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(CASE REPORT)

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A case report on Rheumatoid Arthritis with sickle cell trait

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Abstract

A female patient aged 6 years, a suspected case of sickle cell trait (SCT) having symptoms of Rheumatoid arthritis (RA), while evaluating joint complaints in adult sickle cell disease (SCD) patients, a number of sickle cell-based entities come to mind such as avascular necrosis, osteomyelitis, bone infarcts, and septic arthritis. RA is a chronic systemic inflammatory disease, many reports highlighted the occurrence of RA in SCD presenting as diagnostic challenges for cases with chronic inflammatory arthritis, SCT also have appeared to persist in some populations at a perplexingly high rate given the degree of early mortality of homozygosity of SCD, our case report showed that not only SCD but if a patient has SCT they can develop RA as complication. Our case report concludes that during the evaluation of a SCT patient who presents with chronic synovitis, one should strongly consider the possibility of coexistence of RA and SCT.

Keywords: Sickle cell trait; Rheumatoid arthritis; Sickle cell disease; Genetic predisposition

1. Introduction

Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease characterized by inflammation and synovitis leading to damage of cartilage and juxta-articular bone destruction [1]. Environmental factors (smoking and infection), as well as genetic predisposition, are known to play a role in the development of RA. Among Caucasian patients, the human leukocyte antigen-DRB1 (HLA-DRB1) alleles containing the shared epitope, are markers of disease risk and severity. However, HLADRB1 has been found in only one third of African-Americans (AA) RA patients,[1] along with RA, While evaluating joint complaints in adult sickle cell disease (SCD) patients, a number of sickle cell-based entities come to mind such as avascular necrosis, osteomyelitis, bone infarcts, and septic arthritis[2] this diagnosis is generally overlooked and rarely considered. Anecdotal reports highlighted the occurrence of RA in SCD presenting as diagnostic challenges for cases with chronic inflammatory arthritis, joint effusions, erosive arthritis and non-gouty arthritis [3-5] The molecular underpinnings of SCD fascinated scientists of the time, as it had been noted that the heterozygote state, sickle cell trait (SCT), appeared to persist in some populations at a perplexingly high rate given the degree of early mortality of homozygosity of SCD. Prevalences as high as 20%–40% had been described in certain African tribes, Mediterranean populations, and Indian aboriginal groups, and the overlap of the SCT allele frequency patterns and malarial endemicity soon led A.C. Allison to the theory that sickle hemoglobin (HbS) must confer a selective advantage of malarial resistance in the carrier state.[4] In SCD, the red blood cells (RBC) dehydrate causing increased viscosity of the cytosol; RBC become unable to maintain their flexibility and shape and acquire the typical sickle shape [6]. RBC membrane in SCD have a tendency to adhere to the endothelium [7]. Vaso-occlusive crises (VOC) results in blockage of the blood flow by the sickled red cells which lead to acute chest syndrome, ischemia, stroke, infarcts, pain, bone marrow degeneration and bony infarcts. The Centers for Disease Control and Prevention estimate that about 100,000 Americans are affected by SCD with a life expectancy of 43 and 41 years of age, for women and men respectively [8,9].In a study revealed that the prevalence of SCD coexisting with RA was 0.94%, which is similar to the prevalence of RA among the

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general population. Their patients, mostly from Afro-Caribbean descent, with SCD-RA were compared to age and sex matched patients with SCD and RA [10]. The SCD-RA patients had significantly lower hemoglobin and tended to have a lower BMI, increased periarticular osteopenia, erosive arthritis, prolonged morning stiffness, increased number of hospitalizations and longer hospital stay [11] For a definitive classification of RA, the following are required: confirmed synovitis in at least one joint, absence of an alternative diagnosis, and a total score of at least six of a possible 10 in the following four domains: involved joints(range 0–5), rheumatoid factor (RF) or anti-cyclic citrullinated peptide antibody (anti-CCP) (range 0–3), elevated erythrocyte sedimentation rate (ESR) or C-reactive protein(CRP) (range 0 –1), and symptom duration of six weeks or more (range 0–1)[12] It is strongly advised to keep in mind the possibility of RA coexistence when the clinical course of the painful crisis in SCD patients does not follow the expected trajectory. The prompt use of agents which target the underlying pathophysiology of RA remains the best option for the prevention of potential damage in these patients, who usually present with comorbidities due to SCD.

2. Case report

A 6-year-old female child presented with complaints of swelling over right thigh since 1 year (accidentally noticed, static in size, knee swelling), swelling over right ankle (pain), cough and cold since 1 day, Low grade intermittent fever (100.2°F) since 1 day that relieved by medication, problem and pain while walking due to swelling of knee.

3. Physical examination

Upon physical examination swelling over right thigh and knee was noted along with pain. On General examination the patient was fair, cooperative and coherent, Head, Eyes, Ears, Nose, Throat, Mouth, Neck (HEENTMN) were found Normal, CNS: Conscious and oriented, no neurological deficits, CVS: S1, S2 (positive), EF 60%, no murmurs noted, RS: BLAE (+). No signs of wheezing or crackles, GIT: soft, non-distended.

3.1. Vitals

Blood Pressure (BP): 106/60 mm of Hg, Respiratory Rate (RR): 23 breaths/minute, Pulse rate (PR): 112 beats/minute, Temperature: 100.2°F, Oxygen saturation (SpO2): 98%.

3.2. Patient demographics

Allergies: No allergies were noted. Medical history: Diagnosed with sickle cell trait 6 months ago. Patient had swelling over right knee without pain since 1 year which was noticed recently when the child developed pain while walking. Medication history: Patient was not on any medication. Social history: Non-smoker and non-alcoholic. Family history: Patient's mother has Sickle cell disease, also had 6 times PCV transfusion and is on Hydroxyurea tablet. Developmental history: Normal, school going child.

3.3. Laboratory findings

Table 1 laboratory findings

Parameters	Obtained value	Normal range	Interference
Hemoglobin	11.50g/dl	11.1-14.1 g/dl	Normal
RBCs	4.44mill/cumm	3.9-5.1 mill/cumm	Normal
WBCs	14500cells/cumm	5000-13000cells/cumm	Infection/Inflammation
Neutrophils	54%	30-50%	Neutrophilia
Lymphocytes	44%	50-80%	Lymphocytopenia
Monocytes	1%	2-12%	Monocytopenia
Eosinophils	1%	1-6%	Normal
MCH	24.90pg	24-30pg	Normal
MCHC	35.90g/dl	29-37g/dl	Normal
MCV	69fL	75-87fL	Microcytic Anemia
PCV	32%	34-40%	Anemia

RDWs	14.10%	11.6-14%	Macrocytic Anemia
SGOT (AST)	31IU/L	0-37IU/L	Normal
SGPT (ALT)	11IU/L	0-46IU/L	Normal
Serum ALP	336IU/L	28-382IU/L	Normal
Total Bilirubin	0.80mg/dl	0.1-1.2mg/dl	Normal
Direct Bilirubin	0.20mg/dl	0-0.4mg/dl	Normal
Indirect Bilirubin	0.60mg/dl	0.1-0.8mg/dl	Normal
Total Protein	7g/dl	6-8g/dl	Normal
Albumin	4.10g/dl	3.2-5g/dl	Normal
Sodium	137mEq/L	135-145mEq/L	Normal
Potassium	4.30mEq/L	3.5-5mEq/L	Normal
Calcium	1.28mg/dl	1.12-1.32mg/dl	Normal
Urea	19mg/dl	14-40mg/dl	Normal
Creatinine	0.78mg/dl	0.6-1.2mg/dl	Normal
Lactate Dehydrogenase	452U/L	230-460U/L	Normal

3.4. Diagnostic tests

USG of local part (Right knee) - Moderate supra patellar effusion with 2.4mm with minimal to mild synovial thickening in right knee, Malarial parasite - Not detected, Anti-nuclear antibody (ANA): 58 Units: Positive, RA factor (ELISA): Positive, Anti Citrullinated protein antibody blood test: Positive.

Final diagnosis: rheumatoid arthritis with sickle cell trait

3.5. Plan of action

Table 2 Supportive Management Chart

Sr.	Drug	Dose	Route	Frequency
1.	Inj. Amoxicillin Clavulanate	450mg	IV	TID
2.	Inj. Paracetamol	15mg	IV	SOS
3.	Inj. Pantoprazole	15mg	IV	OD
4.	Tab. Naproxen	250mg	PO	BD
5.	Tab. Prednisolone	5mg	PO	TID (1/2-1-1/2)
6.	Tab. Multivitamin B complex	---	PO	BD
7.	Tab. Folic acid	5mg	PO	OD
8.	Tab. Calcium + Vitamin D3	---	PO	BD

4. Discussion

The patient being described is a 6-year-old girl with SCT, not on regular medications. Past history showed that her Sickling test was performed and positive results were obtained. Further HPLC test was done to rule out Sickle cell trait. She never faced any flares of RA previously. Also, RA was diagnosed when she presented with complaints of pain in right knee and difficulty in walking. This case, therefore, highlights the importance of ruling out arthritis in all cases of SCT or SCD, if patient presents with acute onset of pain, swelling over right ankle etc. The patient was managed very well with the medications mentioned (Table.2), patient was stabilized and Discharged.

5. Conclusion

In conclusion, our case report showed that not only SCD but if a patient has SCT they can develop RA as complication which is not yet observed. Hence, during the evaluation of a SCT patient who presents with chronic synovitis, strongly consider the possibility of coexistence of RA and SCT; keeping in mind that the absence of musculoskeletal symptoms in SCT can masquerade and delay the diagnosis of RA in this patient population. Though not fatal but early diagnosis and treatment can reduce the prevalence of complications and overall health of patients. It is possible that the underlying inflammatory mechanisms present in SCT and RA may worsen the clinical manifestations of each disease if not managed properly.

Compliance with ethical standards

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Disclosure of conflict of interest

All authors declare that they have no conflict of interest.

Statement of informed consent

Informed consent was obtained from the individual participant included in the study. No Animal is used in the study and direct intervention was not performed.

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