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Vaginal Seeding and its Potential Risks

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Date of Submission: 14/04/2018.

Abstract:

Caesarean sections are procedures that have saved many babies lives and mothers included. However, the increasing numbers of babies born through C-sections have been observed with the increasing prevalence of asthma and obesity among children. Some studies have even linked them together, hinting that this may be related to the babies not being exposed to the mother's vaginal microbiota; which has been proved to play a role in the development of the new-born's digestive and immune system. This has led to the development of a new procedure known as "Vaginal Seeding" which aims to mimic the process of normal vaginal delivery, by taking a swab from the mother's vaginal fluid and spreading it on the baby directly after the C-section is performed. The demand for vaginal seeding has been increasing worldwide and doctors are alarmed that mothers may be exposing their babies to potentially harmful bacteria found in the mother's genitalia that they are not aware of and hence, leading then to a deadly fate. Mothers are being asked to weigh out the risks and to sustain from partaking in this procedure until adequate amount of research proves it to be safe and beneficial.

1. Introduction:

1.1. The Increasing Rate of Caesarean Sections:

Ideally, no more than 15 percent of deliveries should be C-sections, according to the World Health Organization. That's the approximate proportion of births that require surgical intervention to protect the mother or infant in situations such as prolonged labor, fetal distress or a breech baby.

In many countries – including the U.S., Mexico, Brazil, Australia and Italy – C-section rates are more than double the level WHO recommends.

Doctors explain that the rates are unnecessarily high in some countries in part because some surgical deliveries are elective, done only because women requested them, and because mothers who have one C-section are often encouraged to deliver this way again. ⁽¹⁾

1.2. Children Born Through C-sections are at Risk of Obesity and Chronic Immune Disorders:

New studies have shown that while cesarean deliveries are often necessary to save lives and prevent injuries, being born by C-section may also leave babies vulnerable to chronic health problems.

There is increasing evidence to suggest that there are differences in the gut bacteria found in babies born naturally or via caesarean section before labour. Those born through caesarean section appear to be at increased risk of asthma, allergies and food intolerances in later life due to a lack of 'protective' bacteria. ⁽²⁾

In the womb, a baby's gut is most likely a sterile environment until the membranes rupture and the water breaks. At this point, researchers believe, the microbiome is first colonized by mom's bacteria. It continues to be planted during the trip through the birth canal, where a child is

coated with its mother's microbes. Right after birth, a baby's microbiome closely resembles the bacteria of the mom's vagina.

But what happens when a baby is born via C-section, deprived of contact with its mother's vaginal bacteria? Its bacterial community resembles the bacterial communities found on skin. And not just mom's skin, but that of doctors, nurses, other patients in the hospital, the person who cleaned the operating room floor. This is a cause for concern, as a pioneer colonization by these types of bacteria may make a baby more susceptible to harmful pathogens and eventual illness.

Compared to vaginally born babies, those born via C-section are more likely to suffer from a host of health problems: asthma, allergies, eczema, type 1 diabetes and celiac disease. They are more likely to be hospitalized for gastroenteritis. Researchers now believe that this can partly be explained by their microbiomes.

What's more, the difference in the microbiome resulting from the mode of delivery persists over time. Caesarean-born infants have a more slowly diversifying microbiota, even after six months of age – and a 2014 Dutch study found these differences still existed in children at seven years of age.

When they analysed past research, they found 20 studies linking C-sections to childhood type 1 diabetes. They also found 23 studies connecting surgical deliveries to asthma and nine suggesting a tie to obesity.

In the U.S., where about one third of deliveries are by C-section, 2.13 of every 1,000 babies born this way develop type 1 diabetes, compared with 1.79 per 1,000 infants delivered vaginally, the study found.

About 9.5 percent of C-section babies develop asthma, compared with 7.9 percent for vaginal births. Obesity develops in 19.4 percent of children delivered by C-section, compared with just 15.8 percent for vaginal births, the study found. ⁽¹⁾

With studies suggesting an increased risk for C-section babies to develop these disorders, researchers have been trying to develop new ways to mimic normal vaginal delivery, if even in part, to prevent them.

2. Vaginal Seeding and its Potential Risks:

2.1. What is Vaginal Seeding?

The term "vaginal seeding" – also known as microbirthing – describes the use of a gauze swab to transfer maternal vaginal fluid, and hence vaginal microbiota, on to an infant born by caesarean section.

This is achieved by placing a rolled up sterile gauze in the mother's vagina and leaving it there for up to one hour, then placing it inside a container until the baby is born. The gauze is then

wiped over the baby's mouth, face and body. Some reports claim that even the eyes are wiped.⁽⁴⁾

Often the husband or partner undertakes the swabbing process, but in some cases parents have asked medical staff to perform the procedure.⁽⁵⁾

2.2. The Aim of Vaginal Seeding:

The composition of the early microbiota of infants is heavily influenced by mode of delivery. In infants born by caesarean section the microbiota resembles that of maternal skin, whereas in vaginally born infants it resembles that of the maternal vagina.⁽⁴⁾

Cesarean delivery performed before the onset of labour or before the rupture of membranes prevents the fetus from coming into contact with vaginal fluid and bacteria. The intended purpose of vaginal seeding is to transfer maternal vaginal bacteria to the new-born. The theory of vaginal seeding is to allow for proper colonization of the fetal gut and, therefore, reduce the subsequent risk of asthma, atopic disease, and immune disorders.⁽⁶⁾

2.3. The Risks of Vaginal Seeding:

The main risk is that the mother may transmit infections to the baby that she is unaware of resulting in a neonatal infection that may otherwise have been potentially avoided by cesarean delivery without seeding. These include:

- **Herpes simplex virus (HSV)**, which can cause **genital herpes** in adults: HSV in newborns is rare, but can cause severe illness throughout the body.
- **Group B streptococcus**: 20-30% of pregnant women are estimated to be carriers, usually with no symptoms, and this bacteria is the most common cause of neonatal sepsis.
- **Chlamydia** and **gonorrhoea**: both can cause conjunctivitis in a newborn, which often requires treatment with intravenous antibiotics to prevent permanent damage.⁽⁷⁾

It is critical to note that the current state of cumulative investigative data into the potential benefit and harm of vaginal seeding at this time consists of a single pilot study in which only four infants underwent seeding, with no long-term follow up. It is also critical to note that the pilot study involved only women who were not carriers of group B streptococci, had no signs of vaginosis, and had a vaginal pH less than 4.5. Because 20% of pregnant women at term are carriers of group B streptococci, the risk of performing vaginal seeding in the general population is unknown.⁽⁸⁾

2.4. What Researchers Recommend:

Doctors, nurses, midwives and parents need to be aware they are doing something with a potential risk that currently doesn't have any evidence of benefit.⁽⁵⁾

Breastfeeding and antibiotic use are also known to alter the microbiota, and mothers who hope to give their baby a healthy microbiota might be better to focus on breastfeeding and avoiding unnecessary antibiotic exposure.⁽⁹⁾

If a patient insists on performing the procedure herself, a thorough discussion with the patient should be held acknowledging the potential risk of transferring pathogenic organisms from the woman to the neonate. Risk stratification is reasonable for such women in the form of testing for infectious diseases and potentially pathogenic bacteria. Serum testing for herpes simplex virus and cultures for group B streptococci, *C trachomatis*, and *N gonorrhoea* should be encouraged. It is further recommended that the obstetrician–gynecologist or other obstetric care provider document the discussion. Because of the theoretical risk of neonatal infection, the pediatrician or family physician caring for the infant should be made aware that the procedure was performed. ⁽⁸⁾

Conclusion:

Caesarean sections are performed to maintain the life of the mother and the child when vaginal delivery is risky. Although their short-term complications are known, studies suggest that they can lead to long-term complications such as obesity and chronic immune disorders in the child. Vaginal seeding was hypothesized to decrease this risk by mimicking normal vaginal delivery. However, the risks of this procedure may outweigh the benefits, and researchers recommend that mothers and physicians should sustain from it until adequate researches prove otherwise. However, if the mother wants to strengthen her child's immunity, they recommend breastfeeding as its benefits are much safer.

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