Original Article

Clinicolaboratory Profile and Follow-up Study of Children with Oligoarticular Juvenile Idiopathic Arthritis in a Tertiary Care Hospital

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Abstract

Background: Oligoarticular juvenile idiopathic arthritis (OJIA) is the commonest subtype of juvenile idiopathic arthritis and is associated with chronic synovitis, joint deformity, and uveitis. Data regarding its clinical profile and outcomes from India remain limited. The aim is to assess the clinical and laboratory profile of children with oligoarticular JIA and evaluate their treatment response and outcome during follow-up. **Material and Methods:** This prospective and retrospective observational study was conducted at the Indira Gandhi Institute of Child Health, Bengaluru, between August 2022 and February 2024. Children diagnosed with oligoarticular JIA according to ILAR criteria were enrolled and followed for one year. Demographic, clinical, laboratory, ophthalmological, treatment, and outcome data were collected and analysed using SPSS version 25.0. **Results:** A total of 101 children were enrolled, of whom 82 completed one-year follow-up. Females constituted 64.4% of the study population, and the median age at disease onset was 5.75 years. The knee was the most commonly affected joint (77.2%). ANA positivity was observed in 29.7% of children, while uveitis developed in 14.6% of those completing follow-up and was more frequent among ANA-positive patients. Methotrexate was administered to 90.2% of patients, intra-articular corticosteroids to 50.0%, and TNF inhibitors to 7.3%. At one year, 68.3% achieved inactive disease, 58.5% were in remission on medication, 9.8% achieved remission off medication, and joint deformity was present in 9.8%. **Conclusion:** Early diagnosis according to ILAR criteria and prompt institution of methotrexate-based therapy resulted in favorable disease control in most children. Regular ophthalmological screening, particularly in ANA-positive patients, remains essential for early detection and management of uveitis.

Keywords: Oligoarticular juvenile idiopathic arthritis, ILAR, antinuclear antibody, uveitis, methotrexate, remission.

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Introduction

Juvenile idiopathic arthritis (JIA) is the most common chronic rheumatic disease of childhood and comprises a heterogeneous group of inflammatory arthritides of unknown etiology that begin before the age of 16 years and persist for at least six weeks after exclusion of other causes of arthritis. Persistent synovial inflammation may lead to pain, joint swelling, limitation of movement, growth disturbances, deformities, and functional disability if not diagnosed and treated early. In addition to musculoskeletal manifestations, JIA is associated with significant extra-articular complications, particularly chronic anterior uveitis, which may result in irreversible visual impairment if not detected and managed promptly.[1,2]

The International League of Associations for Rheumatology (ILAR) classifies JIA into seven subtypes based on clinical and laboratory characteristics during the first six months of illness. Oligoarticular juvenile idiopathic arthritis (OJIA) is defined by involvement of four or fewer joints during the initial six months of disease and is further categorized into persistent and extended oligoarthritis depending on disease progression after six months. Oligoarticular JIA represents the most common subtype in Europe and North America, accounting for approximately 40–60% of all JIA cases, although its prevalence is relatively lower in Asian populations.[1,3]

Oligoarticular JIA predominantly affects young children, particularly girls, with the peak age of onset between two and six years. The knee is the most frequently involved joint, followed by the ankle and elbow. The disease usually presents with painless joint swelling, morning stiffness, limp, or reduced joint mobility rather than severe pain, often resulting in delayed diagnosis. Although the disease generally has a favorable prognosis compared with other JIA subtypes, untreated synovitis may progress to joint contractures, limb-length discrepancy,

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deformity, and functional limitation.[2,4]

Antinuclear antibody (ANA) positivity is observed in nearly one-third to one-half of children with oligoarticular JIA and is an established risk factor for chronic anterior uveitis. Uveitis is often asymptomatic in its early stages, making regular ophthalmological screening essential. Delayed recognition may result in cataract, glaucoma, band keratopathy, and permanent visual loss. Current recommendations advocate periodic slit-lamp examination, particularly in ANA-positive young children with early-onset disease.[4,5]

The management of oligoarticular JIA has evolved considerably over the past decade. Non-steroidal anti-inflammatory drugs, intra-articular corticosteroid injections, methotrexate, and biological disease-modifying antirheumatic drugs (DMARDs), including tumor necrosis factor (TNF) inhibitors, have substantially improved disease control and long-term outcomes. International treat-to-target recommendations emphasize achieving clinical inactive disease through early diagnosis, regular disease activity assessment, timely escalation of therapy, and multidisciplinary follow-up.[4,6]

Despite these advances, the clinical spectrum, laboratory profile, treatment response, and long-term outcomes of oligoarticular JIA vary across different geographic regions. Data from the Asian subcontinent remain relatively limited, and differences in genetic background, environmental factors, healthcare access, and referral patterns may influence disease presentation and prognosis. Institution-specific studies are therefore important to understand the local disease profile and optimize management strategies.[3,7]

In view of the limited Indian data, the present study was undertaken to evaluate the clinical and laboratory profile of children diagnosed with oligoarticular juvenile idiopathic arthritis attending a tertiary care pediatric rheumatology center and to assess their clinical outcome during follow-up, with particular emphasis on joint deformity, uveitis, and response to treatment.

Materials and Methods

Study Design: This was a hospital-based prospective and retrospective observational study conducted to evaluate the clinical profile, laboratory characteristics, treatment response, and follow-up outcomes of children with oligoarticular juvenile idiopathic arthritis (OJIA).

Study Setting: The study was carried out in the Department of Pediatric Rheumatology, Indira Gandhi Institute of Child Health (IGICH), Bengaluru, a tertiary care referral center for pediatric rheumatic disorders.

Study Duration: The study was conducted over 18 months, from August 2022 to February 2024.

Study Population: The study included children attending the Pediatric Rheumatology Outpatient Department or admitted to IGICH with a diagnosis of oligoarticular juvenile idiopathic arthritis according to the International League of Associations for Rheumatology (ILAR) classification criteria.

Sample Size: The sample size was estimated using the formula:

$n = Z^2PQ/d^2$

where P = 5% (prevalence reported by Hegde et al.), Z = 1.96 at 95% confidence interval, and d = 5% absolute precision.

The calculated minimum sample size was 73. After adding 10% for possible non-response and loss to follow-up, the required sample size was 80. During the study period, 101 eligible children were enrolled, all of whom were included in the analysis.

Inclusion Criteria

- Children younger than 16 years diagnosed with oligoarticular juvenile idiopathic arthritis according to ILAR criteria.
- Newly diagnosed patients and previously registered OJIA patients attending follow-up during the study period.
- Parents or legal guardians willing to provide written informed consent.

Exclusion Criteria

- Other ILAR categories of juvenile idiopathic arthritis, including systemic-onset, polyarticular, psoriatic, enthesitis-related, and undifferentiated arthritis.
- Secondary causes of arthritis including traumatic arthritis, septic arthritis, reactive arthritis, connective tissue diseases (systemic lupus erythematosus, juvenile dermatomyositis, mixed connective tissue disease), vasculitis, hematological malignancies, metabolic disorders, and acute rheumatic fever.

Study Procedure: Institutional Ethics Committee approval was obtained before commencement of the study. Written informed consent was obtained from parents or legal guardians prior to enrolment.

Detailed demographic information, age at onset, age at diagnosis, duration of symptoms, affected joints, family history, clinical examination findings, and extra-articular manifestations were recorded using a predesigned case record form.

Laboratory investigations performed according to institutional protocol included complete blood count, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), antinuclear antibody (ANA), rheumatoid factor (RF), liver and renal function tests, and other investigations when clinically indicated. Slit-lamp ophthalmological examination was performed for screening and diagnosis of uveitis.

Treatment details including use of non-steroidal anti-inflammatory drugs, intra-articular corticosteroid injections, methotrexate, biological agents, and physiotherapy were documented.

Patients were evaluated at enrolment and subsequently followed up at 6 months and 12 months. Disease activity, joint involvement, development of deformities, uveitis, treatment response, adverse effects, and achievement of inactive disease status were assessed during each follow-up visit.

Outcome Measures

Primary Outcomes

- Clinical and laboratory profile of children with oligoarticular juvenile idiopathic arthritis.
- Clinical outcome during follow-up in terms of disease activity, joint deformity, and treatment response.

Secondary Outcomes

- Frequency of ANA positivity and uveitis.
- Pattern of joint involvement.
- Requirement for methotrexate, intra-articular steroids, and

biological therapy.
- Disease remission and inactive disease at follow-up.

Ethical Considerations: The study was approved by the Institutional Ethics Committee of Indira Gandhi Institute of Child Health, Bengaluru. Confidentiality of patient information was maintained throughout the study, and participation was voluntary.

Statistical Analysis: Data were entered into Microsoft Excel and analysed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation or median with interquartile range according to data distribution, while categorical variables were presented as frequencies and percentages. Comparisons between continuous variables were performed using the paired Student's t-test where appropriate. Categorical variables were analysed using the Chi-square test or Fisher's exact test. A p-value of <0.05 was considered statistically significant.

Results

A total of 101 children with oligoarticular juvenile idiopathic arthritis (OJIA) were enrolled in the study. Of these, 89 (88.1%) attended the first follow-up at 6 months and 82 (81.2%) completed the 12-month follow-up. Persistent oligoarticular JIA was observed in 94 (93.1%) children, while 7 (6.9%) progressed to extended oligoarticular JIA.

Table 1: Baseline demographic and clinical characteristics of the study population (n=101)

Parameter	Value
Female	65 (64.4%)
Male	36 (35.6%)
Persistent oligoarticular JIA	94 (93.1%)
Extended oligoarticular JIA	7 (6.9%)
Median age at presentation, years (IQR)	6.4 (4–10.5)
Median age at disease onset, years (IQR)	5.75 (3–9.5)
Median duration before diagnosis, months (IQR)	6 (2–12)
Median number of joints involved	2 (1–3)

Female children predominated (64.4%). Most patients had persistent oligoarticular disease, with a median age at onset of 5.75 years and a median diagnostic delay of 6 months.

Table 2: Clinical manifestations, joint involvement, and laboratory profile (n=101)

Parameter	n (%) / Mean ± SD
Pain and tenderness	100 (99.0)
Restriction of movement	101 (100)
Joint swelling	93 (92.0)
Early morning stiffness	68 (67.3)
Fever	14 (13.8)
Synovial thickening	13 (12.8)
Uveitis at presentation	7 (6.9)
Knee involvement	78 (77.2)
Ankle involvement	32 (31.6)
Hip involvement	14 (13.8)
Wrist involvement	11 (10.8)
Elbow involvement	10 (9.9)
Small joints	7 (6.9)
Shoulder involvement	2 (1.9)
Hemoglobin (g/dL)	11.2 ± 1.4
Total leukocyte count (/µL)	10,592 ± 3,996
Platelet count (lakh/µL)	3.7 ± 1.2
SGOT (IU/L)	27.9 ± 12.9
SGPT (IU/L)	23.2 ± 10.1
Elevated ESR	63 (62.4)
Elevated CRP	20 (19.8)
ANA positive	30 (29.7)
RF positive	7 (6.9)

Pain, restricted joint movement, and knee involvement were the predominant clinical features. Approximately one-third of patients were ANA positive, while RF positivity was uncommon.

Table 3: Follow-up findings, treatment, and disease outcome among children completing the study (n=82)

Parameter	n (%)
Follow-up completed	82 (81.2)
Uveitis during follow-up	12 (14.6)
Methotrexate therapy	74 (90.2)
NSAIDs	80 (97.6)
Intra-articular corticosteroids	41 (50.0)

TNF inhibitors	6 (7.3)
Physiotherapy	82 (100)
Active disease at 12 months	26 (31.7)
Inactive disease	56 (68.3)
Remission on medication	48 (58.5)
Remission off medication	8 (9.8)
Joint deformity	8 (9.8)

Most children required methotrexate, while half received intra-articular corticosteroids. At one year, over two-thirds achieved inactive disease, and joint deformity was observed in fewer than 10% of patients.

Table 4: Characteristics of children with uveitis (n=12)

Parameter	n (%)
Total uveitis cases	12 (14.6)
Female	9 (75.0)
Male	3 (25.0)
ANA positive	8 (66.7)
ANA negative	2 (16.7)
ANA not performed	2 (16.7)
Required corticosteroids	8 (66.7)
Required surgical intervention	2 (16.7)
Median interval from JIA diagnosis to uveitis (months)	6 (2–12)

Uveitis occurred predominantly in ANA-positive girls and developed within six months of diagnosis in most patients. Two children required surgical intervention for ocular complications.

Table 5: Comparison between ANA-positive and ANA-negative children

Variable	ANA Positive (n=30)	ANA Negative (n=36)	p-value
Mean age at presentation (years)	5.3 ± 3.6	7.4 ± 4.2	0.03
Mean age at onset (years)	5.6 ± 3.5	5.8 ± 1.8	0.05
Duration before diagnosis (months)	7.4 ± 5.1	9.3 ± 5.2	0.02
Uveitis	8 (28.6%)	2 (7.4%)	0.04
Median ESR (mm/hr)	24 (10–30)	38 (21.5–56)	0.011
Extended oligoarthritis	4 (13.3%)	3 (8.3%)	0.39
Joint deformity	2 (6.6%)	2 (5.5%)	0.85
Inactive disease at final follow-up	26 (86.7%)	27 (75.0%)	0.23

ANA-positive children presented at a younger age and had a significantly higher frequency of uveitis than ANA-negative children (28.6% vs. 7.4%; p=0.04). No significant differences were observed in disease progression, deformity, or treatment outcomes between the two groups.

Discussion

Oligoarticular juvenile idiopathic arthritis (OJIA) is the most common subtype of juvenile idiopathic arthritis and generally has a favorable prognosis when diagnosed and treated early. Delayed diagnosis, however, may result in persistent synovitis, joint deformity, growth disturbances, and chronic anterior uveitis. The present study evaluated the clinical profile, laboratory characteristics, treatment response, and one-year outcomes of children with OJIA at a tertiary care center. The findings demonstrated female predominance, early childhood onset, predominant knee involvement, frequent ANA positivity, favorable response to methotrexate-based therapy, and a high proportion of children achieving inactive disease after one year.

Females constituted 64.4% of the study population, with a median age at disease onset of 5.75 years, consistent with the epidemiological pattern reported by Guzman et al., who observed that oligoarticular JIA predominantly affects preschool-aged girls and generally has a favorable prognosis with contemporary treatment.[9] The median delay of six months between symptom onset and diagnosis highlights the need for earlier recognition and referral to minimize long-term joint damage.

Pain, restriction of joint movement, and joint swelling were the most frequent presenting features, while the knee was the commonest joint involved, followed by the ankle and hip. Similar patterns have been reported by Ringold et al., emphasizing that large weight-bearing joints are predominantly affected and respond well to early intra-articular corticosteroids and disease-modifying therapy.[10]

ANA positivity was observed in nearly one-third of patients and was significantly associated with younger age at presentation and a higher frequency of uveitis. During follow-up, uveitis developed in 14.6% of children, most of whom were females and ANA positive, with a median interval of six months from arthritis diagnosis. These findings are consistent with reports by Shenoi et al. and current international recommendations, which identify ANA positivity as a major risk factor for chronic anterior uveitis and advocate regular slit-lamp screening for early detection.[11,12]

Methotrexate was the principal disease-modifying agent and was administered to over 90% of children completing follow-up. Half of the patients required intra-articular corticosteroid injections, whereas TNF inhibitors were necessary in only a few refractory cases. These observations support current treatment guidelines

recommending a stepwise approach with methotrexate as the first-line DMARD and biologic therapy for persistent disease activity.[10–12]

Clinical outcomes were favorable, with 68.3% of children achieving inactive disease after one year and fewer than 10% developing joint deformity. ANA-positive children had significantly higher rates of uveitis but showed treatment response and remission rates comparable to ANA-negative patients, suggesting that ANA positivity predicts ocular involvement rather than poorer articular outcome.[13]

The strengths of this study include comprehensive clinicolaboratory evaluation and prospective follow-up using standardized disease activity criteria. Limitations include the single-center design, relatively small sample size, incomplete ANA and RF testing in some patients, and a follow-up period limited to one year. Larger multicenter studies with longer follow-up are needed to evaluate long-term remission, relapse, and functional outcomes.

Overall, early diagnosis according to ILAR criteria, timely initiation of methotrexate-based therapy, appropriate use of biologic agents when indicated, and regular ophthalmologic surveillance resulted in favorable disease control and a low incidence of joint deformity and vision-threatening complications.

Conclusion

Oligoarticular juvenile idiopathic arthritis predominantly affected young female children, with the knee being the most commonly involved joint. ANA positivity was associated with a significantly higher risk of uveitis, emphasizing the importance of regular ophthalmologic screening. Methotrexate-based therapy, supplemented by intra-articular corticosteroids and biologic agents when required, resulted in inactive disease in most children after one year of follow-up, while joint deformity remained uncommon. Early diagnosis using ILAR criteria, timely initiation of disease-modifying therapy, and regular multidisciplinary follow-up are essential for achieving favorable long-term musculoskeletal and ocular outcomes.

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Conflicts of interest

There are no conflicts of interest.

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