

Characteristics, Management, and Outcomes of Bacterial Dermohypodermatitis at the Infectious and Tropical Diseases Department of Fann University Hospital, 2016-2020

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Received: 24 Jun 2023; Accepted: 02 Aug 2023; Published: 09 Aug 2023

Citation: Thioub D, Fortes L, Sarr NA, et al. Characteristics, Management, and Outcomes of Bacterial Dermohypodermatitis at the Infectious and Tropical Diseases Department of Fann University Hospital, 2016-2020. *Microbiol Infect Dis.* 2023; 7(3): 1-5.

ABSTRACT

Recent trends show a clear increase in cases of bacterial dermohypodermatitis (BDH) worldwide. According to some authors, this upsurge is linked to an increase in risk factors, particularly depigmentation. In Senegal, all data relating to BDH come from dermatology departments. The objective of this study was to describe the characteristics, management, and outcomes of dermohypodermatitis at the Infectious and Tropical Diseases Department (SMIT) of Fann hospital. This was a retrospective study conducted at the SMIT. The study population consisted of all patients hospitalized in the department for BDH from 2016 to 2020.

We recorded 54 cases of BDH, representing a hospital frequency of 1.29%. The sex ratio (M/F) was 0.42. The median age was 46.5 years [17-85 years]. The most factor of BDH, was depigmentation (31.48%). BDH was localized to the lower limbs in 81.48%. Pain (96.30%), inflammatory swelling (92.59%), and erythematous placard (85.19%) were the main physical symptoms. Blood cultures were positive for *Staphylococcus aureus*, and *Staphylococcus saprophyticus*. Cytobacteriological examinations of fluid from ruptured phlyctens isolated *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Enterobacter spp*, *Escherichia Coli*, and *Acinetobacter Spp*. Deep vein thrombosis (DVT) was found in 4 patients (13.79%). Complications were present in 18 patients (33.33%). We recorded 5 deaths, representing a lethality rate of 9.26%. Depigmentation has become a major risk factor. Women need to be educated about the harmful effects associated with this practice.

Keywords

Bacterial dermohypodermatitis, Erysipelas, Necrotizing fasciitis.

Introduction

Bacterial dermohypodermatitis (BDH) is a group of infections affecting dermohypodermal tissue, the bacterial origin of which is dominated by group A beta-haemolytic streptococcus (GABS) but can sometimes be multi-microbial (40-90%) [1]. BDH are characterized by their clinical and evolutionary polymorphism. They are classically known as "cellulitis". This term was used to designate all infections of the soft tissue, including erysipelas and necrotizing fasciitis [1].

But the 2000 consensus conference has clarified anatomical terminology and definitions. A distinction is thus made between non-necrotizing bacterial dermohypodermatitis (BDH) or erysipelas (involving hypodermal damage of variable depth, without necrosis and not affecting the deep fascia), necrotizing bacterial dermohypodermatitis (involving necrosis of connective tissue and adipose tissue, without involvement of the deep fascia), and necrotizing fasciitis (FN) corresponding to necrotic damage to the pre-muscular aponeurosis and deep fascia [2]. The incidence of dermohypodermatitis is between 10 and 100 cases/100,000 habitants per year. However, recent trends show a clear increase in cases of dermohypodermatitis worldwide [3]. According to

some authors, this upsurge is linked to an increase in risk factors, particularly depigmentation, which has become a major public health problem in sub-Saharan Africa [4].

Dermohypodermatitis remains the leading cause of consultation in dermatological emergencies in Senegal [5]. In our country, all data relating to BDH come from dermatology departments, where the hospital incidence rate is 4.7% [6]. The lack of data on BDH in other departments in particular those of infectious diseases, where this pathology is frequently encountered and associated with comorbidities, motivated us to carry out this study. The main objective of this study was to describe the characteristics, management, and outcomes of dermohypodermatitis cases in the Infectious and Tropical Diseases Department (SMIT) of Fann University hospital.

Methods

This was a retrospective and descriptive cross-sectional study of the records of patients hospitalized at the Infectious and Tropical Diseases department (SMIT) of Fann University hospital for bacterial dermohypodermatitis during the period from 01 January 2016 to 31 December 2020.

The diagnosis of t dermohypodermatitis was clinical and was based on clinical arguments (inflammatory swelling with or without an erythematous placard, delimited or not by a peripheral bead, with or without the presence of necrosis) and confirmed by echography of soft tissues. Data were collected from patient charts and hospitalization records. A standardized form was used for data collection and included: epidemiological data (age, sex, medical history, comorbidities), clinical data (symptoms, localization of BDH), paraclinical data (biology, imaging), therapeutical data (antibiotics, anticoagulation therapy), and evolutionary data. The data was entered using Sphinx version 5.1.0.2 and analyzed using SPSS version 18.

Results

Epidemiological and clinical data

During our study period, we recorded 54 cases of BDH at the SMIT among 4162 hospitalized patients, representing a hospital frequency of 1.29%. The sex ratio (M/F) was 0.42. The median age was 46.5 years [17-85 years]. The most common age group was [41 – 60 years]. A history of dermohypodermatitis was found in 5.56% of cases. Among the factors of BDH, we found depigmentation (31.48%), diabetes (12.96%) and obesity (12.96%). HIV-infected patients accounted for 5.56%. Chronic ulceration was found in 7.41% of patients (Table 1).

Table 1: Epidemiological and clinical characteristics of dermohypodermatitis cases.

Epidemiological characteristics	Frequency (n)	Percentage %
Sex		
Male	16	29.63
female	38	70.37

Age		
≤ 40 years	17	31.48
[41 – 60 years]	24	44.44
> 60 years	13	24.07
Medical history		
History of dermohypodermatitis	3	5.56
Lymphangitis	2	3.70
Comorbidities		
Dépigmentation	17	31.48
HTA	15	27.78
Diabetes	7	12.96
Obesity	7	12.96
Chronic ulcérations	4	7.41
HIV	3	5.56
Lymphœdema	2	3.47
Venous insufficiency	2	3.47

Dermohypodermatitis was localized to the lower limbs in 81.48% of cases (table 2).

Table 2: Localization of dermohypodermatitis cases.

Localization of dermohypodermatitis	Frequency (n)	Percentage (%)
Lower limbs	44	81.48
Face	6	11.11
Upper limbs	3	5.56
Genital	1	1.85
Total	54	100

Pain (96.30%), inflammatory swelling (92.59%), and erythematous placard (85.19%) were the main physical symptoms. Fever was present in 48.10%. Dermohypodermatitis was bullous in 40.74% (Table 3).

Table 3: Clinical symptoms of dermohypodermatitis cases.

Clinical symptoms	Frequency (n)	Percentage (%)
Pain	52	96.30
Swelling	50	92.59
Erythematous placard	46	85.19
Blisters	22	40.74
Fever	26	48.10
Adenopathy	11	20.37
Peripheral bead	6	11.11
Necrosis plaque	4	7.41
Snowy crackles	2	3.70

A point of entry was found in 42 patients (77.77%). Post-traumatic ulceration was the most common, reported in 26 patients (48.15% of cases), inter-toe intertrigo in 12 patients (22.22%) and chronic ulceration in 4 patients (7.40%).

Paraclinical Data

The mean haemoglobin (Hb) level was 11.29 g/dl; microcytic hypochromic anaemia was found in 63.24% of the population (n=49). A predominantly neutrophilic hyperleukocytosis was noted in 73.44% of cases. CRP was positive in 95.48% of cases, with a mean of 147.5 mg/l [4 - 384 mg/l]. Blood cultures were taken in 6 patients and only 2 were positive for 01 Staphylococcus

aureus, and 01 Staphylococcus saprophyticus. Cytobacteriological examinations of fluid from ruptured phlyctens performed in 5 patients, isolated 01 Staphylococcus aureus, 01 Klebsiella pneumoniae, 01 Enterobacter spp, 01 Escherichia Coli, and 01 Acinetobacter Spp.

Venous Doppler ultrasonography was performed in 29 (53.7%) patients. Deep vein thrombosis (DVT) was found in 4 patients (13.79%). A cerebral CT scan was performed in only 1 patient, who presented with a facial location; the report indicated dermohypodermatitis of the face.

Therapeutical data

Preventive anticoagulant treatment was introduced in 61.11% of cases, 38.88% of whom were hospitalized for 7 days or more. Antibiotic therapy was initially parenteral in all patients, with monotherapy in 79.63% and dual therapy in 20.37% (table 4). The indication for dual therapy was justified in 08 cases by the occurrence of a complication (decompensation of tares, necrosis, sepsis). Surgical debridement was performed in 4 patients, in an orthopedic department.

Table 4: Distribution of cases of DHB according to antibiotics used, SMIT 2016-2020 (n=54).

Antibiotics therapy	Frequency (n)	Percentage (%)
Monotherapy	43	79.63
Amoxicillin Clavulanic acid	40	74.07
Ceftriaxone	3	5.56
Combination therapy	11	20.37
Metronidazole + Amoxicillin Clavulanic acid	5	9.25
Metronidazole + Ceftriaxone	2	3.70
Metronidazole + Ciprofloxacin	1	1.85
Gentamicin + Amoxicillin Clavulanic acid	1	1.85
Gentamicin + Ceftriaxone	1	1.85

Evolutionary data

The hospitalization duration varied from 3 days to 27 days, 44 patients (81.48%), had a hospital stay less than 14 days. The outcome was favorable in 90.74% of cases. Complications were present in 18 patients (33.33%) and were distributed as follows:

- Deep vein thrombosis (4 patients, 7.41%)
- Sepsis (4 patients, 7.41%)
- Decompensations of tares (7 patients, 12.96%)
- Necrosis (3 patients, 5.55%)

We recorded 5 deaths, representing a lethality rate of 9.26%; all cases of death had presented at least on complication (Table 5).

Table 5: Epidemiological and clinical profile of death cases.

	Sex (Age)	Comorbidities	Medical history	Localization of dermohypodermatitis	Complications
Case 1	F (74)	Diabetes	history of DHB	lower limbs	Deep vein thrombosis Decompensated Diabetes
Case 2	F (44)	Depigmentation HIV	None	lower limbs	Sepsis
Case 3	F (18)	None	None	Face	Intracranial suppuration
Case 4	F (42)	Hypertension	None	lower limbs	Sepsis
Case 5	M (68)	None	NSAID	lower limbs	Sepsis

Discussion

Epidemiological aspects

In Senegal, hospital studies place dermohypodermatitis among the main reason for hospitalization in dermatology [3]. In our study, we found a hospital frequency of 1.29%, whereas other studies carried out previously in dermatology departments found much higher frequencies [3,4]. This could be explained by the fact that most cases of dermohypodermatitis are treated in dermatology departments in Senegal. It was also found in this study that dermohypodermatitis was more frequent in adult women, the median age was 46.5 years [17-85 years]; this had already been reported by other authors in the literature [3,5,7-10].

The use of lightening products in our countries has become a real public health problem [5,11,12]. In fact, voluntary depigmentation was the most frequent risk factor in our study, it concerns 31.48% of patients. In the Congolese study, voluntary depigmentation ranked far ahead of the other risk factors (60%) [13]. This can be explained by the different practices of skin depigmentation, in a more "intensive" mode in the countries of Central Africa than in the countries of West Africa [14].

The others main risk factors found in our study were cardiovascular disease with its clinical signs of lymphoedema and venous insufficiency of the lower limbs, diabetes, obesity, they had also been mentioned in Senegalese literature with varying frequency [3,11,12].

We found a point of entry in 77.77% of cases and post-traumatic ulceration were the most common point of entry (48.15%). Whereas Titou H et al., in Morocco, found intertrigo (78%) [11]. This frequency of inter-toe intertrigo could be explained by religious habits (frequent ablutions), which lead to poor drying of the feet and to maceration and microbial proliferation between the toes. Non-steroid anti-inflammatory drugs (NAID) use was reported in only 1 of our patients (1.85%). In the literature, the use of NSAIDs is linked to the development of necrosis leading to DHBN or necrotizing fasciitis [15].

Clinical Aspects

In our study, swelling and pain were present in almost all patients. They remain the most constant signs of DHB, even in diabetic patients [18]. In Morocco and France, respectively, Frikha F et al. [16] and Lanoux P et al. [17], found an erythematous placard in 100% of their cases. In our study, the erythematous placard was found in 85.19% of cases. The dark colour of the patients' skin would make it difficult to identify the erythematous lesion in some of our patients. Almost all of our DHB (81.48%) was located in the lower limb, as reported in several series [6,8,18].

Paraclinical aspects

Hyperleukocytosis was found in 73.44%. These results were 3.5 times higher than those of Titou H et al. (22%) [11]. These differences may be explained by laboratory standards: in the Titou H et al. study, hyperleukocytosis was defined as a white blood cell count greater than 12,000/mm³, whereas in other laboratories the standard would be 10,000/mm³. Blood cultures and samples of pathological products (taken at the DHB site) isolated bacteria such as: *Staphylococcus saprophyticus*, *Enterobacter spp*, *Escherichia coli* and *Klebsiella pneumoniae*, which did not correspond to the germs usually responsible for DHB, demonstrating the unreliability of the samples, as well as the susceptibility to colonization by hospital germs.

The value of imaging in DHB, in particular Doppler ultrasound of the lower limbs, is prognostic, as the aim is to look for possible complications. Doppler ultrasound was performed in 53.7% of our cases. Venous thrombosis was found in 03 patients (5.55%). The risk of DVT in patients with BVD remains very low, as reported in the literature [19,20]. However, if the swelling persists under appropriate antibiotic therapy and there are risk factors for thromboembolic disease, the association should be considered.

Therapeutic aspects

More than half of our patients (61%) were on preventive anticoagulant treatment. In fact, anticoagulation therapy in the management of dermohypodermatitis is not systematic and depends on the existence of cardiovascular risk factors. The most used antibiotic in our study was amoxicillin-clavulanic acid (74% of cases). However, penicillin G remains the first-line antibiotic reported in the literature [6,15]. These differences may be explained by the unavailability of penicillin G in Senegal in recent years, and amoxicillin remains the first-line treatment for DHB in our country. Dual therapy was justified in 8 patients due to the presence of comorbidities and/or complications (sepsis, decompensation of underlying diseases).

Evolutionary Aspects

Our results showed a high rate of complications (33.33%) compared to those reported in other studies [15,16]. This large difference may be explained by the high rate of comorbidities found in our study, which makes decompensation of pre-existing defects the main complication. Moreover, among the 18 cases of complications, 16 had at least one medical condition or comorbidity. In the literature, several authors associate the occurrence of complications with the existence of co-morbidities or a particular medical condition [6,21]. The hospital lethality rate was 9.26%. Among the 5 cases of death in our series, 4 had developed sepsis during hospitalization. The occurrence of sepsis was found to be a factor associated with death by several authors [22-24].

Conclusion

Almost all of our patients who presented complications had at least one comorbidity. According to the literature, the existence of co-morbidities is a factor influencing the prognosis of BDH.

The upsurge in BDH would appear to be linked to the existence of several risk factors: in particular, local, and regional risk factors or general risk factors. Depigmentation has become a major risk factor. Women particularly those with comorbidities, need to be educated about the harmful effects associated with this practice.

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