Research Article

Functional health assessment of children suffering from juvenile idiopathic arthritis

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ABSTRACT

Background: Juvenile idiopathic arthritis (JIA) is an autoimmune, non-infective, inflammatory joint disease of more than 6 weeks duration in children less than 16 years of age. The disease commonly occurs in children from the ages of 7 to 12, but it may occur in adolescents as old as 15 years of age, as well as in infants. The aim of this study was to assess health and functional status of children suffering from juvenile idiopathic arthritis for a period of one year using childhood health assessment questionnaire and disease activity score.

Methods: In the present study, children less than 12 years with JIA attending the rheumatology OP (out- patient) and general ward of the Institute of Child Health (Tamil Nadu, India), were selected. Thus a total of 54 cases were enrolled in the study. They were investigated and assessed for functional status based on childhood health assessment questionnaire and disease activity score. They were followed up for one year and also re-assessed for their functional status after one year.

Results: The mean age of the study children was 7.83 ± 2.2 years. It was seen that systemic onset type of arthritis (55.6%) was the most common type. Joint pain was the presenting complaint among all the children (100%). Fever was present in 85.2% children. Almost every joint was involved in study population; knee (88.9%) was the commonest joint involved. 74.6% of children had wrist involvement and ankle involvement was found in 70.4% cases. The mean score of functional status was 1.03 ± 0.26; after a period of 1 year none had severe disability while the mean score was 0.89 ± 0.42. Disease activity index was 2.85 ± 0.84 and after a period of 1 year it was found to be 2.76 ± 0.68.

Conclusions: The mean age of children with JIA was 7.83 ± 2.2 years with joint pain and fever as most common presentation. Although all joints were involved, knee joint was the commonest. The childhood health assessment questionnaire for the assessment of the functional status and disease activity index were simple tools, with good ability to predict disease outcome.

Keywords: Childhood health assessment questionnaire, Juvenile idiopathic arthritis, Functional status

INTRODUCTION

Juvenile rheumatoid arthritis (JRA) is the most common arthritis of childhood. It represents a group of disorders that share the clinical manifestation of chronic joint inflammation. The etiology is unknown, and the genetic component is complex, making clear distinctions between the various subtype is also difficult. As a result, the various sets of classification criteria that have been recognized have different benefits and limitations. A new nomenclature, Juvenile Idiopathic Arthritis (JIA), is being increasingly used in order to define the subgroups better.

JIA is an autoimmune, non-infective, inflammatory joint disease of more than 6 weeks duration in children less than 16 years of age. The disease commonly occurs in children from the ages of 7 to 12, but it may occur in adolescents as old as 15 years of age, as well as in infants.[1] In the United States approximately 300000 children are estimated to have some type of arthritis. The incidence of JIA ranges from 4-14 cases per 100000 children annually.[2] The cardinal clinical feature is persistent swelling of the affected joint(s), which commonly include the knee, ankle, wrist and small joints of the hands and feet. Swelling may be difficult to detect clinically, especially for joints such as those of the spine, sacroiliac joints, shoulder, hip and jaw, where imaging techniques such as ultrasound or magnetic resonance imaging (MRI) are very useful.

The 3 major types of JIA are: oligoarticular JIA, polyarticular JIA and systemic JIA.[3,4] The assessment of the health and functional status of children with JIA can be done by using various methods but the childhood health assessment questionnaire (CHAQ) is most useful. It was derived from the adult HAQ which comprises two indices i.e. disability and discomfort. The disability index assesses function in eight areas (dressing and grooming, arising, eating, walking, hygiene, reach, grip and activities), distributed among a total of 30 items.[5] The aim of this study was to assess health and functional status of children suffering from juvenile idiopathic arthritis for a period of one year using childhood health assessment questionnaire and disease activity score.

METHODS

The present longitudinal observational study was conducted in the Institute of Child Health Hospital Chennai (South-Eastern coast of India). For the purpose of study, children less than 12 years of age with juvenile idiopathic arthritis attending the Rheumatology OP and general ward of the institute of Child Health were selected. Thus a total of 54 cases were enrolled and assessed in the study from Nov 2009 to Jan 2013.

All diagnosed cases of juvenile idiopathic arthritis based on International League of Associations for Rheumatology (ILAR) criteria were enrolled in the study. Children with juvenile idiopathic arthritis associated with other chronic illnesses were excluded. Detail history and findings of clinical examinations were recorded in a pre-structured proforma. They were investigated and assessed for functional status based on Childhood Health Assessment Questionnaire and Disease Activity Score (5.0 ned version). They were followed up for one year and also re-assessed for their functional status after one year. The Childhood Health Assessment Questionnaire (CHAQ) is the most widely used functional health status measure in children with Juvenile Idiopathic Arthritis (JIA).[6] It assesses functional ability in 8 domains of physical function (30 items) for children between the ages of 6 months up to 18 years. Each item is scored on a

four point scale ranging from 0(without any difficulty), 1(with some difficulty), 2 (with much difficulty), and 3 (unable to do). Utilization of assistance and or aids in a domain sets the score to a minimum of 2 for that domain. The mean score of the eight domains finally makes up the disability index and ranges from 0 (no disability) to 3 (disabled).[5] The disability index is supplemented with two visual analogue scale (VAS) scores: one for pain, and one for global assessment of overall well-being. Validity and reliability has been reported in previous studies.[5-10] Written informed consent was obtained from at least 1 parent of all participating children. A P value <0.05 was considered statistically significant.

RESULTS

It was observed that out of 54 children, 30 (55.6%) were of less than 8yrs of age whereas 24 (44.4%) were of age more than 8 years of age. The mean age of the children studied was 7.83 ± 2.2 years. Proportion of male children was 51.9% and that of female was 48% (Table 1).

Table 1: Age and sex wise distribution of children with IJA.

Variables		Number of patients	Percentage
Age	< 8 years	30	55.6%
	>8 years	24	44.4%
Sex	Male	28	51.9%
	Female	26	48.1%

It was seen that systemic onset type of arthritis (55.6%) was the most common type followed by polyarticular type (29.6%) and oligoatricular type (14.8%). Among clinical features, joint pain was the presenting complaint among all the children. Fever was present in 85.2% children while 20.4% had rashes, 37% had hepatomegaly. Joint swelling was present in 31.5% children and 29% had lymphadenopathy. None had involvement of heart and eyes. It was observed that almost every joint was involved in the study population. Knee (88.9%) was the commonest joint involved. 74.6% had wrist involvement. Ankle involvement was found in 70.4% cases. 42.6% children had involvement of elbow. There was evidence of small joint involvement also. Metacarpophalangeal (51.9%), proximal interphalangeal (29.6%), metatarsophalangeal (22.2%) joint were also involved. Hip, shoulder and cervical joint involvement were also seen in few cases (Table 2).

Children were assessed for their functional status using Health Assessment Questionnaire in their initial visit and were graded accordingly. It was seen that 7.4% children did not have disability, 38.9% had mild disability, 27.8% had moderate disability and 9.3% cases had severe disability. 9 (16.7%) patients were not applicable as they were below 3 years. The mean score was 1.03 ± 0.26. After a period of 1 year none had severe disability. 18.5% cases were found to be free of disability, 38.9 % had mild

and 25.9% had moderate disability. The mean score was 0.89 ± 0.42 (Table 3 and Figure 1).

Table 2: Distribution according to characteristics of presentation of IJA.

Variables		No. of patients	%
Type	Oligoarticular	8	14.8%
	Polyarticular	16	29.6%
	Systemic onset	30	55.6%
	Fever	46	85.2%
	Rash	11	20.4%
	Hepatomegaly	20	37%
	Joint pain	54	100%
Symptoms	Joint swelling	17	31.5%
	Lymphadenopathy	16	29%
	Pericarditis	0	0%
	Uveitis	0	0%
Joint involvement	Cervical	4	7.4%
	Shoulder	3	5.6%
	Elbow	23	42.6%
	Wrist	40	74.6%
	Metacarpophalangeal	28	51.9%
	Proximal interphalangeal	16	29.6%
	Hip	1	1.9%
	Knee	48	88.9%
	Ankle	38	70.4%
	Metatarsophalangeal	12	22.2%

Table 3: Distribution according to childhood health assessment questionnaire scale.

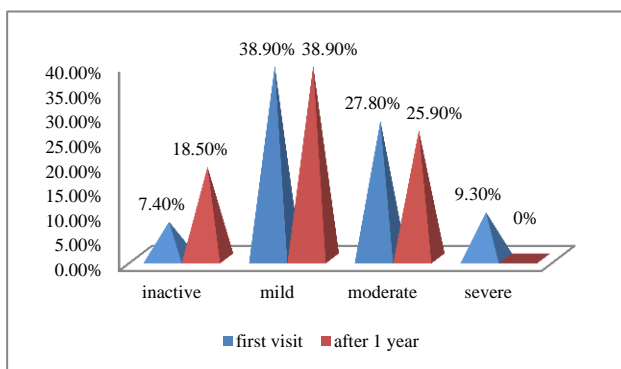| Variables	First visit		After one year	
	No. of patients	%	No. of patients	%
Inactive	4	7.4	10	18.5
Mild	21	38.9	21	38.9
Moderate	15	27.8	14	25.9
Severe	5	9.3	0	0

Figure 1: Distribution according to childhood health assessment questionnaire scale.

Disease activity index was also calculated in the study and it was observed that 59.3% had mild disease activity, 35.2% had moderate activity and 5.6% had severe disease activity. The mean score was 2.85 ± 0.84. After a period of one year, none of the children had severe disease activity. 83.3% had mild activity and 16.7% cases had moderate disease activity. The mean score was found to be 2.76 ± 0.68 (Table 4 and Figure 2).

Table 4: Distribution according to disease activity index.

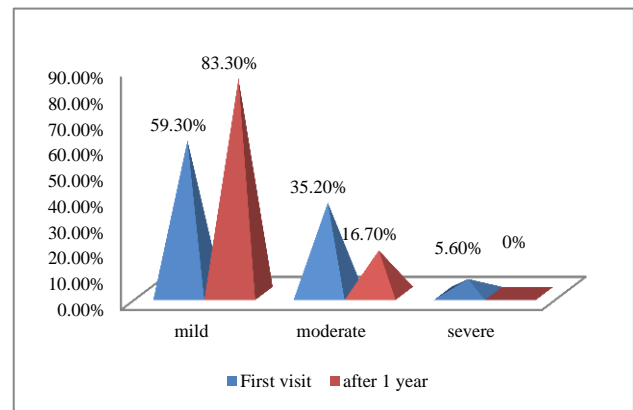| Variables	First visit		After one year	
	No. of patients	%	No. of patients	%
Mild	32	59.3	45	83.3
Moderate	19	35.2	9	16.7
Severe	3	5.6	0	0

Figure 2: Distribution according to disease activity index.

DISCUSSION

It was observed that the mean age of patients was 7.83 ± 2.2 years. Most of the children were affected between 9 to 11 years. In the present study males (51.9%) were outnumbering females (48.1%). This was concurrent with two Indian studies by Gurkirpal et al.[11] and Surjit Singh et al.[12] The commonest type of arthritis observed in the present study was systemic onset followed by polyarticular. This was in contrast to previous studies done by Singh et al.[12] and Sircar et al.[13] who observed oligoarticular as the commonest type.

Among clinical features, joint pain was the presenting complaint among all the children. Fever was present in 85.2% children while 20.4% had rashes, 37% had hepatomegaly. Joint swelling was present in 31.5% children and 29% had lymphadenopathy. None had involvement of heart and eyes. It was observed that almost every joint was involved in the study population. Knee (88.9%) was the commonest joint involved. 74.6% had wrist involvement. Ankle involvement was found in 70.4% cases. 42.6% children had involvement of elbow.

There was evidence of small joint involvement also such as metacarpophalangeal (51.9%), proximal interphalangeal (29.6%), metatarsophalangeal (22.2%) joint were also involved. Hip, shoulder and cervical joint involvement were also seen in few cases.

The functional status of children was assessed using childhood health assessment questionnaire in their initial visit. It was seen that 7.4% children did not have disability, 38.9% had mild disability, 27.8% had moderate disability and 9.3% cases had severe disability. 9 (16.7%) patients were not applicable as they were below 3 yrs. The mean score was 1.03 ± 0.26. After regular treatment for one year all the children were reassessed and it was observed that none of the child had severe disability. 18.5% cases were found to be free of disability, 38.9% had mild and 25.9% had moderate disability. The mean score was 0.89 ± 0.42.

Hyrich et al.[14] studied 740 children with JIA in their study. They observed that median presenting CHAQ score was 0.63 and it was decreased to 0.25 at 1 year. 32% children had CHAQ ≥0.75 at 1 year. The strongest predictor of CHAQ ≥0.75 at 1 year was CHAQ ≥0.75 at presentation (odds ratio 3.92; 95% CI 2.17, 7.09).

Susic et al.[15] studied the functional status of children with JIA by using the Childhood Health Assessment Questionnaire (CHAQ). Their study included 87 patients with the average age of 14 years and was under follow-up on an average of 3.7 years. Parents/patients over 12 years completed CHAQ based on which Disability Index (DI) was calculated. They observed that at the end of the follow-up period, functional ability improved significantly (0.541 vs. 0.398; P<0.05). The progression of the disease was measured by using the Disease activity index. It was observed that 59% had mild disease activity, 35.2% had moderate activity and 5.6% had severe disease activity. The mean score was 2.85. After a period of 1 year treatment it was observed that none of the children had severe disease activity. Whereas 83% had mild activity and 16% cases had moderate disease activity. The mean score was found to be 2.76. Thus the disease activity was observed to be decreased with treatment.

Jansena et al.[16] studied 33 patients and observed that the median HAQ score at entry was 1.12 (range 0-3). An HAQ score under the 50th percentile at entry could be predicted correctly for 74% of patients by entry Disease Activity Score (DAS) and C-reactive protein (CRP) concentration and at one year could be predicted correctly for 73% of patients by entry HAQ and pain score.

CONCLUSION

Thus we observed that the mean age of the study children with JIA was 7.83 ± 2.2 years with joint pain and fever as most common presentation. Although all the joints were involved, knee joint was the commonest. The childhood health assessment questionnaire for the assessment of the functional status and Disease activity index were simple tools, with good ability to predict disease outcome. Thus the childhood health assessment questionnaire is useful to assess the functional disability and also to measure the outcome of treatment.

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