumors, fever, hyperthermia, menopause, alcohol, drugs (eg. vancomycin) hyperthyroidism, hypersensitivity reactions, pheochromocytoma or superior vena cava syndrome. Red face is what we call dermatoses involving the facial area. The aim of our study is to divide the diseases that cause facial erythema into groups and accompany them categorise them according to their clinical findings. Among these diseases, especially acne, papulosquamous diseases such as rosacea, atopic dermatitis (AD) and seborrheic dermatitis, sarcoidosis granulomatous diseases such as tuberculosis, infectious

Table 4. Distribution of clinical findings in acne patients

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	73	0	73	100
Lichenification	73	0	0	0
Papule	73	0	70	95.9
Pustule	73	0	60	82.2
Atrophy	73	0	2	2.7
Hypertrophy	73	0	4	5.5
Macule	73	0	0	0
Scale	73	0	0	0
Nodule	73	0	28	38.4
Patch	73	0	0	0
Erosion	73	0	0	0
Vesicule	73	0	0	0
Hyperpigmentation	73	0	0	0
Hypopigmentation	73	0	0	0
Telangiectasia	66	7	0	0

Table 5. Distribution of clinical findings in connective tissue diseases

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	35	0	35	100
Lichenification	35	0	0	0
Papule	35	0	1	2.9
Pustule	35	0	0	0
Atrophy	35	0	12	34.3
Hyperpigmentation	35	0	0	0
Macule	35	0	0	0
Scale	35	0	0	0
Nodule	35	0	0	0
Patches	35	0	16	46
Erosion	35	0	0	0
Vesicule	35	0	0	0
Hyperpigmentation	35	0	10	29
Hypopigmentation	35	0	8	23
Telengiectasia	33	2	17	51.5

Table 6. Distribution of clinical findings in sarcoidosis

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	2	0	2	100
Lichenification	2	0	0	0
Papule	2	0	0	0
Pustule	2	0	0	0
Atrophy	2	0	0	0
Hypertrophy	2	0	0	0
Macule	2	0	0	0
Scale	2	0	0	0
Nodule	2	0	2	100
Patch	2	0	2	100
Erosion	2	0	0	0
Vesicule	2	0	0	0
Hyperpigmentation	2	0	0	0
Hypoppigmentation	2	0	0	0
Telangiectasia	2	0	2	100

Table 7. Distribution of clinical findings in pigmentation disorders

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	8	0	0	0
Lichenification	8	0	0	0
Papule	8	0	0	0
Pustule	8	0	0	0
Atrophy	8	0	0	0
Hypertrophy	8	0	0	0
Macule	8	0	2	25
Scale	8	0	0	0
Nodule	8	0	0	0
Patch	8	0	6	75
Erosion	8	0	0	0
Vesicule	8	0	0	0
Hyperpigmentation	8	0	8	100
Hypopigmentation	8	0	0	0
Telangiectasia	8	0	0	0

causes, pigmentation disorders, connective tissue diseases, photodermatoses, lymphocytic infiltrates and neoplastic diseases such as actinic keratosis, basal cell carcinoma (BCC), squamous cell carcinoma were divided into groups.

In our retrospective study, 64.1% of the patients presenting with a red face had an age range of between 20-40. In the literature female patients had a higher rate of applying to health care services compared to male patients [5]. Our study is also included in the literature supports the findings.

The most common skin type in the patients was Fitzpatrick 2-4. In a study in 2015 conducted in Turkey, Fitzpatrick 4 skin type was found to be the most common followed by Fitzpatrick 3 skin type [6]. Fitzpatrick 3-5 skin type increases susceptibility towards solar lentigos, melasma or postinflammatory hyperpigmentation. Meanwhile patients with Fitzpatrick 1-2 are more prone to rosacea.

Rosacea is a common chronic inflammatory skin condition affecting the face area, and it was the main common disease cause of red face detected in our study. There are four subtypes: these include erythematotelangiectatic, papulopustular, phymatous and ocular types. The severity, disease course, and percentage of rosacea in affected areas differ. Erythematotelangiectatic is the most common subtype rosacea was observed, followed by papulopustular rosacea. One hundred rosacea patients participated to our study; 68 of them had erythematotelangiectatic (ETTR) type, 30 papulopustular type and 2 phymatous type were detected. We observed that the most common subtype of rosacea is ETTR. In 2016 Tan et al. [7] made a large-scale, multicenter retrospective study and the most common subtype observed was ETTR. Our study was consistent with literature; the most common cause of red face or facial erythema being rosacea and in a patient presenting with "red face" is rosacea is first diagnosis that should come to mind [8]. Among the connective tissue diseases, acute cutaneous disease is the most frequently applied to our clinic followed by systemic sclerosis and the third

Table 8. Distribution of clinical findings in dysplastic lesions

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	2	0	2	100
Lichenification	2	0	2	100
Papule	2	0	0	0
Pustule	2	0	0	0
Atrophy	2	0	0	0
Hypertrophy	2	0	0	0
Macule	2	0	0	0
Scale	2	0	0	0
Nodule	2	0	0	0
Patch	2	0	0	0
Erosion	2	0	0	0
Vesicule	2	0	0	0
Hyperpigmentation	2	0	0	0
Hypopigmentation	2	0	0	0
Telangiectasia	2	0	2	100

Table 9. Distribution of clinical findings in inflammatory dermatoses

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	28	0	28	100
Lichenification	28	0	4	14.3
Papule	28	0	0	0
Pustule	28	0	0	0
Atrophy	28	0	0	0
Hypertrophy	28	0	2	7.1
Macule	28	0	2	7.1
Scale	28	0	24	85.7
Nodule	28	0	0	0
Patches	28	0	2	7.1
Erosions	28	0	0	0
Vesicules	28	0	0	0
Hyperpigmentation	28	0	4	14.3
Hypopigmentation	28	0	0	0
Telangiectasia	28	0	0	0

Table 10. Distribution of clinical findings in infectious diseases

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	6	0	6	100
Lichenificaton	6	0	2	33
Papule	6	0	4	67
Pustule	6	0	2	33
Atrophy	6	0	0	0
Hypertrophy	6	0	0	0
Macule	6	0	2	33
Scale	6	0	2	33
Nodule	6	0	0	0
Patch	6	0	0	0
Erosion	6	0	0	0
Vesicule	6	0	2	33
Hyperpigmentation	6	0	0	0
Hypopigmentation	6	0	0	0
Telangiectasia	6	0	0	0

most common cause was DLE. Due to our clinic working closely with rheumatology connective tissue patients were referred to us frequently. According to the results, erythema was observed in all 35 patients, telangiectasia in 17 patients, atrophy in 16 patients, and 10 patients had hyperpigmentation, hypopigmentation was seen 8 patients and papule in 1 patient. Most of these patients were affected

Table 11. Distribution of clinical findings in cutaneous lymphomas

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	4	0	4	100
Lichenification	4	0	0	0
Papule	4	0	0	0
Pustule	4	0	0	0
Atrophy	4	0	0	0
Hypeertrophy	4	0	0	0
Macule	4	0	0	0
Scale	4	0	4	100
Nodule	4	0	4	100
Patch	4	0	4	100
Erosion	4	0	4	100
Vesicule	4	0	0	0
Hyperpigmentation	4	0	2	50
Hypopigmentation	4	0	0	0
Telangiectasia	4	0	0	0

Table 12. Distribution of clinical findings in bullous diseases

	N		Number of patients with symptoms (n)	Percentage of patients with symptoms (%)
	Total patients	Lost data		
Erythema	6	0	6	100
Lichenification	6	0	0	0
Papule	6	0	0	0
Pustule	6	0	0	0
Atrophy	6	0	0	0
Hypertrophy	6	0	0	0
Macule	6	0	0	0
Scale	6	0	4	67
Nodule	6	0	0	0
Patches	6	0	0	0
Erosion	6	0	6	100
Vesicule	6	0	0	0
Hyperpigmentation	6	0	0	0
Hypopigmentation	6	0	0	0
Telangiectasia	6	0	0	0

with acute cutaneous lupus due to systemic lupus erythematosus (SLE). Patients with SLE presented with typical malar rash. Malar rash in SLE is characterized with bilateral erythema. It is often repetitive, occurs after sun exposure and passes without scarring. Two different subtypes of acute cutaneous lupus erythematosus (ACLE) have been identified: generalized ACLE and localized ACLE. Unlike localized ACLE, malar rash is accompanied in generalized ACLE.

SLE may present with a generalized morbiliform rash on the trunk and is as termed photosensitive lupus dermatitis or maculopapular rash of lupus [9]. The second cause of connective tissue diseases that frequently causes erythema on the face is systemic sclerosis, the most common clinic presentation on the face erythematous mat telangiectasias and facial fibrosis [10].

Mat telangiectasias, especially in limited systemic sclerosis is accompanied by esophageal dysmotility, dilated nail bed capillaries, sclerodactyly and calcinosis cutis accompanies [11]. In DLE, the lesion is characterised by brown hyperpigmentation around the circumference with hypopigmentation in the middle. Due to scarring DLE may cause extensive cosmetic morbidity. Often cicatricial alopecias are referred to our hair disorders outpatient clinic, therefore ACLE and SS are more commonly observed.

The number of patients presenting with sarcoidosis was low. Two patients admitted to our clinic presented with papulonodular sarcoidosis. All the patients (100%) presented erythema, nodules, patches and telangiectasia was observed. Especially lupus pernio and plaque sarcoidosis are associated with severe systemic disease. Papulonodular sarcoidosis is characterized by purple-brown papules and nodules especially on the face and the extremities.

Most of our patients presenting with pigmentation disorders had melasma. Hyperpigmentation was observed in all patients (100%) and in 6 patients patch and maculae were observed in 2 patients. Our cosmetology and laser unit is the reason melasma patients were frequently applying.

Melasma is a disorder an acquired hyperpigmentation that affecting up to 30% of women who were pregnant. The clinical pattern is symmetrical, with irregular borders, light or dark. It is characterized by brown hyperpigmented patches. Increased hyperpigmentation in summer is one of the hallmarks of this disorder [12].

The disease observed from the dysplastic lesions group was BCC and 2 patients applied during the study period. In all of these patients (100%) hyperpigmentation, lichenification and telangiectasia have been observed. BCC of the skin, most common in the fair-skinned adult population over 50 years of age is cancer. Its incidence is increasing worldwide and ultraviolet exposure is the main carcinogenic factor. In some genodermatoses, there may be a predisposition to the formation of BCC.

In inflammatory dermatoses group seborrheic dermatitis is the

most common disease, followed by AD. Erythema was observed in all of this patient group, scales in 24 patients, lichenification in 4 and hyperpigmentation 2 patients, hypertrophy, macula and patch in 2 patients. Seborrheic dermatitis is a skin disease that can be seen frequently in all age groups.

Characteristic symptoms are facial erythema, scaling, and pruritus. Most commonly on the scalp, face and seen in the presternal region. Clinical diagnosis of seborrheic dermatitis depends on the localization of the lesions and appearance. The most probable known cause is the inflammation of the skin caused by a response to malassezia furfur. AD, also known as atopic eczema is a chronic relapsing inflammatory skin disease. The incidence of AD in developed countries has increased 2 or 3 times and accounts for approximately 15% to 20% of children and 1% of adults worldwide. Pruritus, typical localizations and it's chronic course makes the diagnosis of the disease. Upper lip cheilitis, centrofacial pallor and periocular or periorbital eczematous lesions are common.

In our study tuberculosis was the most common infectious disease which caused "red face". Lupus vulgaris was followed by herpes labialis. In our study erythema was observed in all patients, papules in 4, lichenification in 2 patients, pustules, macules, scales and vesicles were detected. The face is one of the most affected areas in lupus vulgaris and often, patients present with hard, dry plaques on an erythematous background [13].

Mycosis fungoides (MF)/sezary syndrome, was the most common cutaneous lymphoma found in our study. In all of our 4 patients who applied with lymphoma, erythema, scales, nodules, patches, erosions were observed and meanwhile hyperpigmentation was observed in 2 patients. MF is the most common cutaneous T-cell lymphoma. Typically, neoplastic T-cells are localized in the skin and causes patches, plaques, tumors, or erythroderma. The diagnosis of MF is quite may be difficult due to variable clinical and histological findings. Molecular biology facilitates the diagnosis. However, MF could be confused with a wide variety of skin diseases which makes clinical experience very important. Especially at the beginning, it manifests itself with erythematous brown scaly plaques, later the disease progresses to erythematous, scaly plaques or tumoral lesions in the later stages of the disease.

On the other hand, folliculotropic MF and erythrodermic MF often involve the face characterised by diffuse erythema, scaling and alopecia [14].

Pemphigus is the most common bullous disease and 6 patients have presented to our clinic. Erythema and erosion were detected in all of our patients, and scales was detected in 4 patients has been done. Pemphigus is a disease characterised by intraepithelial bullae, acantholysis of the mucosa and skin and it is associated with high mortality and morbidity [15]. Pemphigus vulgaris commonly presents with loose bullae or erosions involving the skin or mucosa may be seen in patients [16].

Study Limitations

However, the subtype of pemphigus foliaceus, which causes erythema and scaling in the face area is also known as pemphigus erythematosus or seborrheic pemphigus. Having a bullous diseases out patient clinic pemphigus patients rarely apply to our primary outpatient clinics.

Conclusion

When we looked at the literature the frequency associated with the diseases causing red face wasn't much studied and there was no algorithm related to its approach. In your study we investigated the frequency, clinical findings, first-choice treatment steps and we looked at the Fitzpatrick skin type found in these patients. There were 94 men and 168 women participating in our study. Diseases that caused "red face" rosacea was the most common, followed by acne and its subgroups, and connective tissue is the third.

A larger retrospective study is needed to optimise our approach to patients presenting with facial erythema or "red face".

Ethics

Ethics Committee Approval: The approval of Istanbul Univeristy-Cerrahpasa, Cerrahpasa Faculty of Medicine Ethics Committee was taken before initiating the study (number: E-83045809-604.01.01-371606, date: 26.04.2022).

Informed Consent: Retrospective study.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: D.D.A., B.E., Design: B.E., Data Collection or Processing: D.D.A., Analysis or Interpretation: D.D.A., Literature Search: D.D.A., Writing: D.D.A.

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