Section: Paediatrics

Original Research Article

STUDY OF NEONATAL JUINDICE ASSOCIATED WITH AUTISM SPECTRUM DISORDERS IN GUJARAT POPULATION

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Abstract

Background: Autism spectrum disorders (ASD) are neuro developmental disorder characterized by impairments in social interaction, abnormalities in verbal and non-verbal communication, and elevated bilirubin levels, which cause toxic effects on the central nervous system and aggravate the ASD. **Materials and Methods:** 95 ASD and 95 controlled groups aged between 11 months to 3 years were studied. Every child was subjected to a serum bilirubin test, and some patients having higher levels were subjected to phototherapy, and obtained to results were compared. **Result:** The age differences in children were 11 months, 2 years, and 3 years; firstborn were 82 (86.3%) in ASD, and products of multiple gestations were 5 (5.26%). There was a significant p value in S. Bilirubin in ASD patients. Maximum reported S. Bilirubin was between 48 (50%) (between 10 mg/dl to > 25 mg/dl), and 4 (4.2%) received phototherapy. **Conclusion:** The children with ASD having elevated S. Bilirubin cause neurotoxicity and aggrevate neuro developmental disorders characterized by social withdrawal and unnatural social life.

INTRODUCTION

Autism Spectrum Disorders (ASD) are a heterogeneous group of lifelong neuro developmental disorders characterized by significantly unnatural or impaired social interaction and participation, difficulty communicating, and restricted behaviors and interests.[1] Risk factors for ASD include genetic factors, environmental factors, maternal obesity, alcohol intake, and pregnancy complications such as preeclampsia and antenatal hemorrhage.[2] Pregnancy supplements such as folic acid and vitamins are associated with a 40% reduction in the risk of ASD.[3]

Sleep disorders are a common problem for children with ASD and often remain untreated. Sleep disorders among ASD patients include anxiety, related brain pathologies, and an inability to regulate the sleep hormone melatonin. The problem of sleep disturbance affects social communication, quality of life, and increases parental sleep disruption and stress.[4] Hence, an attempt is made to evaluate the age, birth details, and co-morbidities of ASD in different age groups of children.

MATERIALS AND METHODS

95 children aged between 11 months to 3 years admitted at GME and R Society Medical College Hospital, Gotri, Vadodara, Gujarat-390021, were studied.

Inclusive Criteria:

Children having symptoms of autism are having neurodevelopment disorders characterized by persistent impairment in reciprocal social interaction and communication and sleep problems.

Exclusive Criteria

Children having epileptic seizures and normal LFT (liver function test) congenital anomalies of the crania or brain were excluded from the study.

Method: 95 diagnosed autism spectrum disease and 95 (normal) controlled groups were compared. Every child was subjected to Bilirubin ≥ 20 mg/d1. S. Bilirubin test was early morning (in the empty stomachs of the children) to get accurate results. These patients were noted treated; follow-up was done, but apart from the treatment, 90% of the children developed ASD.

The duration of the study was January 2023 to December 2023.

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Statistical Analysis: Both results of children were compared with t test and with percentage. The analysis was done in male and female children at 2:1.

RESULTS

[Table 1] Comparative study of children with autism spectrum disorder and controlled group:

a) Age differences: 11 months 30 (31.5%) Autism group, 32 (33.6%) controlled 2 years 50 (52.6%) Autism group, 45 (47.3%) controlled group, 3 years 15 (15.7%) Autism group, 18 (18.9%) in controlled group.

b) Birth details: premature-8 (8.42%) Autism group, 9 (9.47%) controlled group, First born: 82 (86.3%) in Autism group, 80 (84.2%) controlled group, product of multiple gestation: 5 (5.26%) in the autism group, 6 (6.31%) in the controlled group

[Table 2] (a) comparison of serum bilirubin mean value 2.5 (±1.2) in the ASD group and 2.0 (±1.6) in the controlled group; t test was 2.4 and p<0.001 (p value was highly significant).

(b) Maximum reported bilirubin ≥ 10 mg/dl was observed in 48 (50%) in the ASD group, 56 (58.9%) in the controlled group, SB ≥ 15 mg/dl was observed 25 (29.4%) in the ASD group, 28 (29.4%) in the controlled group, S.B. ≥ 20 mg/dl was observed in 5 (5.2%) in the ASD group, 7 (7.3%) in controlled group, S.B ≥ 25 mg/dl was observed in 2 (2.10%) in ASD group, 3 (3.15%) in the controlled group, 12 (12.6%) in the ASD group, and 18 (18.9%) in the in the controlled group received phototherapy.

Maximum bilirubin level ≥ mg/d1 and baby received phototherapy were 4 (4.21%) in the ASD group and 12 (12.6%) in the controlled group.

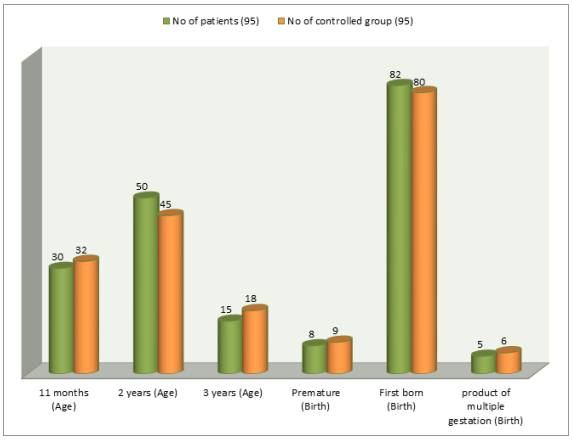

Figure 1: Comparative study of children with Autism spectrum disorders and controlled group

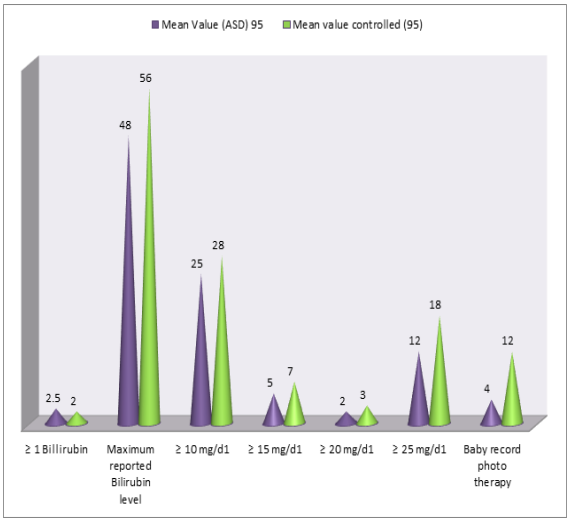

Figure 2: Study of Bilirubin levels and photo therapy

Table 1: Comparative study of children with Autism spectrum disorders and controlled group. No. of patients: 95

Sl No (a)	Particulars Age difference	No of patients (95)	Percentage (%)	No of controlled group (95)	Percentage (%)
1	11 months	30	31.5	32	33.6
2	2 years	50	52.6	45	47.3
3	3 years	15	15.7	18	18.9
(b)	Birth details				
1	Premature	8	8.42	9	9.47
2	First born	82	86.3	80	84.2
3	product of multiple gestation	5	5.26	6	6.31

(First born=Eldest or first lings)

Table 2: Study of Bilirubin levels and photo therapy

Sl No	Details	Mean Value (ASD) 95	Mean value controlled (95)	t test	p value
a	≥ 1 Billirubin	2.5 (SD±1.2)	2.0 (SD±1.6)	2.4	P<0.001
b	Maximum reported Bilirubin level ≥ 10 mg/d1 ≥ 15 mg/d1 ≥ 20 mg/d1 ≥ 25 mg/d1	48 (50%) 25 (26.3%) 5 (5.2%) 2 (2.10%) 12 (12.6%	56 (58.9%) 28 (29.4%) 7 (7.3%) 3 (3.15%) 18 (18.9%)		
c	Baby record photo therapy	4 (4.21%)	12 (12.6%)		

DISCUSSION

In the present, neonatal juindice associated with ASD in the Gujarat population. The age different was 11 months, 2 years, 3 years and premature birth was 8 (8.42%), and first born were 82 (86.3%), and products of multiple gestations were 5 (5.26%) [Table 1]. S. Billirubin level 2.5 (± 2) in ASD and 2.0 (± 1.6) in the controlled group; t test was 2.4 and p<0.001 (p value was highly significant). The

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maximum reported S. Bilirubin was 48 (50%) between (>10 mg/dl to ≥ 25 mg/dl), 4 (4.2%) baby received phototherapy [Table 2]. These findings were more or less in agreement with previous studies.[6-8] There is a biological pliability to suggest an association between bilirubin and ASD. Bilirubin is a known neurotoxin. The globes pallidus, cerebellum, hippo campus and sub thalamic nuclear bodies have been identified as areas in the brain vulnerable to bilirubin toxicity.[9] There is also evidence of lower gray matter volumes in the putamen and cerebellar hyperplasia in individuals with autism, creating a degree of overlap that may indicate shared mechanism.[10] Moreover, clinical features of bilirubin-induced neurological dysfunction may cause abnormalities in the secretion of neurotransmitters, which results in muscle tone abnormalities, Senso neural, audiological, and visuomotor dysfunction, hyper excitable neonatal reflexes, neuro behaviour manifestations, speech and language abnormalities, and intellectual disability. It is also hypothesized that unconjugated hyper bilirubinemia is a significant cause of ASD in premature and term infants. Hence, unconjugated hyperbilirubibemia may be linked to ASD and may have affected the prevalence of ASD globally.[11]

CONCLUSION

The present study of ASD in jaundice children aged between 11 months to 3 years old children provides evidence that children un-conjugated hyperbilirubinemea is associated with the development of ASD. Further prospective studies of genetic histo-pathological, nutritional, and hormonal studies in pregnant women are required to predict the unconjugated hyperbilinemia because the exact pathogenesis of the correlation between ASD and hyperbilirubinema is still unclear.

Limitation of Study: Owing to the tertiary location of the research centre, the small number of patients, and the lack of the latest technologies, we have limited findings and results.

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