ASUM

Standards of Practice

Promoting ultrasound excellence



Guidelines, Policies and Statements

Statement on Ultrasound and Autism Spectrum Disorder

Adopted by Council August 2017

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1. Introduction

The Australasian Society for Ultrasound in Medicine (ASUM) is a multidisciplinary society whose mission is to advance the clinical practice of diagnostic medical ultrasound for the highest standards of patient care. A primary aim of ASUM is to promote, educate and disseminate standards of ultrasound practice in this continually developing specialty.

1.1. Statement

Autism spectrum disorder (ASD) affects approximately 1% of children in developed countries and is characterised by qualitative impairment in social communication and restricted repetitive behaviour or interests. There has been a 10-fold increase in the prevalence of ASD over the past 40 years, most likely due to broader diagnostic criteria, increased awareness, and inclusion of milder cases, however a real increase cannot be excluded.

Analysis of in utero ultrasound exposure in humans has failed to show harmful effects in neonates or children, including in the incidence or severity of ASD. However, ultrasound is a form of energy with effects in the tissues it traverses, and its use should be restricted to medical indications, by trained professionals, for as short a period and as low an intensity as compatible with accurate diagnosis.

1.2. Purpose

A recent study (Webb et al) has suggested that heterogeneity of ASD may, in part, result from exposure to early ultrasound in genetically vulnerable children.

This Statement seeks to consider and evaluate the study and its results and conclusion.

1.3. Scope/Applicability

This statement is applicable to all.

2. Evaluation of Study

The aetiology of ASD is principally genetic, with the initiating process originating during fetal life, but there are also environmental factors that may play a role. Ultrasound has been identified as potentially one of the environmental factors that may influence the incidence and severity of autism. To date, analysis of in utero ultrasound exposure in humans has failed to show harmful effects in neonates or children, particularly in school performance, attention disorders, and behavioural changes. There is no independently confirmed peer-reviewed published evidence that a cause–effect relationship exists between in utero exposure to clinical ultrasound and development of ASD in childhood from recent high-quality studies.

The recent study by Webb et al involves a case series endeavouring to assess factors influencing ASD severity rather than ASD incidence. From 2644 families with one child with ASD aged 4–18 years and one unaffected full sibling, a subgroup of 1749 children who had array comparative genomic hybridisation testing was collected. Parents were asked to recall whether ultrasound was performed in the first trimester, but no information was gathered regarding indication for scan,

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gestation at scan, imaging modality, exposure duration, number of scans, or exposure in other trimesters. Just over 60% recalled having at least one ultrasound in the first trimester and in those children there was a statistically significant increase in one metric of parent-reported repetitive behaviours compared to unexposed children, but no difference, or one improvement, in nine other metrics of cognitive ability, social affective behaviours or repetitive behaviours.

There were 133 children (7.6% of the initial cohort) with ASD-associated copy number variants. In those exposed to first trimester ultrasound there was a statistically significant decrease in non-verbal IQ and, in boys only, an increase in one metric of repetitive behaviour compared to unexposed children, but no difference on the other eight metrics.

The methodological concerns raised by this study include reliance on parental recall, lack of detail regarding ultrasound exposure, lack of appropriate (sibling) control group, possible confounding factors were not taken into account, regression analysis was undertaken without appropriate significance level correction for multiple comparisons (the results are not significant at the 5% level with a Bonferroni correction).

Given the high risk of bias and statistical inaccuracy in this study, the conclusions are unjustified and the criteria for causation are not met. Furthermore, the findings are not generalisable to all individuals with ASD, notably to those who are not considered genetically susceptible.

3. Related/Supporting Documents

This Statement is based on the following document (with permission):

McLennan, A. Ultrasound and Autism Spectrum Disorder. AJUM. 2016;19:131-132.

4. Supporting Information/References

The following documents inform this statement:

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