The UCLA-University of Utah Epidemiologic Survey of Autism: Recurrent Infections


Two hundred and forty-one children with autism were ascertained and diagnosed (DSM-III criteria) in an epidemiologic survey of Utah. Pediatric and other pertinent medical records were abstracted for 233 patients and 66 of their siblings without autism for otitis media, upper respiratory, and other infections. A significantly greater number of children with autism had recurrent otitis media, upper respiratory and other infections than their non-autistic siblings. A greater number of children with autism with recurrent infections had lower IQ scores, seizures, hearing deficits, delayed motor milestones, poorer speech, congenital anomalies, feeding problems, vomiting, diarrhea, and other types of infections than children with autism with mild or no infections. The only significant pre-, peri-, or postnatal risk factors between children with autism with recurrent, mild or no infection was an increase in the maternal-fetal incompatibility (ABO or RH) in the recurrent infection group. Half the families with more than one child with autism had recurrent infections and 72% of those children with concurrent diseases which effect the CNS had recurrent infections. Methodological limitations are discussed.

Introduction

A large percentage of children experience at least one episode of otitis media by age 3 years and about a third more than three episodes (Teele et al., 1980). Early onset of otitis (Klein et al., 1984) and increased frequency play an important role in the risk of recurrence. The risk of recurrence increases 7 times with 1 or 2 episodes, 8 times with 3 to 6, and 165 times with more than 6 episodes (Kraemer et al., 1983).

Otitis media has been reported to occur with language disordered (Bishop & Edmundson, 1986; Gleason, 1988) Down’s syndrome (Brooks et al., 1972; Balkany et al., 1979) hyperactive (Hagerman & Falkenstein, 1987) learning disabled (Freeman & Perkins, 1979; Gottlieb et al., 1979; Secord et al., 1988), and Fragile-x (Hagerman et al., 1987) children. There are limited reports of otitis media co-occurring in children with autism. Konstantareas and Homatidis (1987) reported finding an increased incidence of ear infections in children with autism over their normal peers, and that lower functioning children with autism had an earlier onset than the higher functioning children with autism. Gordon (1989) reported an increased incidence of ear dysfunctions in autism. Smith et al. (1988) compared children with autism, learning disabled, and normal children, and found a greater negative tympanic pressure, typically bilateral, in children with autism than learning disabled children with serous otitis media.

Recent studies suggest that a sub-group of children with autism have immune system deficiencies which might render them susceptible to recurrent infections (Stubbs & Crawford, 1977; Weizman et al., 1982; Warren et al., 1986, 1987, 1990; Barboni et al., 1990; Marchetti et al., 1990a, 1990b; Yonk et al., 1990). We have also seen in clinical practice children with autism whose parents report that they have recurrent infections prior to one year of age. The earliest diagnosis of otitis media is usually several years before the diagnosis of autism.

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The purpose of this study was to investigate whether more children with autism had infections than their siblings and to identify the parameters which might differentiate the children with autism with recurrent infections with those with mild or no infections.

Methods

An epidemiologic survey of Utah was completed in which 489 possible children with autism born between 1963 and 1984 were ascertained. Two hundred and forty-one children were diagnosed as having autism (AU) (DSM-III criteria; APA, 1980) on a blind basis by at least two clinicians. There were 184 male and 49 female AUs and 36 male and 30 female siblings (SIBs) without autism available for study. Two hundred and eight AUs had adequate enough information on recurrent infections to study those infections. Details of the ascertainment, diagnosis, demographic data, prevalence, recurrence risks, familial aggregation, segregation analysis, natal factors, rare diseases, and psychological assessment of first-degree relatives have been previously reported (Ritvo et al., 1989a, 1989b, 1990; Jorde et al., 1990, 1991; Mason-Brothers et al., 1990; Freeman et al., 1989). Medical records of 233 AUs and 66 of their SIBs were surveyed for documentation of recurrent, mild or no otitis media and upper respiratory infections. The following records were available for the AU subjects: 79.8% obstetrical, 90.1% birth, 89.3% pediatric, 100% diagnostic and 98.3% school; and for their 66 SIBs: 85.5% obstetrical, 93.5% birth, 100.0% pediatric, 35.5% diagnostic and 74.2% school. Parents filled out a 500 item developmental questionnaire (available from E. Ornitz-UCLA) consisting of pre-, peri-, and postnatal data, early development, medical, and behavior problems for 85.8% of the AUs and 43.9% of the SIBs. Data from the parental questionnaire was not used to formulate data on recurrent infections but as a comparison of pediatric records.

An R-Base for DOS file was created for data management, with a CRUNCH statistical analysis program.

Data for otitis media and upper respiratory infections was derived from a review of the records from pediatricians, ear, nose, and throat (ENT) specialists, consultations with other pediatricians, emergency admissions to hospitals, and pediatric emergency clinics. Records for otitis media and upper respiratory infections were felt to be complete for 208 of the AUs and 66 of their SIBs. These medical records were reviewed for each child from birth to five years of age, the most common years for infections to occur. Data for otitis media (OM) and upper respiratory infections (URI) were broken down into three groups: no, mild and recurrent infections. The criteria for the three groups were: the no infection group had no evidence of any OM or URI in their pediatric records, the mild group had at least 1–4 infections per year, and the recurrent group 5 or more infections per year. Data was computed from the date of onset of these infections for a one year period then for the 2nd year, 3rd year, etc. These infections appeared to diminish for most children by the third year, so data for only the 1st two years is presented. The OM data was also combined with the URI data to form an “overall infection” group (OM + URI combined). Some of the pediatric records were difficult to read, and on occasion only the antibiotics prescribed for the child were listed, not the infection being treated. This type of deficient data was not included in the study since the type of infection could not be ascertained. Therefore, the recurrent infection group is probably underestimated.

Each child’s records were summarized on data coding sheets. Data for infections consisted of the following information: no. of episodes of OM and URI per year for each year from the time of onset of these infections, month (season) of infections, severity of infections (3 = recurrent, 2 = mild, 1 = no infection), number of occurrences and age of onset for pneumonia, bronchitis, and surgical procedures such as insertion of polyethylene (PE) tubes (i.e. grommets), tonsillectomy, adenoidectomy, and the age and number of PE tube insertions. The decision of the pediatrician to have PE tubes placed was usually based on the chronic nature of these infections. ENT specialists were consulted before they performed the surgical procedure. Data for IQ, seizures, hearing tests, and other problems of development were also recorded. Standardized tests such as the Bayley, Stanford-Binet, WISC, and Merrill-Palmer were used for IQ testing in the majority of children. Two hundred and eight AU children and 66 of their SIBs had pediatric records adequate enough to document data on recurrent infections. Separate variance T-tests were used for the T statistic because of unequal variances.