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Clinical spectrum of arthritis in children: A single center study from eastern India

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Abstract

Background: The importance and awareness of pediatric rheumatic diseases (PRDs) are increasing globally. Arthritis in children is a condition that can potentially lead to complications. It can be a manifestation of multiple disease processes. This study was aimed at identifying the common causes and evaluating the clinical profile of pediatric arthritis in Eastern India.

Methods: This was an observational, cross-sectional, hospital-based study conducted on 68 children after obtaining approval from the Institutional Ethics Committee. All participants satisfied the inclusion criteria. The study duration was from February 2021 to July 2022.

Results: Out of 68 cases, 29 children had chronic arthritis, and acute arthritis was noted in 39 children. Henoch-Schönlein purpura (HSP) (16.18%) and systemic lupus erythematosus (SLE) (8.82%) were the common causes of acute arthritis. Juvenile idiopathic arthritis (JIA) (n = 22, 32.35%) was the most common rheumatological disorder in our study. The common subtypes of JIA were polyarthritis and systemic onset JIA (sJIA) (n = 10 each). Various extra-articular manifestations involving the mucocutaneous, renal, cardiac, respiratory, and central nervous systems were also observed.

Conclusion: There is limited data on arthritis from eastern India, and our study aims to provide valuable insights to help bridge the gap in the existing literature.

***Keywords**:* arthritis; acute; chronic; children; eastern India; juvenile rheumatoid arthritis

Introduction

Awareness of Pediatric Rheumatic Diseases (PRDs) is increasing globally, and rheumatology is an emerging specialty in India. These diseases are important chronic causes of childhood morbidity and disability. Arthritis is inflammation of the joint synovium, regardless of cause. Children with arthritis present with swelling, redness, warmth, pain, and limited movement or refusal to use the joint. It can affect one or more joints [1]. Inflammation lasting less than 6 weeks is acute; beyond 6 weeks, it is chronic. Monoarthritis affects one joint; oligoarthritis affects fewer than five joints; polyarthritis affects five or more joints [1].

Arthritis has varied clinical presentations and causes, with differing underlying pathophysiology. A thorough history and physical exam are essential for evaluation. Fever, rash, and constitutional symptoms may suggest infectious or autoimmune causes [2, 3]. Involvement of other organs often indicates specific etiologies. Differentiating arthralgia (joint pain without inflammation signs such as warmth, erythema, swelling)

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from arthritis is crucial. Diseases like systemic lupus erythematosus (SLE) may present early with arthralgia [1].

Juvenile Idiopathic Arthritis (JIA), previously juvenile rheumatoid arthritis, is arthritis before age 16 lasting more than 6 weeks. It is the most common chronic arthritis in children and a diagnosis of exclusion [1, 3]. Other causes include infectious, hematological, and immunodeficiency disorders [3]. In the U.S., prevalence of arthritis in children under 18 is about 305 per 100,000 [4]. Data from India remain sparse [5].

This study was aimed at identifying the common causes and evaluating the clinical profile of pediatric arthritis in Eastern India.

Materials and methods

This was an observational, cross-sectional, hospital-based study. The study was conducted in the department of Pediatric Medicine, in a tertiary care teaching institute in Kolkata after obtaining approval from the Institutional Ethics Committee. The study was carried out between February 2021 to July 2022.

Inclusion criteria: Arthritis was defined as intra-articular swelling or two or more joint findings—limited range of motion, tenderness or pain on motion, and warmth. Arthritis lasting less than 6 weeks was classified as acute, and more than 6 weeks as chronic [2, 3].

Study population included children aged 1 month to 12 years admitted to Pediatric Medicine Ward (In patient department- IPD). We included IPD patients only in our study, primarily because their clinical records are more comprehensive and detailed, better follow up, and relative ease of obtaining informed consent in IPD settings compared to outpatient department. Written informed consent from parents or legal representatives, and assent from children aged 7 to 12 years were obtained.

Exclusion criteria: Children diagnosed with arthritis due to joint trauma, bone cyst, or neoplasm.

As an observational study, no formal sample size calculation was done. Based on time and logistics, approximately 3–4 subjects were expected monthly over 18 months, targeting 60 subjects. Detailed history, physical examination, and necessary laboratory investigations were performed, all conducted within the institution.

Statistical analysis

Statistical analysis involved expressing categorical variables as numbers and percentages, compared using Pearson's Chi-square or Fisher's exact test. Continuous variables were expressed as mean, median, and standard deviation, compared using Mann-Whitney U or Kruskal-Wallis tests. Data analysis used SPSS version 22, with significance set at $p < 0.05$.

Results

We had a total of 68 cases in our study. Males were 37 and females were 31 in number with a male to female ratio of 1.2:1. Mean age of cases were 7.3 years, age range was one month to 12 years. Out of 68 cases, 29 children had chronic arthritis, and acute arthritis was noted in 39 children.

Figure 1 shows the clinical diagnosis and etiologies. JIA was the most common disorder with 22 out of 68 children (32.35%)). The other etiologies were Henoch-Schonlein purpura (HSP) (n=11), systemic lupus erythematosus (SLE) (n=6), juvenile dermatomyositis ((JDM) (n=4), reactive arthritis (n=5), septic arthritis (n=4), acute rheumatic fever (ARF) (n=2), hemophilia (n=3), acute lymphoblastic leukemia (ALL) (n=2), combined variable immunodeficiency (CVID) (n=2), patients with inflammatory bowel disorder (IBD)(n=2), post multiple inflammatory syndrome in children (MISC) (n=2), and also patients with serum sickness, scrub typhus infection, ParvoB19 infection (n=1, each).

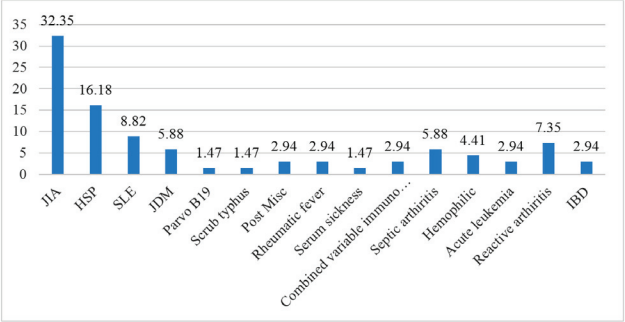

Figure 1: Clinical diagnosis and etiology percentage (%).

Among JIA (n=22) patients, systemic onset JIA (sJIA) (n=10) and polyarthritis were most common (n=10, each). Most of the JIA patients presented with chronic arthritis except 4 patients with systemic onset JIA (sJIA) who presented with acute onset arthritis. Rheumatoid Factor (RF) positive polyarthritis were noted in 3 patients (n=3), whereas 7 patients were RF negative polyartiarthritis (n=7). One patient had oligoarthritis (n=1) and rest one had enthesitis related arthritis (ERA, n=1) (Figure 2). Juvenile dermatomyositis (JDM) (n=4), inflammatory bowel disease (IBD) (n=2), acute lymphoblastic leukemia (ALL) (n=1/2), systemic lupus erythematosus (SLE) (n=2/6), hemophilia (n=2/3) had chronic arthritis.

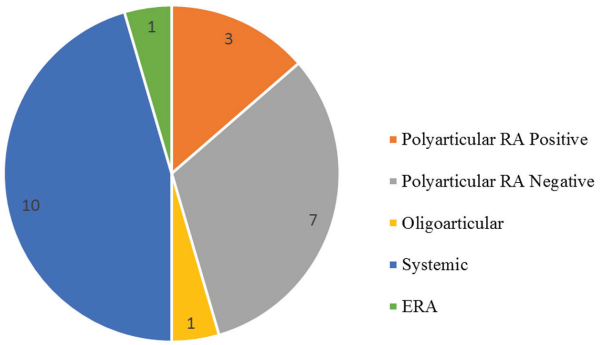

Figure 2: Subtype of juvenile idiopathic arthritis.

Distribution of Joint involvement: Knee joint was most commonly affected (100%) in patients with JIA , followed by wrist (90%), ankle (60%), elbow (40%). Beside JIA, among other patients , ankle joint was affected most commonly (76.5%), followed by knee joint (70.6%), wrist joint (39.7%), elbow joint (29.4%), small joints of hands and feet (11.8%), SI joint (2.9%). None had shoulder joint involvement.

Extra articular manifestations: Table 1 shows the extra articular manifestations. Mucocutaneous, renal, cardiac, respiratory and central nervous system involvement were seen in our patients. Extra-articular organ involvement and the clinical presentations were different in patients, depending on the underlying etiology. We did not encounter any child with psoriatic arthritis during our study period. Uveitis and rheumatoid nodules were not present in our study.

Joint deformity: 4 patient developed deformities. Two patients with poly articular JIA (n=2/10), one patient with JDM (n=1/ 4), one with hemophilia (n=1/3) had deformities.

Laboratory findings

We studied various hematological and inflammatory markers. Among inflammatory markers, we studied ESR, CRP, Ferritin, Triglyceride and Procalcitonin in all patients. Comparison of these markers were done with patients who had chronic rheumatological arthritis (CRA) and the other patients presented with acute manifestations (Table 2, Table 3).

Difference in the mean haemoglobin value and leukocyte count were comparable in CRA and others, while platelet count showed significant difference among patients with CRA and patients with acute arthritis. Mean value of platelet count was 4.15 in CRA and 3.25 in non CRA (P value : 0.039) . Among the inflammatory markers, significantly increased level of triglyceride (P value : 0.008) was noted among cases of CRA comparing with non CRA patients.

Table 1: Extra articular manifestations.

Extra articular manifestations	*Number*	*Etiology*
Malar rash	4	SLE(n=4/6)
Discoid rash	3	SLE(n=3/6)
Evanescent rash	2	sJIA(n=2/10)
Heliotrope rash	4	JDM (n-4/4)
Gottrons papules	4	JDM (n-4/4)
Oral ulcer	3	SLE (n=3/6)
Myocarditis	5	SLE (n=3/6), Scrub (n=1), ERA(n=1)
Pancarditis	2	RF (n=2)
Pleural effusion	3	SLE (n=1/6), ERA(n=1), Post MISC(n=1)
Macrophase activation Syndrome	2	sJIA(n=2/10)
Nephritis	6	SLE (n=5/6, HSP (n=1/11)
Hypertensive encphalopathy	2	sJIA (n=2/10)

Table 2: Comparison of hemogram between CRA (Chronic rheumatologic arthritis:-JIA, IBD, ERA) and others.

CRA		*Hb(gm/dl)*	*TLC (mm^3)*	*Platelet ($10^3/mm^3$)*
NO	Mean	9.95	12486.36	3.25
	Median	9.95	12550.00	3.40
	SD	1.54	7291.27	1.47
YES	Mean	9.52	12167.08	4.15
	Median	9.70	12000.00	4.35
	SD	1.87	4560.01	1.97
	p value	0.358	0.672	0.039
	Significance	Not Significant	Not Significant	Significant

Table 3: Comparison of inflammatory markers among CRA (JIA,IBD) and others.

CRA		*ESR (mm/1st hr)*	*CRP (mg/dl)*	*Ferritin (microgm/L)*	*Procalcitonin (ng/ml)*	*Triglyceride (mg/dl)*
NO	Mean	57.25	3.05	307.48	3.01	181.55
	Median	51.50	1.20	243.00	0.40	163.00
	SD	29.30	4.13	225.98	6.88	69.67
YES	Mean	58.13	4.39	774.19	1.63	252.25
	Median	51.00	2.00	366.35	0.50	216.00
	SD	34.58	4.46	1650.78	4.32	137.90
	p value	0.959	0.310	0.345	0.832	0.008
	Significance	Not Significant	Not Significant	Not Significant	Not Significant	Significant

ANA was positive in 14 patients in our study. Patients with SLE (n=6/6), JDM (n=3/4), polyarticular JIA (n=4 /10) and patient with ERA (n=1/1) were detected ANA positive. RF was positive in 3 children with polyarticular JIA (n=3/10). HLA B-27 was positive in 2 patients – one patient with ERA (n=1/1), other patient with reactive arthritis (n=1/5).

Imaging: Joint erosion were detected in 9 children on X-ray, while joint effusion were detected in 62 (91.2%) children on USG.

Discussion

Arthritis in children can lead to significant complications and may be a manifestation of various disease processes. Clinicians must maintain a broad differential diagnosis with a high suspicion for conditions that can have serious outcomes, including infectious, musculoskeletal, autoimmune, and oncologic disorders.

We studied 68 cases, comprising 37 males and 31 females, with a male-to-female ratio of 1.2:1. The mean age was 7.3 years, ranging from 1 month to 12 years. Among these, 29 (42.6%) had chronic arthritis, while 39 (57.4%) presented with acute arthritis. Previous studies in the Indian population reported different male-to-female ratios: 1.6:1 in Patra PK's study from Patna, and 2.1:1 in Hegde A's study from northern India [5, 6]. Agarwal S's Mumbai study found equal gender distribution [7].

Juvenile idiopathic arthritis (JIA) was the most common arthritis in our study (n=22, 32.35%). Among JIA patients, 6 with systemic onset JIA (sJIA, n=6/10) had chronic arthritis, while 4 presented acutely. Rheumatoid factor (RF) positive polyarthritis was noted in 3 patients (n=3/10 polyarthritis), and RF-negative polyarthritis in 7 (n=7/10). Oligoarthritis and enthesitis-related arthritis (ERA) were rare (n=1 each).

Polyarthritis (10/22, 45%) and sJIA (10/22, 45%) were the predominant subtypes, followed by oligoarthritis and ERA. This aligns with Menon et al. from South India, where polyarthritis (26/62, 41.9%) was most common, followed by systemic JIA (32.3%) and ERA (1.6%) [8]. However, Rahman et al. in Bangladesh found polyarthritis (39%) followed by oligoarthritis (33%) as most common [9]. Studies from northern and southern India showed different patterns: Hegde et al. reported more ERA cases (20/56) [6], while Agarwal et al. found similar numbers of sJIA and ERA patients (n=18 each, 29.5%), followed by polyarthritis (n=16, 26.2%) and oligoarthritis (n=8, 13.1%) [7].

No cases of psoriatic arthritis were observed, consistent with Hegde et al. and Rahman et al. studies [6, 9]. The knee was the most commonly affected joint in JIA, corroborating Hegde et al.'s findings, followed by the wrist, ankle, and small joints [6].

Twenty percent of sJIA patients showed evanescent rash, compared to 61.1% in Agarwal et al.'s Mumbai study [7]. Among SLE patients, 66.6% had malar rash, 33.3% had oral ulcers, and 50% showed discoid rash. Andy SK et al. reported similar findings with malar rash in 72% and oral ulcers in 32% of pediatric SLE patients [10]. All juvenile dermatomyositis (JDM) patients (n=4) had Gottron's papules, and 75% had heliotrope rash. Shehata R et al. found Gottron's papules in 60% and heliotrope rash in 52% of JDM patients [11]. None of our patients had uveitis. Hegde et al. reported it as rare (3.5%) [4], whereas Berthold et al. found a 10.8% incidence of uveitis in Swedish JIA patients (8% chronic) [12].

Antinuclear antibody (ANA) positivity was found in 14 patients (20.6%). All SLE patients (6/6) were ANA positive, along with 75% of JDM (3/4), 20% of polyarthritis (2/10), one ERA patient, and two

with reactive arthritis. Three out of 10 polyarthritis patients (30%) were RF positive, higher than Paudyal BP et al.'s Nepal study reporting 15.3% RF positivity in polyarticular JIA [13].

Two patients were HLA-B27 positive: one with ERA and one with reactive arthritis. The reactive arthritis patient had axial (sacroiliac joint) and large peripheral joint involvement. Shougrakpam noted that HLA-B27-associated rheumatoid arthritis features more axial joint pain and involvement [14]. The ERA patient with HLA-B27 positivity had polyarticular disease. Hegde A et al. and Agarwal S et al. found high HLA-B27 positivity among ERA patients (70% and 83%, respectively) [6, 7].

Platelet counts were significantly higher in patients with chronic rheumatological arthritis (CRA)—JIA, inflammatory bowel disease (IBD), ERA—compared to non-CRA patients ($p=0.039$). Tekeli AA et al. reported thrombocytosis in 72% of JIA patients [15]. Significantly elevated triglyceride levels ($p=0.008$) were also observed in CRA compared to non-CRA patients. Sun et al. noted increased triglycerides during active systemic and polyarticular JIA ($p<0.05$) [16]. Rodríguez-Carrio J et al. also linked high triglyceride levels with inflammation in rheumatoid arthritis [17].

Imaging: While JIA remains a clinical diagnosis, imaging is crucial to exclude other causes of joint swelling, monitor disease progression, and assess treatment response. X-ray and ultrasonography (USG) are readily available and help differentiate joint inflammation, tenosynovitis, tumours, or fractures.

In our cohort, 91.2% had joint effusion on USG, and 13.2% (n=9) showed joint erosions on X-ray. Erosions were mostly seen in polyarticular JIA (5/10), with 2 RF-positive cases. Other erosions occurred in one ERA, one sJIA, and one hemophilic arthropathy patient.

Limitations: Our study has limitations: it is a single-center, cross-sectional study with a small sample size, limiting generalizability. Larger, multicenter epidemiological studies across India are needed. Additionally, MRI was not used due to resource constraints. There is limited data on arthritis from Eastern India, and our study aims to provide valuable insights to help bridge this gap.

Conclusion

In our study, the most common causes of acute arthritis were Henoch-Schönlein purpura (HSP) and systemic lupus erythematosus (SLE). Juvenile idiopathic arthritis (JIA) was the most prevalent disorder overall. The common subtypes of JIA were polyarthritis and systemic onset JIA (sJIA). ANA positivity was observed in 20.6% of patients, although it was uncommon among those with JIA.

Conflicts of interest

Authors declare no conflicts of interest.

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