International Journal of Theoretical and Applied Research (IJTAR)
ISSN: 2812-5878

Homepage: https://ijtar.journals.ekb.eg

Brief Communications Arising and Corrections

Prevalence of thrombocytosis in epidermolysis bullosa patients

Rasha Aly El Sayed [1*], Sanaa Mahmoud Abd El- Tawab [2], Mediha K, Alkhma'le [3], Amani A Al- Bakawi [3]

[1] *Zoology and Entomology Department, Faculty of Science (for Girls), Al-Azhar University, Cairo, Egypt.*
[2] *Zoology Department, Faculty of Science, Beni-Suef University, Beni-Suef 62514, Egypt.*
[3] *Zoology Department, Faculty of Science, Hail University, Saudi Arabia.*

ARTICLE INFO

Received 04/06/2022
Revised 10/10/2022
Accepted 10/11/2022

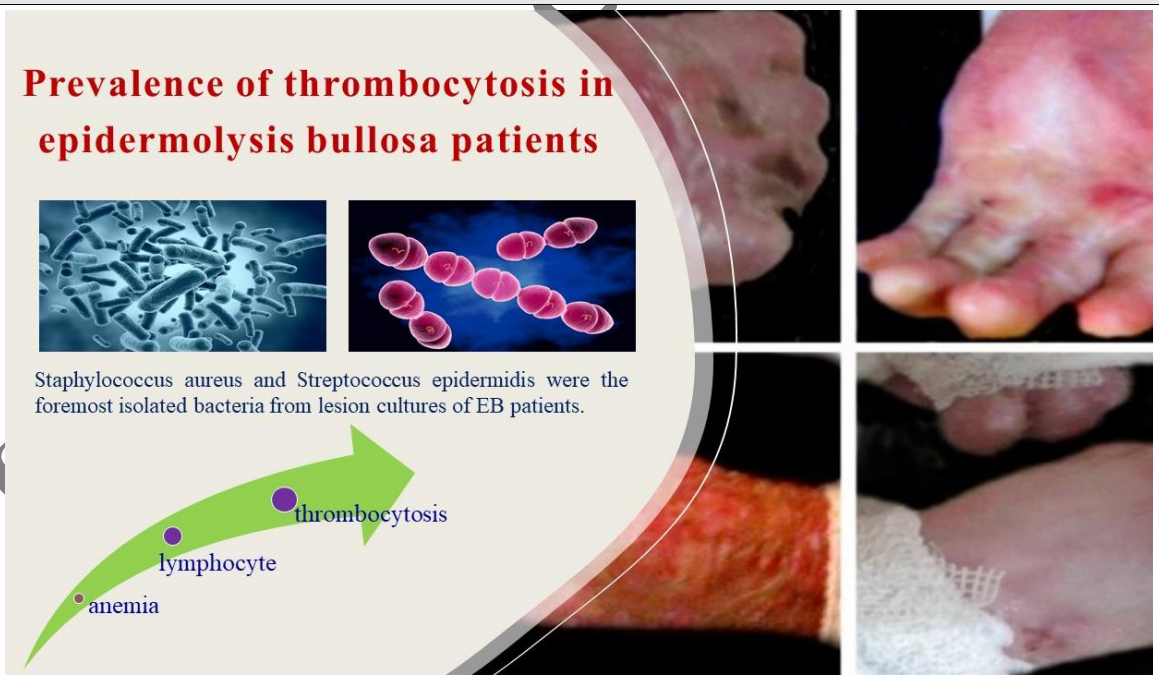
Keywords

Epidermolysis bullosa
Hematologic parameters
Thrombocytosis
Anemia

ABSTRACT

Epidermolysis bullosa (EB) is a rare hereditary genetic illness characterized by excessive skin and mucous membrane fragility, which causes blisters and ulcers to form after minor trauma. As EB is a rare disease, the reported studies regarding epidermolysis bullosa are very limited. This study was aimed to investigate the alterations in the hematologic parameters and assess the prevalence of thrombocytosis in children suffering from EB. Eight EB patients aged (3 to 12 years) from the Dermatology Unit of King Khalid Hospital (KKH), Hail city, Saudi Arabia were included in this study. The hematological changes of EB patients were characterized by a significant decrease in the total erythrocytes (RBCs) count, hemoglobin (Hb), hematocrits (PCV) percentage, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH). The predominance of thrombocytosis and lymphocyte production was verified in this study. Moreover, Staphylococcus aureus and Streptococcus epidermidis were the foremost isolated bacteria from lesion cultures of EB patients. In conclusion, thrombocytosis, anemia, and/or poor nutritional status seem to be common complications in nearly all cases of EB.

Graphical abstract



* *Corresponding author*
E-mail address: rs.elsayed@gmail.com

DOI: 10.21608/IJTAR.2023.140535.1004

Special issue "selected papers from the International Annual Conference on Basic and Applied Science (IACBAS-2022)"

1. Introduction

Epidermolysis bullosa (EB) is a genodermatosis that affects the skin, mucous membranes, and infrequently the internal organs [1]. It is marked by skin blistering, bullae, and erosions caused by minor mechanical friction and poor wound repair [2]. It can range in severity from moderate to fatal with concealed symptoms in mild cases [3]. EB is a scarce disease with a diverse variety of incidence, prevalence and has no sex predilection [4]. There are four basic types of EB depending on the site of blisters formation: intraepidermal [EB simplex), inside (junctional EB), below the basement membrane zone (dystrophic EB), and with a mixed pattern (Kindler syndrome) [5,6]. Patients with various forms of EB can develop a variety of problems, that cause significant pain and lower the quality of life [6]. Moreover, non-healing wounds can also lead to serious systemic infections, malnutrition, and growth retardation, as well as induce carcinogenesis in some patients [7]. This study attempts to improve the therapeutic approaches and patient quality of life by better understanding the link between nutritional, hematologic, and infectious features in selected dystrophic EB patients.

2. Patients and Methods

This is a descriptive study of dystrophic Epidermolysis Bullosa (EB) cases that is based on information from eight patients clinically diagnosed with inherited EB. Patients were referred from the dermatology clinic at the Dermatology Unit of King Khalid Hospital (KKH), at the maternity branch, Hail city, Saudi Arabia. All the patients were Saudis and subjected to a full history examination. Out of these 8 cases, only 2 cases were males with age ranges from [3-8], while the remaining 6 cases were females with age ranges from [3-12]. All the patients were hospitalized, and the diagnosis of each patient was recorded by the specialists in the Dermatology Unit of KKH. Bodyweight (g) and height (Cm) were measured and body mass index (BMI) for the patients was calculated by the use of the formula: weight (kg)/height^2 (m^2).

CBC and differential leucocytes count as well as the prevalence of several bacterial infection types in EB patients were recorded. Counting of RBCs and WBCs was carried out manually by Neubauer chamber, using saline (0.9% NaCl) for RBCs counting and gentian violet for WBCs counting [8]. The hematocrit value (PCV%) was determined according to Dacie and Lewis [9] and the hemoglobin (Hb) was measured as described by Lucky [10]. Also, mean corpuscular volume (MCV), mean cell hemoglobin concentration (MCHC), mean cell hemoglobin (MCH), and total and differential leucocytes were enumerated according to Dacie and Lewis [9].

Limitations: Statistical analysis was unachievable because of limited data (cases).

2. Results and Discussion

The Based on acquainted assent, eight EB patients from the Dermatology Unit of King Khalid Hospital (KKH), at the maternity branch, Hail city, Saudi Arabia were included in our study.

This study has some constraints due to the limited sample size (only 8 instances) and an unexpectedly old age range (3 to 12 years), making statistical significance difficult to attain. The wound dressings used, the location of chosen lesions, and the normal clinical variability prevalent in individuals with EB were all potential variables that were not properly considered.

There was no control group as this is a descriptive study. There was a predominance of chronic malnutrition, indicated from BMI values in the table (1) that come in accordance with Sousa et al. [11]. In the current work, the hematological changes of EB patients (Table 2&3) were characterized by a decrease in the total erythrocytes (RBCs) count, hemoglobin (Hb), hematocrit (HCT) percentage, mean corpuscular volume (MCV) and mean corpuscular hemoglobin (MCH). Anemia (abnormally low oxygen-carrying capability of the blood) is a prominent EB consequence (Table 2). Our findings are in line with those of several published fewer reviews and case series, which all indicate that anemia is common in EB patients [12, 13]. Anemia is impacted by a variety of reasons, the most prevalent is the persistent loss of blood and fluids caused by blistering and open skin sores, as observed in this study. Inadequate diets, as well as impaired absorption of blood-building chemicals, may exacerbate the disease [14]. Furthermore, the reduced hematocrit (HCT) percentage could be ascribed to a lower total red blood cell count as well as a failure in blood osmoregulation and plasma osmolarity [15]. Furthermore, there was a predominance of chronic leukocytosis and thrombocytosis without a direct association to the EB patient's sex, which is consistent with previous findings [16]. This is quite likely a cause of dilated cardiomyopathy in EB patients [17].

The present study demonstrated a great area of damaged skin (Fig.1). The extensive areas of denuded skin that greatly occurred in all cases may indicate the loss of the stratum corneum which serves as a barrier to microbial penetration [18]. In patients with EB, ulceration of the skin leads to the formation of lesions that are inhabited by various bacteria [19]. Staphylococcus aureus and Streptococcus epidermidis have been shown to be the most often isolated bacteria from wound cultures of EB patients, but gram-negative infections with bacteria, such as Pseudomonas aeruginosa, also occurred (Table 4). Accumulation of serum and moisture on the surface may be the main cause of the bacterial growth enhancement [20]. Patients with epidermolysis bullosa subtypes of the current study may have immunologic abnormalities, including increased leukocyte production that indicate attempts of the body to the resistance of infections [20].

Proposition studies in EB are required to build a foundation for future clinical research and to provide improved care to people suffering from such a devastating disease. Studies could be more practical since its higher incidence makes sample size calculations more feasible. The severity of EB encourages the patients to look for other ways to lessen their symptoms, but it also makes it more difficult for them to participate in the trial, reducing sample size and

increasing recession rates. Patients with less severe condition lack the motivation to engage in clinical studies.

Table 1. Body weight (kg), height (Cm) and body mass index (BMI) of patients with epidermolysis bullosa.

Parameters	Cases							
	1	2	3	4	5	6	7	8
Sex	M	M	F	F	F	F	F	F
Weight (Kg)	13.00	13.5	9.0	12.7	12.7	13.0	15.5	19.60
Height (Cm)	85	108	78	90	92	1000	106	135
BMI	14.60	15.92	14.60	18.6	11.56	11.92	12.60	10.20

BMI: body mass index, M: male, F: female

Table 2. CBC of patients with epidermolysis bullosa.

Test	Normal Range	Cases							
		1	2	3	4	5	6	7	8
WBC (10^3/µL)	3.5-10.0	18.7	10.9	14.7	11	15.9	12.4	19	12.5
RBC (10^6/µL)	M 5-6.6 F 4.0-5.0	4.22 -	4.55 -	- 4.63	- 5.25	- 4.67	- 4.43	- 4.75	- 4.78
Hb (g/dl)	M 13-18 F 12-16	9.4 -	10.7 -	- 12.3	- 10	- 10.7	- 10.2	- 9.4	- 10.3
HCT (%)	M 40-54 F 37-47	30 -	32 -	- 34	- 40	- 34	- 32	- 35	- 33
MCV (FL)	86-96	71.6	70.8	72.8	76.2	73.7	72.7	74.1	68.6
MCH (Pg)	27-32	22.3	23.5	26.6	26.7	25.1	23	24	23.6
MCHC (g/dl)	30-35	31.1	33.2	36.5	35	34	31.7	32.4	34.3
PLT (10^3/µL)	150-400	263	555	402	460	604	450	604	456

WBC: white blood cell count, RBCs: red blood cell count, Hb: hemoglobin, HCT: hematocrit, MCV: mean corpuscular volume, MCH: mean corpuscular hemoglobin, MCHC: mean corpuscular hemoglobin concentration and PLT: platelet count.

Table 3. Differential leucocytes count of patients with epidermolysis bullosa.

Test	Normal Range	Cases							
		1	2	3	4	5	6	7	8
Neutrophils	40-75%	57.70	49.50	28.30	48.30	44.20	47.20	58.80	50.30
Lymphocyte	20-45%	32.00	41.00	64.90	43.20	49.00	47.20	33.00	40.30
Monocytes	2-10%	10.00	9.50	7.00	9.00	7.00	7.00	8.00	9.00
Eosinophils	1-6%	-	-	-	-	-	-	-	-
Basophils	0-1%	-	-	-	-	-	-	-	-

Table 4. Types and prevalence of bacterial infections in epidermolysis bullosa patients

Selected Organism	Source	Cases							
		1	2	3	4	5	6	7	8
Staphylococcus aureus	Wound	+	++	+	+	+	-	+	-
	Left knee	-	-	+	+	+	+	+	-
	Wound swab from abdomen	-	-	+	-	-	-	-	-
	Blood	-	-	-	-	-	+	-	-
		-	-	-	-	+	-	-	-
Staphylococcus epidermidis	Blood	+	-	-	-	-	-	-	-
	Left leg	-	-	-	+	-	-	-	-
Pseudomonas aeruginosa	Skin from back	+	-	-	-	-	-	-	-
	Skin swab from right axill	+	-	-	-	-	-	+	-
	Wound	+	-	-	-	-	-	-	-
	Wound right chest	-	+	-	-	-	-	-	-
Pseudomonas luteola	Right eye	-	-	-	+	-	-	-	-
Acinetobacter lwoffii	Left eye	-	-	-	+	-	-	-	-

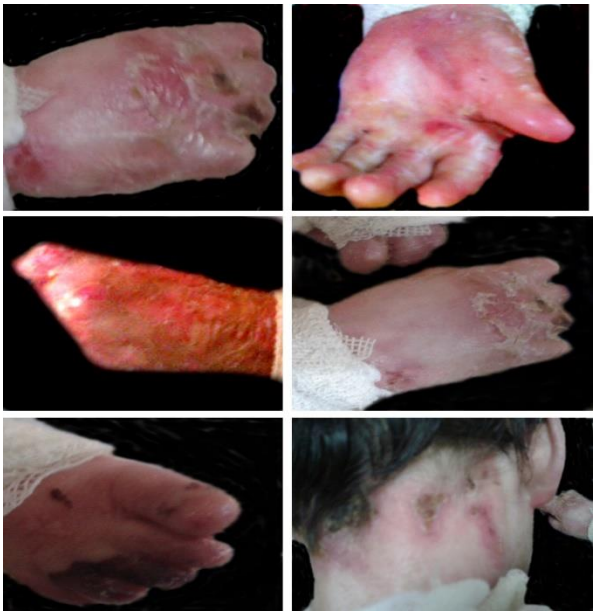


Fig.1 Clinical presentation of patients with Epidermolysis Bullosa.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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