



Babies that are born prematurely have fragile brains, and are at greater risk of sustaining forms of brain injury such as [hypoxic-ischemic encephalopathy \(HIE\)](#) and [cerebral palsy \(CP\)](#) (1). Magnesium sulfate, an inorganic salt, can help to reduce the risk of preterm birth-associated brain damage in two important ways.

First, antenatal magnesium sulfate can be used to suppress premature labor and delay preterm birth, which gives medical professionals time to administer [antenatal steroids](#) that can help to reduce the risk of [birth injuries](#) (2, 3). Second, magnesium sulfate can provide direct neuroprotective effects to the baby's brain. A systematic review suggested that this drug can play an important role in the prevention of cerebral palsy (4). Research also indicates that it can lower the risk of periventricular leukomalacia (PVL) (5) and intraventricular hemorrhage (6).

On this page, we will discuss this second use of magnesium sulfate, fetal neuroprotection. (Click on this link for more information on the use of [magnesium sulfate for suppressing preterm labor.](#))

How does magnesium sulfate protect a baby's brain?

Exactly how magnesium sulfate provides neuroprotection of the fetus is not well understood, but professionals hypothesize that in-utero administration of magnesium sulfate may (7):

- Stabilize blood pressure and normalize cerebral blood flow
- Stabilize neuronal membranes and block excitatory neurotransmitters
- Protect against oxidative injury
- Protect against inflammatory injury

When and how should magnesium sulfate be administered?

Hyagriv N. Simhan and Katherine P. Himes (2019) suggest that magnesium sulfate be offered to women carrying viable fetuses, who are very likely to deliver a premature baby within the next 24 hours. This may include patients with preterm premature rupture of membranes or



preterm labor without membrane rupture, as well as those who have a planned preterm birth for medical reasons. Simhan and Himes recommend limiting the use of magnesium sulfate to pregnancies that are between 24 and 32 weeks' gestation, although they note that more research may reveal benefits in fetuses closer to term. They suggest first giving a 4g loading dose via IV and a 1g maintenance dose every hour for 24 hours, or until the baby is born (whichever is sooner) (7).

Is magnesium sulfate safe for all pregnant women and babies?

While magnesium sulfate administration is known to be safe in most pregnant women (provided that the medication is carefully dosed and the patient's well-being is closely monitored), it should not be given under certain circumstances. Women who have one or more of the following conditions may experience dangerous side effects if they receive magnesium sulfate (2, 5):

- Myasthenia gravis
- Muscular dystrophy
- Myocardial compromise
- Cardiac conduction defects
- Impaired renal (kidney) function

A recent systematic review and meta-analysis suggests that the use of magnesium sulfate is generally safe for infants. Emily Shepherd and colleagues searched several databases, such as the Cochrane Library and Web of Science, for studies on the use of magnesium sulfate in pregnancy. Some of these studies considered its use to prevent preterm labor or prevent infant brain injury, while others were focused on magnesium sulfate as a treatment for maternal conditions (pre-eclampsia and eclampsia). Overall, they found no clear negative effects of antenatal exposure to magnesium sulfate. Certain individual studies had reported adverse health outcomes, but Shepherd and colleagues identified these studies as having a moderate to high risk of bias (they were not randomized controlled trials). They do note that additional research into the safety of this drug is warranted, and could help to inform clinical



practice guidelines (8).

About the HIE Help Center and ABC Law Centers

The HIE Help Center is run by [ABC Law Centers](#), a medical malpractice firm exclusively handling cases involving HIE and other birth injuries. Our lawyers have over 100 years of combined experience with this type of law, and have been advocating for children with HIE and related disabilities since the firm's inception in 1997.

We are passionate about helping families obtain the compensation necessary to cover their extensive medical bills, loss of wages (if one or both parents have to miss work in order to care for their child), assistive technology, and other necessities.

If you suspect your child's HIE may have been caused by medical negligence, please [contact us](#) today to learn more about pursuing a case. We provide free legal consultations, during which we will inform you of your [legal options](#) and answer any questions you have. Moreover, you would pay nothing throughout the entire legal process unless we obtain a favorable settlement.

You are also welcome to reach out to us with inquiries that are not related to malpractice. We cannot provide individualized medical advice, but we're happy to track down informational resources for you.

Sources

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