South Australian Perinatal Practice Guideline

Tocolysis for Uterine Hypercontractility

Note:
This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

SA Health does not accept responsibility for the quality or accuracy of material on websites linked from this site and does not sponsor, approve or endorse materials on such links.

Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Note: The words woman/women/mother/she/her have been used throughout this guideline as most pregnant and birthing people identify with their birth sex. However, for the purpose of this guideline, these terms include people who do not identify as women or mothers, including those with a non-binary identity. All clinicians should ask the pregnant person what their preferred term is and ensure this is communicated to the healthcare team.

Explanation of the Aboriginal artwork:
The Aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the Aboriginal culture. The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant woman. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.

Australian Aboriginal Culture is the oldest living culture in the world yet Aboriginal people continue to experience the poorest health outcomes when compared to non-Aboriginal Australians. In South Australia, Aboriginal women are 2-5 times more likely to die in childbirth and their babies are 2-3 times more likely to be of low birth weight. The accumulative effects of stress, low socio economic status, exposure to violence, historical trauma, culturally unsafe and discriminatory health services and health systems are all major contributors to the disparities in Aboriginal maternal and birthing outcomes. Despite these unacceptable statistics, the birth of an Aboriginal baby is a celebration of life and an important cultural event bringing family together in celebration, obligation and responsibility. The diversity between Aboriginal cultures, language and practices differ greatly and so it is imperative that perinatal services prepare to respectfully manage Aboriginal protocol and provide a culturally positive health care experience for Aboriginal people to ensure the best maternal, neonatal and child health outcomes.

Purpose and Scope of PPG

The purpose of this guideline is to provide information on the management of uterine hypercontractility and hyperstimulation.

Management of Uterine Hypercontractility

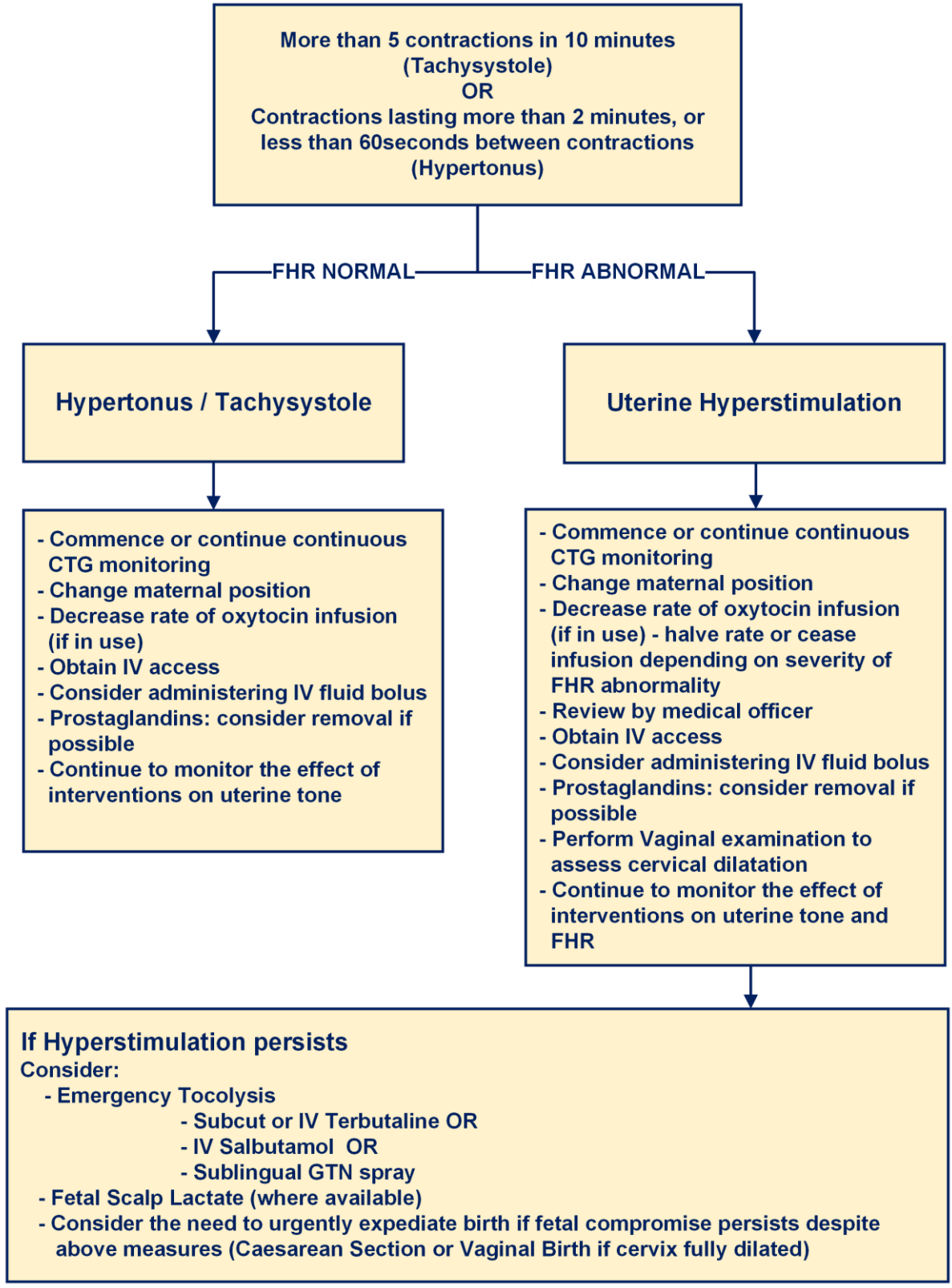

Table of Contents

Summary of Practice Recommendations

Uterine hyperstimulation refers to more than five contractions in ten minutes (tachysystole) or contractions lasting more than two minutes (hypertonus) with the presence of fetal distress.

It is important that uterine hyperstimulation is recognised and managed appropriately as it can cause poor utero-placental perfusion and resultant fetal and thus neonatal compromise.

Early recognition of either hypertonus or tachysystole can prevent uterine hyperstimulation occurring.

If initial management is unsuccessful, then the use of tocolytic agents is usually effective in improving fetal wellbeing (approximately 98%).

Monitoring of maternal cardiovascular side effects is required when tocolytic agents are used.

Aboriginal women should be consulted about any decisions in the first instance if requested an Aboriginal Health Professional should be consulted. To ensure cultural safety and appropriateness, Aboriginal women should be offered a female practitioner and/or clinic where available.

Abbreviations

ARM	Artificial rupture of the membranes
CTG	Cardiotocograph
IV	Intravenous
L	Litre(s)
mg	Milligram(s)
mL	Millilitre(s)
mmHg	Millimetres of mercury
NICE	National Institute for Clinical Excellence
%	Percent
PGE_2	Prostaglandin E_2
RANZCOG	Royal Australian and New Zealand College of Obstetricians and Gynaecologists

Definitions

Hypercontractility	Excessive uterine activity – Hypertonus and Tachysystole both constitute hypercontractility
Hyperstimulation	Tachysystole or hypertonus with the presence of fetal heart rate abnormalities
Hypertonus	Contractions lasting longer than 2 minutes in duration, or occurring within 60seconds of one another
Tachysystole	More than 5 active labour contractions in ten minutes

Literature Review

Excessive uterine activity is defined as:

- more than five active labour contractions in ten minutes (tachysystole) or
- contractions lasting longer than two minutes in duration or occurring within 60 seconds of each other (hypertonus).[1]

Uterine hyperstimulation is defined as excessive uterine activity (either tachysystole or uterine hypertonus) in the presence of fetal heart rate abnormalities.[1]

Excessive uterine activity may occur spontaneously in labour; however, it is frequently associated with prostaglandin agents or oxytocin infusion[1] (see *Induction of labour* PPG available at www.sahealth.sa.gov.au/perinatal).

When excessive uterine activity occurs in spontaneous labour it is important to consider the presence of uterine abruption.[2]

A retrospective study found that administration of tocolytic treatment with ß2-adrenergic drugs following PGE2 induced uterine hyperstimulation was successful in normalising uterine contractions and reversing fetal compromise within 5 minutes in 98 % of cases.[3]

Early recognition is essential as uterine hyperstimulation causes poor utero-placental perfusion leading to a decrease in fetal oxygenation and eventually fetal compromise.[1]

A raised uterine baseline pressure also contributes to reduced utero-placental perfusion. Sustained baseline pressures above 15 mmHg lead to fetal heart rate changes.[4]

With increasing contraction frequency, the risk of fetal hypoxia is increased. Fetuses of women with four to five contractions per ten minutes prior to FBS were 2.4 times more likely to have hypoxia compared to fetuses of women with two to three contractions per ten minutes.[5]

Management of Uterine Hyperstimulation

Employ initial management measures:

- place the woman in left lateral position
- ensure good intravenous (IV) access and give bolus of fluid
- continuous electronic fetal monitoring and observe for signs of fetal compromise
- reduce oxytocin infusion (or cease), consider removal of prostaglandins (ie., Cervidil or dinoprostone gel) if present
- palpate uterus to determine response to management.

If initial management measures fail, and there is ongoing concern regarding fetal heart rate then administer tocolysis:

- adverse effects on the fetus can be avoided by minimising periods of hyperstimulation and administering treatment in a timely manner
- either salbutamol OR terbutaline tocolysis may be administered
- glyceryl trinitrate (Nitrolingual®) pump spray may be given if salbutamol or terbutaline are not available (see below).

In cases where fetal compromise is sustained despite the above emergency measures, consider need to expediate birth.

Post Tocolysis Management and Considerations

- Await the return of a **normal** CTG and allow 30 minutes recovery. A normal CTG includes:
  - baseline FHR 110 - 160 bpm
  - baseline FH variability of 6 - 25 bpm
  - no decelerations.
- If using oxytocin for labour augmentation, allow the contraction pattern to re-establish.
  - Assess contraction strength and frequency, consider recommencement of oxytocin at HALF the rate it was being administered prior to turning it off.
- Note that slower and smaller increments in oxytocin dosage may be required to achieve the optimal balance between contraction strength and fetal wellbeing. This may result in a slightly longer labour.

Terbutaline Tocolysis Regimen[6]

Action

Terbutaline is a beta-adrenergic stimulant. Stimulation of beta-2-adrenoreceptors causes relaxation of the smooth muscle of the bronchi, uterus and skeletal muscle blood vessels.

Terbutaline is observed to have similar efficacy to Salbutamol for injection, with less side effects.

Indications

- Uterine hyperstimulation – hypertonus or tachysystole causing fetal compromise with no improvement from initial management [see flow chart].
- Tocolysis before attempting external cephalic version for breech presentation.

[Note: these are not TGA approved indications]

Contraindications

- Sympathomimetic amine hypersensitivity.

Relative Contraindications

- Cardiac disease.
- Acute hypertensive crisis:
  - do not administer to women with severe hypertension (≥ 160 mmHg) as terbutaline may exacerbate hypertension
  - for women with mild-moderate hypertension (i.e., Systolic BP < 160 mmHg), monitor blood pressure closely following administration.
- Hyperthyroidism.
- Diabetes.

Table 1: Recommended Terbutaline Dose and Administration

Terbutaline: 1 mL ampoule 500 micrograms / 1 mL
Dosage and administration > May be given subcutaneous or intravenous. **Subcutaneous** > Using a 1 mL syringe, draw up 0.5 mL (250 micrograms) of terbutaline and administer 0.5 mL subcutaneously. **Intravenous** > Using a 1 mL syringe, draw up 0.5 mL (250 micrograms) of terbutaline. > Add to a 10 mL syringe and make up to 10 mL with sodium chloride 0.9 % (25 micrograms per mL). > Give intravenous terbutaline slowly in 50 microgram (2 mL) boluses up to 250 micrograms in total [often 100 micrograms (4 mL) will be sufficient]. > **Ensure monitoring of maternal pulse whilst bolus doses are administered.** > **Stop IV administration if maternal pulse > 140 bpm.**
Side effects > Tremor, headache, nervousness, cardiovascular effects including arrhythmia, tachycardia, palpitation, muscle cramps, hypokalaemia.

Salbutamol Tocolysis Regimen[7]

Action

Salbutamol is a beta-adrenergic stimulant. Stimulation of beta-2-adrenoreceptors causes relaxation of the smooth muscle of the bronchi, uterus and skeletal muscle blood vessels. When given by the intravenous route, it is effective at producing uterine relaxation in most instances however the onset is variable and dependent on dosage.

IV administration may also cause a marked increase in insulin levels, lactate levels and plasma glucose levels. It may also cause a fall in potassium due to the intracellular shift associated with increased glucose and insulin levels.

Half-life of IV salbutamol ranges 4 to 6 hours.

Salbutamol is known to cross the placenta, evidenced by a rise in fetal heart rate baseline.

Indications

- Uterine hyperstimulation – hypertonus or tachysystole causing fetal compromise with no improvement from initial management [see flow chart.]
- Tocolysis before attempting external cephalic version for breech presentation.

Contraindications

- A bolus dose of salbutamol is contraindicated in:
  - cardiac disease
  - acute hypertensive crisis
  - hyperthyroidism.

Relative Contraindication

- Diabetes.

Table 2: Recommended Obstetric Salbutamol Dose and Administration

Obstetric salbutamol: 5 mL ampoule 5 mg / 5 mL
Dosage and administration: - using a 1 mL syringe, draw up 0.25 mL (250 micrograms) of salbutamol - add to a 10 mL syringe and make up to 10 mL with sodium chloride 0.9% (25 micrograms per mL) - give intravenous salbutamol slowly in 50 microgram (2 mL) boluses up to 250 micrograms in total (often 100 micrograms (4 mL) will be sufficient). - **Ensure monitoring of maternal pulse whilst bolus doses are administered.** - **Stop IV administration if maternal pulse > 140bpm.**
Side effects - Fetal and maternal tachycardia, maternal hypotension, ventricular ectopics, supra-ventricular tachycardia, ventricular fibrillation, pulmonary oedema, hypoxia – secondary to increased oxygen demands + / - fluid shift in lungs, hyperglycaemia.

Sublingual Glyceryl Trinitrate Spray (Nitrolingual®)[8]

Nitrolingual® pump spray is a metered dose spray that delivers glyceryl trinitrate 400 micrograms per spray emission.

Action

The principal pharmacological action of glyceryl trinitrate is relaxation of vascular smooth muscle, producing a vasodilator effect on both peripheral arteries and veins, with more prominent effects on the latter.

Indications

- Persistent uterine hypercontractility associated with fetal compromise.

  [Note: not a TGA approved indication]

Contraindications

- Acute circulatory failure (shock, circulatory collapse).
- Cardiac disease.
- Pronounced hypotension (systolic BP < 90 mm Hg).
- Severe anaemia.

Dosage and Administration

- 1 metered spray (400 micrograms) administered as spray droplets beneath the tongue (sublingual) – DO NOT INHALE.
- Repeat after 5 minutes if hypertonus sustained.
- No more than 2 metered doses should be given.

Practice Points

- Nitrolingual® pump spray should be primed before using it for the first time by pressing the nozzle five times.
- If Nitrolingual® pump spray has not been used for seven days a priming of one spray will be necessary.
- If the product has not been used for more than four months, it will need to be primed several times (maximum five) until an even spray is obtained.
- The woman should be in a sitting position.
- The bottle should be kept vertical with the nozzle head uppermost.
- Hold the opening in the nozzle head as close to the open mouth as possible and spray under the tongue.
- Close the mouth immediately after each dose.

Side Effects

- Headache.
- Hypotension.
- Reflex tachycardia or bradycardia.
- Rare: nausea, vomiting, flushing.

Resources

SAPPGs Web-based App:

Practice Guidelines (sahealth.sa.gov.au)

Medicines Information:

Medicines Information Homepage - SA Pharmacy Medicines Information Service - LibGuides at South Australian Health Library Service (sahealthlibrary.sa.gov.au)

SA Health Pregnancy:

Pregnancy | SA Health

Australian Government Pregnancy, Birth and Baby:

Pregnancy, Birth and Baby | Pregnancy Birth and Baby (pregnancybirthbaby.org.au)

References

1. Intrapartum Fetal Surveillance | Clinical Guideline, 4th Edition [Internet]. RANZCOG. 2019.
2. Hobson SR, Abdelmalek MZ, Farine D. Update on uterine tachysystole. J Perinat Med. 2019;47(2):152-60.
3. Egarter CH, Husslein PW, Rayburn WF. Uterine hyperstimulation after low-dose prostaglandin E2 therapy: tocolytic treatment in 181 cases. Am J Obstet Gynecol. 1990;163(3):794-6.
4. Management of uterine hyperstimulation (tachysystole). Clinical practice guideline [Internet]. 2010. Available from: http://www.health.vic.gov.au/clinicalnetworks/maternity.htm.
5. Frenken MWE, van der Woude DAA, Dieleman JP, Oei SG, van Laar J. The association between uterine contraction frequency and fetal scalp pH in women with suspicious or pathological fetal heart rate tracings: A retrospective study. Eur J Obstet Gynecol Reprod Biol. 2022;271:1-6.
6. Bricanyl® Injection (Terbutaline Sulfate) [Internet]. 2022. Available from: https://www.mimsonline.com.au/Search/AbbrPI.aspx?ModuleName=Product%20Info&searchKeyword=terbutaline&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=12660003_2.
7. Ventolin® Obstetric Injection (Salbutamol) [Internet]. 2022. Available from: https://www.mimsonline.com.au/Search/AbbrPI.aspx?ModuleName=Product%20Info&searchKeyword=salbutamol&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=8150001_2.
8. Nitrolingual® Pumpspray (glyceryl trinitrate) [Internet]. 2022. Available from: https://www.mimsonline.com.au/Search/AbbrPI.aspx?ModuleName=Product%20Info&searchKeyword=nitrolingual&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=41170001_2.

Acknowledgements

The South Australian Perinatal Practice Guidelines gratefully acknowledge the contribution of clinicians and other stakeholders who participated throughout the guideline development process particularly:

Write Group Lead

Dr Kate Andrewartha

Write Group Members

Ginny Wilkinson
Dr Sarah Cash
Dr Rachael Earl
Dr Kris Bascombe
Dr Linda McKendrick

Other Major Contributors

Dr Jessica Gehlert
Rosina Gergis

SAPPG Management Group Members

Dr Michael McEvoy (Chair)
Monica Diaz (SAPPG EO)
Marnie Aldred
Sonia Angus
Dr Elizabeth Beare
Elizabeth Bennett
Corey Borg
Dr Feisal Chenia
John Coomblas
Dr Danielle Crosby
Tania Day
Dr Ray Farley
Heather Holmes
Catherine Leggett
Dr Scott Morris
Dr Anupam Parange
Dr Shruti Tiwari
Dr Charlotte Taylor
Allison Waldron

Document Ownership & History

Developed by: SA Maternal, Neonatal & Gynaecology Community of Practice
Contact: HealthCYWHSPerinatalProtocol@sa.gov.au
Endorsed by: Domain Custodian, Clinical Governance, Safety and Quality
Next review due: 28/02/2028
ISBN number: 978-1-76083-548-4
CGSQ reference: **PPG026**
Policy history: Is this a new policy (V1)? **N**
Does this policy amend or update and existing policy? **Y**
If so, which version? **V3**
Does this policy replace another policy with a different title? **N**
If so, which policy (title)?

Approval Date	Version	Who approved New/Revised Version	Reason for Change
28/02/2023	V4	Domain Custodian, Clinical Governance, Safety and Quality	Formally reviewed in line with 5 year scheduled timeline for review.
01/05/2015	V3.1	SA Health Safety & Quality Strategic Governance Committee	Review date extended to 5 years following risk assessment. New template.
10/06/2014	V3	SA Health Safety & Quality Strategic Governance Committee	Reviewed
12/04/2011	V2	South Australian Maternal & Neonatal Clinical Network	Reviewed in line with scheduled review date
18/08/2004	V1	South Australian Maternal & Neonatal Clinical Network	Original approved version.