Implications of Maternal age on outcomes of Pregnancy. Causal Links to Increased Incidence of Children Developing Autism and Related Neurological Dysfunctions

Introduction

Accepted wisdom dictates that the optimum age for safe outcome of pregnancy should be in the age range of 16 to 35. This range satisfies current social, legislative and medical thinking.
Motherhood under the age of 16, is often frowned upon in Western society for legal and social reasons, and is outside the realms of this discussion, however motherhood over the age of 35, whilst practised for many reasons worldwide is considered by current medical wisdom to pose increased risks to both mother and child.

Socio-economic reasons for the apparent upward shift of child bearing age is a complex area of discussion, and will not be attempted in this document, however, the emphasis will be to expand the rationale, and the outcomes of why delayed parenting age, poses increased risks to children born to mature mothers.

It is reported that since the late 1970's, statistics collection agencies worldwide have reported that birth rates for women in their late 30's and 40's have more than doubled. Advances in medical care since that time, specifically in the realm of foetal medicine, help women in this age range, to have safer pregnancies than in the past, however, for the reasons which will be discussed, the risk is increased as to the birth of children in increasing numbers with neurological dysfunction presentations.

Along with the increase of age of motherhood, lies a real increase of live births of children going on to exhibit neurological dysfunction in early childhood.

For the sake of simplicity the term neurological dysfunction will be used, to cover outcomes of brain injury, which are prescribed to children who have been clinically diagnosed as suffering from Autism. Asperger Syndrome, Cerebral Palsy, and any other condition, that may be considered to be on the same spectrum as any of the three conditions described.

The relationship between mild diffuse brain injury and neurological dysfunction has been clearly established by numerous authors, research establishments using high definition scanners have found lesions in varying parts of the brains of diagnosed neurological dysfunctional individuals.
The etiology of brain injury likewise establishes links to maternal infections during pregnancy to birth trauma and associated neurological dysfunction.

Along with maternal infections, Foetal Alcohol Syndrome, a consequence of alcohol intake during pregnancy is considered to contribute a risk to lead to neurological dysfunction in a number of newborns. Authors worldwide are cautioning would be and pregnant women to totally abstain from alcohol intake. Social commentary is increasing awareness of the rise of alcohol intake amongst the female population of childbearing age. Smoking amongst the female population is on the increase and contributes to the risks already discussed.

Age and Pregnancy

There is a universally accepted trend that the average age of conception in developed countries has risen over the last two decades, and now stands at 29 years of age, and that over the last 20 years pregnancies in women over 35 have risen markedly. This situation is giving cause for concern amongst the individual countries health and welfare service as it is considered that this trend is leading to increased risk of abnormal pregnancies, which may lead to greater incidence of premature foetal death before and after birth.

Articles and comment, published in peer reviewed journals over the last 5 years, referring to and analysing data available to authors in Canada, Denmark, Great Britain and the United States of America. They all draw the same conclusions, that childbearing in later life poses an increased risk of pregnancy related problems to the older woman. Authors conclude that “Once an older woman does become pregnant, she runs a greater risk of miscarriage, foetal and chromosomal abnormalities” and “They (older women) were more likely to have hypertension, diabetes mellitus. Preterm birth and small - for- gestational age rates were also higher; compared with women aged 20-24 years.’
The Danish study reported that the rate of miscarriage in older women is significantly greater than in younger women, it found that 9 percent of recognised pregnancies for women aged 20-24 ended in miscarriage. The risk rose to about 75 percent at those aged 45 years or more.(1)
Other studies suggest that first time mothers over 35 are more likely than mothers in their 20’s to have difficulties in labour, fetal distress and a prolonged second stage of labour being implicated.
The reported increase in cesarean sections recently reported in Australia, and especially in women over 35 years of age, may be accounted for, in part, by this reported foetal distress and prolonged labour. A study in 2001 at Harvard Medical School reported that first time mothers over 40 have the highest risk of c-section, 43 percent being the quoted figure. Other studies concur with this result, quoting figures of 40 percent over the age of 35, compared with a 14 percent risk for first time mothers in their 20’s.

(1) Maternal age and fetal loss: population aged register linkage; Anderson.A, et al BMJ 2000 June 24; 320(7251): 1708-1712

Etiology of Neurological Dysfunction

In the light of real rates of increase of recorded incidence of diagnosis of autism and other learning delay disorders world-wide, the current debate for the reasons of the increases in numbers is ongoing.
In 1965, in a paper entitled “Neurological Organization: The Basis of Learning”, Delacato, Doman, Doman, LeWinn, Spitz and Thomas, proposed causes of Neurological Disorganization, which in turn would lead to diagnosis of Autism or any other Autism related condition. The following major groupings are founded as nearly as possible on etiological relationships.
The paper presented its findings of work by the group after two decades of clinical research with several thousand brain injured children.

Causes of Neurological Disorganisation

A]
Defective or arrested development due to;

(1) Genetic Factors

- Chromosomal Aberrations – In Structure and in number.
- Metabolic Factors Genetically Linked – Protein, Lipid, Carbohydrate

(2) Maternal Metabolic Disorders

- Diabetes Mellitus
- Dysthyroidism

(3) Nutritional Factors

- Gestational
- Postnatal

(4) Exposure of Foetus or Child to Noxious Influences

- Maternal Infection
- Irradiation

- Drugs
- Hypoxia

(5) Infection

- Encephalitis
- Meningitis
- Cytomegalic Inclusion Disease
- Toxoplasmosis

(6) Mechanical Intercranial Injury

- Gestational
- Perinatal
- Postnatal

B]

Circulatory Disturbance

- Cerebral vascular Thrombosis
- Cerebral Embolism
- Cerebral arterial compression in association cerebral edema
- Dural sinus thrombosis
- Cerebral hemorrhage

During the years 1972 to 1997 Carl Delacato aided by numerous associates established clinics around the world for the sole purpose of administering Rehabilitation Therapy to Neurological dysfunctional children. Israel in 1972, Germany in 1976, Italy in 1976, Japan in 1982, and England in 1997. In every clinic, the children attending came with a clinical diagnosis, and every child came with a questionnaire, which detailed gestational, perinatal and postnatal history of the child. From this information a very clear understanding of the level of neurological dysfunction could be established as well as possible causes of the dysfunction.

In 1999, Antonio Parisi MD neurologist, attached to the Sorrento Clinic in Italy and medical advisor to Delacato Organizations in Europe, wrote the book “Children who do not look you in the eye – The secrets of autistic behaviour”. His book is based on information gathered by the organization team at the Sorrento clinic with the advantage of 23 years of accumulation of medical histories of patients attending clinics with diagnoses.

The chapter entitled Etiopathogenesis of autism, outlines the causes gleaned from study of medical records, and considers the causes of autism to be all the causes of brain injury during pregnancy, child- birth and the first years of early life, conventionally defined as the first thirty months.

I] PRE - NATAL (exogenous or environmental factors)

a) Infectious Diseases

Toxplasmosis
Cytomegalovirus
Influenza
Measles during the first 3 months of pregnancy
Viral Hepatitis
Herpes Infection
Syphilis

b) Intoxication

Alcohol, tobacco, substance abuse
Thalidomide
benzodiazepine

c) Malnutrition

d) X-ray examinations

II] PRE- NATAL (endogenous factors)

Genetic Causes

PERI- NATAL

Environmental changes to which the foetus is subjected
Delivery
Mechanical trauma
Perinatal hypoxia

POST NATAL

Encephalitis
Brain contact with poisonous substances
Brain contact with substances which become poisonous due to the lack of an enzyme (genetic)
Trauma
All causes of hydrocephalus

In the case of pre-natal causes, infections which may cause the death of the foetus should be considered, followed by those which may cause brain injury but leading to neurological disturbances such as autism. It is important to note here our clinic's record that a very high percentage of mothers of autistic children risked miscarriage during the first four months of pregnancy compared to average population.
Recent publications are reporting increasing findings of women carrying the Hepatitis C virus without showing any physical effects of the virus, in the United States a report suggests that 50 percent of adults over the age of 30 carry cytomegalavirus without showing any physical effects. In Great Britain and The United States screening for both these viral infections in the early stages of pregnancy is uncommon.
It is also noteworthy that in Italy all potential mothers are tested to measure immune cells fighting measles, and vaccination is recommended whenever the immune level is insufficient. This has greatly reduced secondary autism caused by congenital encephalopathy due to measles. The screening for phenylalanine and phenylketonuria is also important for the prevention of congenital brain injury and the consequent avoidance of secondary phenlyketonuria autism.

Peri-natal causes of encephalitic disturbance are environmental changes to which the new- born baby is subjected at the moment of birth, delivery through the birth canal, mechanical trauma and hypoxy (lack of oxygen).
Hypoxy following over rapid or lengthy labour can lead to death or neurological effects such as autism.

Of the four possible causes, hypoxy is undoubtedly the most risky, despite the fact that brains of new-born babies are less vulnerable to lack of oxygen than those of adults. Hypoxy causes selective injury of the central nervous system affecting above all the cortex, base nuclei, and white matter of the hemisphere.
Between the years 2002 to 2004 a number of researchers using computerized imaging in a number of Medical Establishments in the United States observed changes in white matter in the brains of Autistic children.
The lack of oxygen in a premature foetus leads to selective injury of the periventricular blood islets of the germinal tissue.

Hypoxy is also the cause of brain injury during delivery, associated with the use of forceps or suction devices, strangulation with the umbilical cord.

Tonic reflux of the neck of the birth canal eases childbirth, but the lack is itself caused by a disorder of the foetus, so dystocia is not the sole cause of the brain injury. This is a common occurrence in the case of autistic children. Our research team often encounter's one cause of brain injury which seems to provoke further vulnerability to a second pathogenic cause of brain injury.
We find a high percentage of brain injury occurring at the perinatal stage.

Postnataly, the brains of newborn babies are extremely vulnerable to direct attack by viruses or bacteria (encephalitis) and to agents originating in the rest of the body, through metabolic injury.
The study of Hydrocephalus as a cause of autism deserves special attention. The hydrocephalus is caused by an accumulation of cerebral spinal fluid in the ventricles and/or sub-arachnid space whose volume increases. Hydrocephalus may be caused by obstructions of various types, and this prevents the flow of fluid, alternatively by hypersecretion of fluid (secreting tumour of the plexis), or by the reduced re-absorption of fluid. In 99% of cases, the cause is obstruction.
Hydrocephalus in new -born babies has no symptoms except an increase in the volume of the skull with consequent tension of the fontanels and sutural diastases. All widespread or focal symptoms of disorder the central nervous system may be due to the disorder causing onset of hydrocephalus, and for which hydrocephalus is a symptom, or by endocranial hypertension which sooner or later accompanies the hydrocephalus.

At this point it is worth commenting on the influence of cerebral spinal fluid. Cerebral spinal fluid is a clear colourless liquid with a variety of functions, including the balanced regulation of the pressure and volume of the brain; if the volume of blood or of the brain increases, the volume of the liquid decreases and vice versa. This is why children with brain injuries should be monitored closely for the intake of liquids, which – if excessive **–** could cause an epileptic fit and/or hyperactivity and/or bruxism. The presence of a larger than normal ventricular space (the location of cerebral fluid) in brain-injured children leads to the creation of larger quantities of cerebral spinal fluid and hence the reduction of blood volume and lack of oxygen, causing epileptic fits and hyperactivity.

In their published paper “Neurophysiological view of Autism: Review of Recent Research as it Applies to the Delacato Theory of Autism” by Delacato, Szegda and Parisi, the authors noted that 81% of children with autism exhibited enlarged ventricles on CT or MRI scans.
Reducing the amounts of cerebral spinal fluid in the ventricles has the effect of increased blood flow and consequently an increased flow of oxygen to the brain.

At the end of April 2004, the National Institute for Clinical Excellence, (NICE), reported at a press conference, that they were concerned about the rise in occurrence of Caesarian Section births. Observation of birth records of children currently attending Delacato Clinics or having had therapy for Neurological Dysfunction, showed that over 20% of those children had been delivered by emergency or elective Caesarian Section. In early June, a team led by Dr Emma Glasson at the University of Western Australia announced, that as part of their findings into a study of Autistic children, whose mothers had problems during pregnancy and birth procedures, compared with problem free children, that, delivery by emergency and elective Caesarian Section increased the risk of those births leading to incidence of Autism. She goes on to state that children who developed autism were more likely to have had a birth procedure of less than 1 hour. Caesarian section delivery is most likely to be considered as a rapid procedure.

Survey of Recorded Observations

Observations recorded from parents comments were initially reviewed to establish which fell into the three main groups of;

Prenatal

Perinatal

Post Natal.

A more comprehensive review of each group was carried out to identify a reasonable cause of the dysfunction.

Patient observations giving excellent data on the pregnancy, birth and early childhood were reviewed.

Prenatal Observations; 1% - without indicated birth problems.

Prenatal leading to perinatal problems; approximately a third

Perinatal (without pre natal indication); approximately a third

Postnatal Observations; approximately a quarter.

A few children suffered severe reaction within hours after immunisation.

A few children attending the clinic were known to have a chromosomal abnormality.

Caesarean section procedures were carried out in a quarter of cases.

Children subjected to delayed neurological organisation due to interrupted development as a result of not having crept on hands and knees before walking accounted for about a half patients exhibiting postnatal problems.

In the prenatal group, mothers notified illnesses, including infections as well as accidents during pregnancy, which could have led to birth procedure problems, which necessitated a high number of caesarean section procedures.

In the perinatal group hypoxia, lack of oxygen, including those suffering umbilical cord strangulation was a contributory effect. The vast majority of birth procedures were overlengthy (more than 10-12 hours), and conversely over rapid (less than 2 hours).
The children attending clinics came with a wide range of diagnoses at the extreme end of which we noted Agnesis of Corpus Collosum to the milder affected children with sensory difficulties diagnosed as hyperactive, reading, and development delay, and those diagnoses of Asperger Syndrome, Autism, and Cerebral Palsy lying between.
As a consequence of the review we noted that 78% of clinic attending patients acquired mild diffuse brain injury during pregnancy and birth procedures which led to their current diagnoses.
Just as significant, half of patients with post natal development delay was due to the interruption of the natural development sequence in very early childhood (up to 18 months) resulting of a missed development opportunity, that is creeping on hands and knees.

Auto-immune suppression with age

The suspected genetic and observed environmental causes leading ultimately to autism and the rise in maternal age of childbearing women, the suspected relationship between the two, suggests a reason to consider the underlying causes.

Clinical research worldwide, much of it with animals, is suggesting a link between auto-immunity suppression with onset of age. A link is suggested with increase of blood cholesterol levels.
There is as well the relationship between auto-immune suppression as a result of viral infections, and a very real risk of auto-immunity suppression in children with

neurological dysfunction. Mothers with autistic children continue to report regular infections of the inner ear and, regular onset of sinus infection.
Observed evidence amongst older mothers with neurological dysfunctional children suggests that the mothers themselves be subject to one form or another of neurological dysfunction. The evidence for this is anecdotal, based on a small population, and it is suggested that larger studies are needed to establish this observation.

Robin Burn
The Autism Centre
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