

Bacterial skin infections among patients with hemoglobinopathies

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ABSTRACT

Objectives: Hemoglobinopathies are a common problem in our locality, yet there were no previous studies concerning skin lesions among those patients. We sought to find out the most common skin lesions among patients with hemoglobinopathies and the frequency of occurrence of bacterial skin infections in those patients.

Methods: A total of 168 patients with bacterial skin infections were included in this study. The specimens were collected from outpatients dermatology departments of 5 main hospitals in different areas in Basrah governorate, Iraq (hospital – based study) from March 2002 to October 2002. The patients were divided into 2 groups according to the type of hemoglobin on electrophoresis. The first group included 35 patients with bacterial skin infections and hemoglobinopathies while the second one included 133 patients with normal hemoglobin.

Results: Recurrent bacterial skin infections was reported in 30 out of 35 patients with hemoglobinopathies (85.7%) and 45 out of 133 in those with normal hemoglobin (33.8%). In addition, *Staphylococcus aureus* (*S. aureus*) were isolated from patients with hemoglobinopathies (74.3%) and gram negative bacteria (42.9%).

Conclusions: The study revealed that patients with hemoglobinopathies were more susceptible to recurrent bacterial skin infections than those with normal hemoglobin. In addition, *S. aureus* and gram negative bacteria were isolated more commonly from patients with hemoglobinopathies.

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Hemoglobinopathies includes the thalassemia syndromes,¹ patients with SCD syndromes (SS, SC and thalassemia) who suffer with variable severity from hemolytic anemia, painful musculoskeletal crises and increased susceptibility to life threatening acute, chronic and recurrent infections.^{2,3} Infections of bacterial etiology are a major cause of morbidity and mortality in people with these syndromes.^{4,5}

The incidence of septicemia, osteomyelitis, meningitis, septic arthritis and typhoid fever are more common in patients with SCD as well as leg ulcers, which are usually recurrent and resistant to treatment.⁶⁻¹¹

Hemoglobinopathy is an important health problem in Basrah city, Iraq but there are no previous studies or literature concerned with bacterial skin infections in people with these syndromes, thus, the aim of the study were to estimate the frequency of bacterial skin infections with hemoglobinopathies and to find out the most common lesions in those patients.

Methods. The current study involved 168 patients with bacterial skin infections who were consulting the out patients dermatology department of 5 main hospitals in different areas in Basrah from March 2002 to October 2002.

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They were diagnosed by treating physicians according to clinical features. Blood samples were collected and subjected to hemoglobin electrophoresis (using cellulose acetate membrane in an alkaline buffer pH=8.6). In addition, skin swabs were taken from all those patients for bacteriological examination.

Results. The age range of patients was from 9 months to 70 years with a mean age of 7.5 ± 17.5 years and the male to female ratio was 1:1. Recurrent bacterial skin infections was reported in 30 out of 35 patients with hemoglobinopathies (85.7%) and (45) out of (133) in those with normal hemoglobin (33.8%). There was a highly significant association between recurrent bacterial skin infections and hemoglobinopathy. The extremities were the most common sites of bacterial skin lesions in patients with hemoglobinopathies and those with normal hemoglobin, although the percentage among patients with hemoglobinopathies was more than the latter (45.3% versus 45.9%).

The most frequent primary bacterial skin infections detected in patients with hemoglobinopathies was furuncle (31.4%) while for those with normal hemoglobin, impetigo was the most common one (27.1%). Secondary bacterial skin infection (skin lesions that is secondarily invaded by bacteria) was detected less common among patients with hemoglobinopathies than those with normal hemoglobin (11.4% versus 36.1%). Other types of bacterial skin infections were presented in **Table 1**.

Staphylococcus aureus was the common causative agents isolated from patients with hemoglobinopathies and those with normal hemoglobin (74.3% versus 76%), while gram negative bacteria were isolated more frequently from samples taken from Patients with hemoglobinopathies than those with normal hemoglobin (42.9% versus 22.6%) as shown in **Table 1**.

Discussion. The study showed that patients with hemoglobinopathies were more susceptible to develop recurrent bacterial skin infections than those with normal hemoglobin. These results can be attributed to immunological defect, poor perfusion, increased bone marrow turn over and functional asplenia.^{11,12}

The most frequent site of bacterial skin infection in patients with hemoglobinopathies and those with normal hemoglobin was extremities, although the percentage of involvement among patients with hemoglobinopathies was more than the latter. This result can be attributed to poor peripheral circulation resulting from vascular occlusion in addition to dryness of the skin, which was reported in patients

with sickle cell anemia¹³ that can be easily invaded by microbial agents.

The most common primary bacterial skin infection among patients with hemoglobinopathies was furuncle, in addition, other types of deep seated bacterial skin infections were more frequent among those patients. These results can be explained, as any patients with evidences of immunosuppression are more liable to develop recurrent and deep seated bacterial skin infections than immunocompetent ones.¹⁴

Secondary bacterial skin infections were less frequent among patients with hemoglobinopathies than those with normal hemoglobin, which can be attributed to the defect in the function of the skin as a first line of defense against microbial invasion, thus their skin is more liable to primary bacterial skin infections than the secondary ones.

Staphylococcus aureus (*S. aureus*) was the most frequent type of bacteria isolated from specimens collected from patients with hemoglobinopathies and those with normal hemoglobin. This result was compatible with many other studies, which found that *S. aureus* represent the most dominant species isolated from skin infections.^{15,16}

Next to *S. aureus*, gram negative bacteria occupy the second position among the most common etiological agents isolated from patients with hemoglobinopathies. This result can be attributed to immune function impairment observed in patients with hemoglobinopathies, since gram negative bacteria (coliforms and *Pseudomonas*) are members of normal flora of the colon but can cause disease in other parts of the body especially in immunocompromised and debilitated individuals.¹⁵

Table 1 - Types of bacterial skin infections and types of bacteria isolated from these lesions.

Characteristics	Patients with hemoglobinopathies		Patients with normal Hb	
	n	(%)	n	(%)
Types of infection				
Impetigo	5	(14.3)	36	(27.1)
Furuncle	11	(31.4)	20	(15)
Ecthyma	4	(11.4)	7	(5.3)
Folliculitis	4	(11.4)	16	(12)
Carbuncle	3	(8.6)	1	(0.8)
Ulcers	4	(11.4)	5	(3.8)
Secondary bacterial infections	4	(11.4)	48	(36.1)
Types of bacteria				
<i>Staphylococcus aureus</i>	26	(74.3)	101	(76)
Gram negative bacteria	15	(42.9)	30	(22.6)
<i>Streptococcus pyogenes</i>	3	(8.6)	18	(13.2)
Others	0	-	9	(6.8)
Hb - hemoglobin				

In conclusion, hemoglobinopathy must not be forgotten as a risk factor for bacterial skin infections, which tend to be recurrent in the majority of cases. Accordingly, broad spectrum antibiotics should be given to all patients with hemoglobinopathies and skin lesions in order to prevent and treat bacterial skin infections.

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