Effects of this Chemical Foetal Monitoring on the Initial Breathing Growth of Preterm Neonates

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Abstract

Selective serotonin is increasingly used for maternal depression during pregnancy. However, its use is associated with side effects in neonates. Respiratory and feeding problems, jaundice, metabolic and temperature abnormalities, and hypoglycemia have been reported in term infants. However, there are few data on early adaptation in neonates of exposed preterm infants. Our aim was to assess the effects of serotonin exposure on preterm adaptation measures in preterm infants. Data from preterm infants exposed to maternal serotonin during pregnancy and from matched controls were collected retrospectively. The final cohort consisted of 42 infants.exposed to serotonin and 21 matched controls. One-minute Apgar scores were significantly lower in the exposed group compared to the unexposed group (p=0.043). No differences in 5-minute Apgar score, umbilical cord pH, need for delivery room resuscitation, hypoglycemia, hyponatremia, hyperbilirubinemia, need for phototherapy, temperature stability, and maximal oxygen demand rice field. No differences were found in total time on respiratory support, time to complete enteral feeding, length of hospital stay, or complications of preterm birth. In contrast to studies in term infants, there were no significant differences in adaptation and short-term outcomes between preterm infants exposed to serotonin during pregnancy and those not exposed.

Keywords: Serotonin; preterm; Early neonatal adaptation; Catatonia; Hyperbilirubinemia

Introduction

Mood disorders such as depression and anxiety affect up to 20% of pregnant women and are serious medical conditions that, if left untreated, can have a wide range of adverse effects on the mother and newborn. Maternal depression during pregnancy is associated with premature and low birth weight infants [1]. Impaired neurobehavioral development increases the risk of postpartum depression and impaired mother-infant bonding. The use of antidepressants during pregnancy is increasing year by year, reaching an estimated 6-13% of pregnant women [2]. Selective serotonin is often chosen because of its perceived high potency and relatively favorable safety profile. However, it has been found to have significant effects on placental passage and fetal exposure, and use during late pregnancy has been associated with adverse neonatal effects.

All studies reported an increased risk of premature birth. A systematic review and meta-analysis of eight studies from North America and Northern Europe involving a total of 1,237,669 women found that the incidence of preterm birth in depressed women with and without serotonin use during pregnancy was significantly higher than the control group. women were compared. No depression, no drugs use [3]. The risk of preterm birth was significantly higher in serotonin-treated and non-serotonin-treated depressed women compared with controls, even after adjusting for various confounders. The exposed group had a significantly lower birth weight and a higher incidence of respiratory distress syndrome. Five of the eight studies included women who received serotonin only during the first trimester of pregnancy. Women who received serotonin in the third trimester had a significantly higher risk of premature birth compared with first-trimester treatment [4].

Exposure to serotonin in utero is associated with neonatal adjustment disorders, thought to be due to serotonergic overstimulation or postpartum withdrawal symptoms. In a prospective study of term infants, symptoms consistent with neonatal abstinence syndrome (NAS) assessed using the Finnegan score were found in 30% of the exposed neonatal group (n = 60). In contrast, a healthy control group (n=60) was found to be symptom-free. . Thirteen percent of exposed infants had severe NAS (Finnegan score ≥8) and 17% had mild NAS (Finnegan score 4-7). Hypoglycemia was found in 5% of exposed infants. Another retrospective study using the modified Finnegan score of 220 preterm and premature infants exposed to serotonin during late pregnancy found a severe abstinence syndrome rate of 3% and a mild abstinence syndrome rate of 22. %. No differences in results were found between different serotonins (eg citalopram, sertraline, fluoxetine) [5]. Only 19 of the 220 newborns in this cohort were premature. Interestingly, he ranged from 2 to 90 hours to a maximum Finnegan score, which reflects the strongest symptoms of abstinence. Therefore, previously discharged preterm infants may not have been recorded. Another study comparing behavioral symptoms with other symptoms, such as catatonia, respiratory symptoms, and jaundice, in 76 exposed versus 90 unexposed neonates found that the rate of abnormal findings was 77% in the exposed group. compared with 41% in unexposed neonates (p<0.001). Symptoms disappeared within 5 days. A comparison of 21 exposed preterm infants and 55 exposed preterm infants in the same cohort revealed significantly more abnormal findings in the preterm group than in the term group (100% and 69%, respectively) [6]. %, p=0.002). However, as muscle tone, tachypnea, apnea, hypoglycemia, and jaundice were among the parameters studied, this difference could be attributed, at least in part, to the effects of preterm birth [7].

Although most of the available studies on early adaptation and respiratory and metabolic regulation have been conducted in term

infants, some studies have included mixed populations of term and preterm infants and cohorts of large size. A portion consists of full-term infants. Few data are available only for preterm infants. The aim of this study was to assess the effects of intrauterine serotonin exposure on early adaptation and short-term outcomes in preterm infants. We hypothesized that exposure to serotonin in preterm infants is associated with respiratory and metabolic maladaptation [8].

Material and Methods

This was a retrospective observational study conducted in the Carmel Medical Center Neonatal Intensive Care Unit (NICU). Preterm infants exposed to serotonin before birth and matched controls not exposed to serotonin were included. This study was approved by the Carmel Medical Center Research Ethics Committee.

Electronic records of all infants born between 2015 and 2022 and admitted to the NICU were reviewed, and all preterm infants with a known history of maternal serotonin use throughout gestation were included. The control group was matched with confirmed gestational age, birth weight, sex, date of birth, and maternal serotonin negative history. Infants with early-stage culture-positive sepsis, maternal diabetes, significant congenital anomalies, or high suspicion of genetic syndromes, and infants who did not survive the first week of life were not included. Infants with unknown maternal medication history, taking additional psychotropic medications, or whose maternal use of serotonin was discontinued before the third trimester were also excluded. Data were retrospectively collected from electronic patient record databases (Metavision®, iMDsoft, Park Atidim, Tel Aviv, and Israel). Records were reviewed using MetaVision's Query Wizard tool to identify infants admitted to her NICU during the study period, along with complete data on the mother's drug use during pregnancy. We then considered all identified infant data to select serotonin-exposed preterm infants and matched controls [9].

Data were plotted in an Excel spreadsheet (Microsoft Office, Seattle, WA, USA) and statistically analyzed using SigmaPlot State College, Pennsylvania, USA and Coventry, UK). Sample size calculations assumed a prevalence of postpartum dyspnea of 29 percent in an unexposed population consisting primarily of preterm infants. Based on his 1.8-fold increase in dyspnea in term neonates exposed to serotonin, it was estimated that dyspnea in exposed neonates with concurrent preterm birth increased 2.7-fold (1.8×1.5) in his . Therefore, a sample size calculation based on a 29% to 78% increase in dyspnea (compared with unexposed) in exposed premature infants (80% for paternal performance and 5% for alpha) indicated that in each study At least 19 infants were obtained. and control group. Therefore, we hypothesized that an 8-year retrospective study would be sufficient to include a sufficient number of infants with complete prenatal maternal medication data in each group. Statistical analysis included descriptive statistics, Student's t-test or Mann-Whitney U-test (rank sum) for comparing continuous variables according to distribution, and Chi-square test or Fisher's exact test for comparison of categorical variables. Results are presented as mean ± standard deviation (SD) and/or median and interquartile range (IQR) [10].

Results

Between 2015 and 2022, 826 infants were born at Carmel Medical Center, admitted to the NICU, and had maternal drug use data entered into the department's database. Fifty-two of the infants were confirmed to have been exposed to serotonin during pregnancy. We excluded 29 infants exposed at term, 1 preterm infant exposed only in the first trimester, and 1 preterm infant exposed concurrently with benzodiazepines. Her 21 preterm infants exposed to serotonin during pregnancy and her 21 matched controls formed the final cohort (n = 42). Basic maternal and neonatal features are shown. Gestational age at birth ranged from 26.4 to 35.6 weeks. A total of 10 infants (5 of hers in each group) were born at <30 weeks of her age, and 11 had a birth weight <1500 g of hers. In the serotonin-exposed group, 10 preterm infants were exposed to escitalopram, 5 to sertraline, 4 to fluoxetine, and 2 to paroxetine.

Discussion

Serotonin increases serotonin levels by inhibiting reuptake at the serotonin transporter in presynaptic neurons. Due to its relatively few side effects compared to other antidepressants, its use during pregnancy has increased in recent years, with up to 15% of pregnant women reported to be using it. In most reports, serotonin use during early pregnancy is not associated with major structural abnormalities. However, some minor deficiencies have been reported, notably with the use of paroxetine suggesting a slightly increased risk of cardiac defects, albeit inconsistently.

Serotonin crosses the placenta, is present in amniotic fluid and cord blood, and has been shown to correlate with maternal dosage and alter fetal serotonin levels. By crossing the blood-brain barrier, serotonin can not only induce high levels of serotonin in the fetal brain, but also induce rapid changes in serotonin levels during vulnerable periods of brain development. In exposed neonates, increased risk of premature birth and low birth weight, decreased Apgar score, increased frequency of admission to the NICU, serotonin withdrawal syndrome and autonomic imbalance, hypoglycemia, respiratory distress syndrome, persistent pulmonary hypertension, Many early disorders have been reported, such as eating. The length of hospital stay is longer due to problems. Alterations in acute pain responses, alterations in white and gray matter microarchitecture, and long-term effects on neurodevelopment and behavior that persist into childhood have also been reported.

Over the past two decades, the widespread use of serotonin has led to extensive research to assess the health risks associated with in utero exposure. However, this area presents its own methodological challenges. It is difficult to separate drug action from maternal depression and the effects of genetic and epigenetic factors. Also, when comparing exposure to depression with serotonin and exposure to depression without serotonin, treated women may have initiated treatment for severe depression and anxiety more than untreated women. Therefore, there is a selection bias by indication. The observational design of the studies does not yield higher quality evidence. However, the target population and treatments are unlikely to be studied with random assignment. A high degree of population and exposure heterogeneity is found in all studies. Different serotonins have different pharmacokinetics, and their dosages also vary widely. For example, sertraline doses varied from 20 mg/day to over 150 mg/day, exposure duration varied from 40 weeks gestation to just 2 weeks before her delivery, and conclusive meta-results were limited. It is analysis. In addition, many reports have compiled data on preterm infants compared with exposed preterm infants and unexposed controls, although preterm birth itself is an important confounding factor for some of the reported outcomes. In most studies of both term and preterm infants, term infants make up the majority of the cohort. The aim of this study was to assess early neonatal outcomes in preterm infants specifically exposed to serotonin throughout pregnancy compared with unexposed preterm controls.

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Conclusions

In conclusion, preterm infants exposed to serotonin during pregnancy had lower 1-minute Apgar scores than unexposed matched controls. Other adjustment parameters and short-term outcomes were similar between groups. A larger prospective study is needed to confirm our results.

References

1. Ocheke IE, Antwi S, Gajjar P, McCulloch MI, Nourse P (2014) Pelvi-ureteric junction obstruction at Red Cross Children's Hospital, Cape Town:a six year review. Arab J Nephrol Transplant 7: 33-36.

2. Capello SA, Kogan BA, Giorgi LJ Kaufman RP. Prenatal ultrasound has led to earlier detection and repair of ureteropelvic junction obstruction. J Urol (2005) 174: 1425-1428.

3. Johnston JH, Evans JP, Glassberg KI, Shapiro SR (1977) Pelvic hydronephrosis in children: a review of 219 personal cases. J Urol 117: 97-101.

4. Williams DI, Kenawi MM (1976) The prognosis of pelviureteric obstruction in childhood: a review of 190 cases. Eur Urol 2: 57-63.

5. Lebowitz RL, Griscom NT (1977) Neonatal hydronephrosis: 146 cases. Radiol Clin North Am 15: 49-59.

6. Hubertus J, Plieninger S, Martinovic V, Heinrich M, Schuster T, et al. (2013) Children and adolescents with ureteropelvic junction obstruction: is an additional voiding cystourethrogram necessary? Results of a multicenter study. Wor J Urol 31: 683-687.

7. Swenson DW, Darge K, Ziniel SI, Chow JS (2015) Characterizing upper urinary tract dilation on ultrasound: a survey of North American pediatric radiologists' practices. Pediatr Radiol 45: 686-694.

8. Hussain, Walid A, Jeremy D (2019) Approaches to Noninvasive Respiratory Support in Preterm Infants: From CPAP to NAVA. Neo Rev 20:213–221.

9. Bordessoule, Alice (2012) Neurally Adjusted Ventilatory Assist Improves Patient–Ventilator Interaction in Infants as Compared with Conventional Ventilation. Pedia Res 72:194–202.

10. Wen LL, Chang WH, Wang HW (2021) Risk factors associated with preterm premature rupture of membranes (PPROM). Taiwan J Obstet Gynecol 60: 805-806.