MATERNITY UNIT
GUIDELINE:

ADMINISTRATION OF ANTENATAL CORTICOSTEROIDS

SCOPE:
All midwives, nurses and obstetricians working in Maternity

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PURPOSE:
To ensure optimal/safe administration of corticosteroids to women at risk of preterm delivery within 7 days between 24+0 and up to 36+6 weeks gestation and for those women planning to have an elective caesarean section before 39 weeks gestation thereby hastening fetal lung maturity.

BACKGROUND:
Alveoli are lined with type 1 and type 2 pneumocytes.Type 1 pneumocytes are responsible for gas exchange in the alveoli; type 2 pneumocytes are responsible for the production and secretion of surfactant. Surfactant reduces the surface tension of alveolar fluid and thereby prevents the alveoli collapsing. This reduces the effort required by the baby to breath. Surfactant is detectable in the alveoli from around 22-24 weeks gestation, but only reaches 'normal' levels by 34-36 weeks gestation.

It is evidenced that the administration of antenatal corticosteroids increases fetal lung maturity and surfactant production and thereby reduces the severity and incidence of respiratory distress syndrome. It also improves the efficacy of postnatal surfactant treatment. The maximum benefit is thought to be 24 hours after the second dose but less than 7 days from the time of treatment.

In early pre-term infants, this benefit of antenatal steroids was significant for infants born at 23, 24, and 25 weeks gestation but not 22 weeks gestation. Therefore administration in the 22nd week is reasonable if delivery at 23 weeks is anticipated and aggressive neonatal intervention is desired. Steroids should only be given in this scenario after thorough consultation with maternal-foetal medicine and neonatology specialists. Parents should be informed that antenatal corticosteroids may decrease mortality while increasing the risk of survival with significant morbidity. Administration of steroids at <22 weeks is unlikely to significantly improve lung function. Other benefits of antenatal corticosteroid therapy in pregnancies at risk of delivering preterm include reductions in the risk for intraventricular haemorrhage, necrotizing enterocolitis, neonatal mortality, and systemic infection.

In the setting of preterm premature rupture of membranes, antenatal steroids do not increase the risk of neonatal or maternal infection, although a 30% increase in total leukocyte count can be seen within 24 hours after betamethasone injection. This change returns to baseline within 3 days, but can complicate the diagnosis of chorioamnionitis.

Potential side fetal side effects include transient foetal heart rate changes that typically return to baseline 4-7 days after treatment. This can include decreased variability on days 2 and 3 after administration. A transient improvement in umbilical artery end-diastolic flow after antenatal steroids has been described starting 8 hours after the first dose and lasting 3 days. This is thought to be due to increased cerebral blood flow and cerebral oxidative stress in response to the steroids. Increased morbidity is seen with infants that do not show an improvement in dopplers following steroids.

For preterm infants who received a single course treatment of antenatal steroids, no significant long term adverse effects are known, however studies suggest that increasing exposure to steroids is associated with increasing risk, specifically for small for gestational age foetuses, decreased placental weight, and, although not statistically significant, increased incidence of cerebral palsy.

In late preterm or early term pregnancies, antenatal steroids have shown immediate respiratory benefits, but again the long term consequences are not fully understood. As such, each case should be considered individually.

An article published February 4, 2016, in the New England Journal of Medicine (Gyamfi-Bannerman et al., Antenatal Betamethasone for Women at Risk for Late Preterm Delivery) showed overall rates of respiratory complications to be low, but a reduced rate was seen in infants given antenatal steroids between 34+0 and 36+5 weeks gestation (the Antenatal Late Preterm Steroids Trial—ALPS). Steroid administration did coincide with an increased rate of neonatal hypoglycaemia.

The ASTECS-2 study published in 2013 looked at long term assessment of children receiving antenatal corticosteroids and no difference in behaviour, cognition, and health were noted. Based on the lack of any apparent adverse long term consequences, the practice of ACS prior to term caesarean became standard in the United Kingdom. Few participants in the trial however were randomized near or at term and many participants were lost to follow up. Another trial found increased risk factors for insulin resistance, although the numbers were insufficient. Also to consider, there are several smaller studies that suggest long term neurologic consequences, including cortical thinning in an area of the brain associated with affective disorders and mental health.

GUIDELINE:
Practitioners (LMC or Core Midwives – if secondary care) must consult with the obstetrician if a woman with a gestation between 24+0 and 34+6 weeks presents with any of the following (Section 88):

- threatened pre-term labour
- pre-term rupture of membranes
- any condition requiring elective pre-term delivery

Between 22+0 and 23+6 weeks, maternal-foetal medicine and neonatalogy should be consulted to discuss steroid administration. Following consultation, if antenatal corticosteroids are indicated, these should be prescribed by the obstetrician and administered by RM/RN without delay.

There is evidence to suggest that steroids should be considered for all women undergoing Elective Caesarean Section at or below 38+6 weeks gestation. There is no benefit at or after 39+0 weeks. It is recommended that elective caesarean section be delayed until 39+0 weeks or after as opposed to giving antenatal steroids if possible. The obstetrician will discuss this with the woman and her LMC during the antenatal consultation and document the decision made and complete the medication chart.

Betamethasone (Celestone)

- Two separate doses of 11.4mg should be given 24 hours apart.
- Each dose should be two ampoules of 5.7 mg (total dose of 11.4mg). This is administered by deep intramuscular injection into large muscle mass (e.g. quadriceps).
- Observe site of injection for erythema and itching.
- Observe mother for any reaction to the drug (anaphylactic shock).

Dexamethasone (to be used in event of betamethasone shortage)

- Four separate doses of 6 mg should be given 6 hours apart.
- This is administered by deep intramuscular injection into large muscle mass (e.g. quadriceps)
- Observe site of injection for erythema and itching.
- Observe mother for any reaction to the drug (anaphylactic shock).

Observations and monitoring appropriate to pre-term labour/premature rupture of membranes are to be carried out (see Pre-term labour/PPROM guidelines) in order to prevent and ensure early detection of chorioamnionitis.

In the case of maternal diabetes observations should include a review of the woman's pre-existing condition as corticosteroids increase serum glucose level. The steroid effect begins approximately 12 hours after the first dose and may last for five days. Regular maternal glucose checks should be done during this time and hyperglycaemia treated as necessary. Neonatal glucose monitoring is indicated if steroids were given within close proximity to delivery.

A single rescue dose of antenatal corticosteroids (one dose of betamethasone) may be considered if the initial treatment was given more than 2 weeks prior, the initial course was given at <28+0 weeks, and the woman is likely to give birth within the next 7 days. Indirect evidence has shown one dose of steroid to be as effective as the routine two dose course. Regularly scheduled repeat courses or multiple courses (more than two) are not recommended.

ASSOCIATED DOCUMENTS:

Hauora Tairawhiti Maternity Guidelines:

- Prevention of pre-term birth
- Preterm Labour and Birth
- Management of preterm pre-labour rupture of the membranes (PPROM)
- All Hauora Tairawhiti Maternity specific diabetic guidelines

References:

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