Do vaccines containing thimerosal cause autistic spectrum disorders in children?

METHODS

Design: Systematic review.

Data sources: PubMed and the Cochrane Library (1996–2004). Reference lists were hand searched.

Study selection and analysis: Eligible studies examined a possible link between thimerosal-containing vaccines and autistic spectrum or neurodevelopmental disorders, or reported the pharmacological characteristics ofethylmercury in humans. Data were extracted on study type, country of study, database or laboratory data examined, and bibliographical characteristics (author, journal, year of publication). Study methods were assessed by study design, type and size of study population, exposure and outcome definitions, validation of developmental diagnosis, sample size calculations, discussion of study power, and statistical methods.

Outcomes: Diagnosis of autistic spectrum disorder.

MAIN RESULTS

Twelve studies met inclusion criteria (seven cohort studies; three ecological studies, and two pharmacological studies ofethylmercury). Three cohort studies showed an association between thimerosal-containing vaccines and neurodevelopmental disorders including autism (see http://www.ebmentalhealth.com/supplemental for table). However, the studies were all published by the same authors, used overlapping datasets, and had crucial flaws in the methodology. For example, completeness in reporting, diagnostic accuracy and validity, and potential diagnostic and reporting bias cannot be properly assessed for each study. The remaining four cohort studies reported no association between thimerosal and neurodevelopmental disorders. The studies were generally well designed and analysed appropriately despite some limitations (see table). These results were supported by two of the three ecological studies, which showed an increase in autism in Denmark and Sweden since 1992, even though thimerosal-containing vaccines have not been used since 1992. Although limited by sample size, pharmacological studies in infants receiving thimerosal-containing vaccinations found that mercury levels in the blood were below the range of known toxicity.

CONCLUSIONS

There is no association between thimerosal-containing vaccines and autism in children and there is little to be gained from new studies investigating this association. Standard practice should not be changed in areas of the world that use thimerosal-containing vaccines.

Commentary

The reported prevalence of autism has increased at least fourfold over the past 30 years. This change may reflect broader diagnostic criteria, improved recognition and referral, leading to increased reporting. However, it is also possible that true autism prevalence is rising, caused by new pathogenic environmental exposures over the past 30 years. Published reports have raised concerns that mercury in vaccines is one such exposure. The hypothesis that autism spectrum disorders result from the preservative thimerosal deserves critical appraisal for at least three reasons. First, the pathogenesis of autism is not understood and plausible hypotheses may accelerate medical discovery. Second, parental worry about vaccine safety decreases vaccination rate. Third, allocation of resources for autism research should be guided by a methodical approach to acquiring and analysing data relevant to plausible hypotheses. Parker et al provide a critical assessment of the quality of published epidemiological studies testing the hypothesis that the preservative thimerosal causes autism. They conclude that reports of an association are based on poorly designed studies and that “there is no association between thimerosal-containing vaccines and NDDs (neurodevelopmental disorders), including autism”. They also conclude that efforts to discover the causes of autism should be best directed toward other hypotheses.

Although thimerosal has been removed from most vaccines used in Europe and North America, clinicians can nevertheless take comfort that influenza or other vaccines still containing thimerosal do not increase the risk of autism or other disorders of brain development. Clinicians in developing countries where conditions require preservatives can be reassured that thimerosal-containing vaccines are safe when used according to established guidelines. The conclusions of Parker et al are consistent with a recent review of this topic and with an even more recent study by Chen et al. Healthcare providers can use this evidence when discussing vaccination risks with parents.

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