

# Induction of Fetal Lung Maturity with Corticosteroids: Which Evidence to Guide Clinical Practice?

Dear Editor,

The clinical practice in maternal-fetal medicine is strongly influenced by the current management of the birth of a baby before a gestational age of 37 complete weeks, because of the high risks and complications (reversible or less) related to a premature birth, first of all Acute Respiratory Distress Syndrome (ARDS) and Intraventricular Haemorrhage (IVH).

The relevant number of resources employed to reach a correct management of this kind of patients is pushing the health policy to develop a strong interest in evidence sourced from medical literature, with the aim to reduce the risk of adverse neonatal outcomes in case of premature birth.

The purpose of this literature review is to bring an update on the appropriate use of corticosteroid during prenatal development, to obtain fetal lung maturity and to decrease the possibility of adverse neonatal outcomes in women at risk of preterm birth or in women who planned elective cesarean.

This review follows the recommendations from the American Academy of Pediatrics (AAP) Committee on Fetus and Newborn,<sup>1</sup> the American College of Obstetricians and Gynecologists (ACOG) Committee on Obstetric Practice,<sup>1,2</sup> the American National Institutes of Health,<sup>3,4</sup> the Royal College of Obstetricians and Gynaecologists,<sup>5</sup> the Cochrane Collaboration,<sup>6,7</sup> the American College of Clinical Pharmacy,<sup>8</sup> the World Association of Perinatal Medicine Prematurity Working Group,<sup>9</sup> the Institute for Clinical Systems Improvement<sup>10</sup> and many previous studies.<sup>11-13</sup>

In this review, the authors used the American system to represent the gestational age: "w" stands for weeks

and "d" stands for days.

## Who benefits from this treatment?

- Antenatal administration of corticosteroids is associated to a significant decrease of perinatal deaths, cases of acute respiratory distress syndrome and intraventricular haemorrhage. It is also a safe practice for the mother.
- There is no known benefit of corticosteroid use for the mother.

## At what gestational age should the treatment be administered?

- A single course of corticosteroids should be administered between 24w+0d and 34w+6d gestational age in women at risk of preterm birth.
- The administration of a single course of corticosteroids could be suggested between 23w+0d and 23w+6d gestational age in women at risk of preterm birth.
- Only an expert specialized gynaecologist can decide to start the treatment before 24w of gestational age, considering the patient's overall physical condition.

## How long after the administration of a single course of corticosteroids is the maturity of lungs induced?

- The risk of acute respiratory distress syndrome decreases if the second dose of the corticosteroids course is administered between 24 hours and 7 days before the childbirth.
- Corticosteroids can also reduce the risk of perinatal death in the first 24 hours, so they should be used in case of suspect childbirth before the administration of the second dose of corticosteroids.

## Is this procedure safe?

- In the short term, there are no known adverse health effects for the mother and the fetus, associated with a single course of corticosteroids.
- Previous studies do not show differences in long term benefits and risks about neurological events or newborn cognitive development, related to the the administration of a single course of corticosteroids. There is little evidence of long term benefits or risks, in relation to repeated courses of corticosteroids.

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### Are there any contraindications to this treatment?

- Caution is advised when corticosteroids are administered in women when a systemic infection is occurring, including sepsis and tuberculosis.
- In case of chorioamnionitis, only an expert specialized gynaecologist can decide to delay the delivery to complete the procedure to induce fetal lungs maturity.

### Who should receive the treatment?

- All women at risk of preterm birth (spontaneous or iatrogenic), until 34w+6d.
- All women who planned elective caesarean before a gestational age of 38w+6d.
- In case of twin pregnancy, a single course of corticosteroid is suggested in patients that risks preterm birth (spontaneous or iatrogenic) between 24w+0d and 34w+6d gestational age.
- If the patients suffer from diabetes mellitus, there are no contraindications related to the administration of a single course of corticosteroids, with the aim to induce the maturity of lungs. In case of Impaired Glucose Tolerance (IGT) or diabetes mellitus, an accurate glucose monitoring is indicated, and a specialized diabetologist should be consulted to reassess insulin therapy (confirmed by National Institute for Health and Clinical Excellence).<sup>14</sup>
- In case of elected cesarean, this is usually performed after a gestational age of 39w, to decrease the risk of acute respiratory distress syndrome. If the section needs to be performed before a gestational age of 38w+6d the administration of a single course of corticosteroids is indicated, with the aim to reduce the chances of developing acute respiratory distress syndrome in the fetus.
- In case of IUGR (Intra-Uterine Growth Restriction), a single course of corticosteroids is indicated between 24w+0d and 35w+6d gestational age in women at risk of preterm birth.

### What is the correct dosage to administer?

- Treatment consists of two doses of 12 mg of betamethasone given intramuscularly 24 hours apart, or four doses of 6 mg of dexamethasone given intramuscularly 12 hours apart.

### In which cases should courses of corticosteroids be repeated?

- Weekly courses of corticosteroids reduce the risk and the severity of acute respiratory distress syndrome. In the short term, the benefits are linked to neonatal weight loss in the first days following birth, and to the newborn head circumference.
- An additional course may be administered - with caution - if the first course had been administered before 26w+0d of gestational age. Only an expert specialized

gynaecologist can decide to add this extra course, considering the patient's overall physical condition and after evaluating eventual obstetric morbidity arisen during last stages of pregnancy.

### Declaration of interest

All Authors have no proprietary, financial, professional or other personal interest of any nature in any product, service or company. The Authors alone are responsible for the content and writing of the paper.

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### REFERENCES

1. Academy of Pediatrics (AAP) Committee on Fetus and Newborn and the American College of Obstetricians and Gynecologists (ACOG) Committee on Obstetric Practice. Guidelines for perinatal care 6<sup>th</sup> ed (2007).
2. Committee on Obstetric Practice. ACOG committee opinion: antenatal corticosteroid therapy for fetal maturation. *Obstet Gynecol.* 2002;99:871.
3. Report on the Consensus Development Conference on the Effect of Corticosteroids for Fetal Maturation on Perinatal Outcomes. U.S. Department of Health and Human Services, Public Health Service, NIH Pub No. 95-3784, November 1994.
4. National Institutes of Health Consensus Development Panel. Antenatal corticosteroids revisited: repeat courses—National Institutes of Health Consensus Development Conference statement, August 17–18, 2000. *Obstet Gynecol.* 2001;98:144–50.
5. Royal College of Obstetricians and Gynaecologists. Green-top Guideline No. 7. Antenatal Corticosteroids to Reduce Neonatal Morbidity and Mortality. October 2010.
6. Crowley P. Prophylactic corticosteroids for preterm birth. *Cochrane Database Syst Rev.* 2000;(2):CD000065.
7. Crowther CA, Harding JE. Repeat doses of prenatal corticosteroids for women at risk of preterm birth for preventing neonatal respiratory disease. *Cochrane Database Syst Rev.* 2007 Jul 18;(3):CD003935.
8. American College of Clinical Pharmacy. Preterm Labor. Pharmacotherapy self-assessment program. 3<sup>rd</sup> ed. Module 11: Women's Health, Kansas City: American College of Clinical Pharmacy, 2000. (Guideline).
9. Miracle X, Di Renzo GC, Stark A, Fanaroff A, Carbonell-Estrany X, Saling E; Coordinators Of World Association of Perinatal Medicine Prematurity Working Group. Guideline for the use of antenatal corticosteroids for fetal maturation. *J Perinat Med.* 2008;36(3):191-6.
10. Creedon D, Akkerman D, Atwood L, Bates L, Harper C, Levin A,

- McCall C, Peterson D, Rose C, Setterlund L, Walkes B, Wingeier R. Institute for Clinical Systems Improvement. Management of Labor. Updated March 2013.
11. Guinn DA1, Atkinson MW, Sullivan L, Lee M, MacGregor S, Parilla BV, Davies J, Hanlon-Lundberg K, Simpson L, Stone J, Wing D, Ogasawara K, Muraskas J. Single vs weekly courses of antenatal corticosteroids for women at risk of preterm delivery: A randomized controlled trial. *JAMA*. 2001;286(13):1581-7.
  12. Thorp JA, Jones AMH, Hunt C, Clark R. The effect of multidose antenatal betamethasone on maternal and infant outcomes. *Am J Obstet Gynecol* 2001;184:196-202.
  13. Kamath-Rayne BD, DeFranco EA, Marcotte MP. Antenatal steroids for treatment of fetal lung immaturity after 34 weeks of gestation: an evaluation of neonatal outcomes. *Obstet Gynecol*. 2012;119(5):909-16.
  14. National Institute for Health and Clinical Excellence. NICE Clinical Guideline 63: Diabetes in pregnancy. Management of diabetes and its complications from pre-conception to the postnatal period. London: NICE; 2008.

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