

## Maternity - Management of Monochorionic Twin Pregnancy

**Summary** This document provides best practice guidance to clinicians caring for women with monochorionic (MC) twin pregnancies. It promotes consistent recognition, monitoring, reporting, management and appropriate referral within the NSW Tiered Maternity Network to optimise fetal and maternal wellbeing.

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**Audience** All Maternity Clinicians;Fetal Medicine Staff;Obstetricians

## MATERNITY - MANAGEMENT OF MONOCHORIONIC TWIN PREGNANCY

### PURPOSE

This Guideline provides best practice guidance to clinicians caring for women with monochorionic (MC) twin pregnancies. It promotes consistent recognition, monitoring, reporting, management and appropriate referral within the tiered NSW Maternity and Neonatal (Perinatal) Networks to optimise fetal and maternal wellbeing.

### KEY PRINCIPLES

This Guideline applies to all NSW Public Health Organisations (PHOs) providing maternity services. The Guideline:

- endorses the Royal Australian and New Zealand College of Obstetrics and Gynaecology (RANZCOG) recommendations for MC twin pregnancies (see Section 2)
- recommends that women with MC twin pregnancies require as a minimum, antenatal care from a Level 4 maternity service in consultation with a Level 5 or 6 maternity service, and planned birth at a Level 5 or 6 maternity service in line with *NSW Maternity and Neonatal Service Capability Framework* [GL2016\\_018](#) (see Section 1.6)
- defines minimum standards for the frequency of ultrasound scanning and ultrasound reporting for women with a MC twin pregnancy (see Section 2.2 and Appendix 1)
- recommends all Tiered Perinatal Networks have an agreed pathway to communicate ultrasound scan results between ultrasound departments and maternity care providers in line with *Tiered Networking Arrangements for Perinatal Care in NSW* [PD2020\\_014](#) (see Section 1.6).

### USE OF THE GUIDELINE

Chief Executives of Local Health Districts are responsible for:

- ensuring appropriate referral, escalation and transfer of care for women with MC twin pregnancies in line with this Guideline and *NSW Maternity and Neonatal Service Capability Framework* [GL2016\\_018](#) (see Section 1.6)
- developing local referral to and reporting pathways for appropriate obstetric ultrasound providers with capability to assess a twin pregnancy (see Section 1.5)
- monitoring and review of outcomes for women diagnosed with MC twin pregnancy (see Section 6).

## REVISION HISTORY

Version	Approved by	Amendment notes
May-2020 (GL2020_011)	Deputy Secretary Health System Strategy and Planning Division	New policy

## ATTACHMENTS

1. Maternity – Management of Monochorionic Twin Pregnancy

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## **1 BACKGROUND**

A monochorionic (MC) twin pregnancy is one in which both fetuses are dependent on a single, shared placenta that has vascular connections between the two umbilical – placental circulations. The complications of MC pregnancy are significant and may lead to perinatal mortality at a rate of approximately 11% in monochorionic twins<sup>[1]</sup>. In addition, monochorionic monoamniotic (MCMA) twins (1% of monochorionic twins) have a greater rate of fetal abnormality, preterm birth, cord entanglement and perinatal death. Early determination of chronicity and amnionicity is essential to optimise management pathways in twin pregnancies<sup>[2]</sup>.

### **1.1 Scope**

This Guideline applies to all NSW Health Public Health Organisations (PHO) maternity services where women with MC twin pregnancies attend for care.

Women with MC twin pregnancies require as a minimum, antenatal care from a Level 4 maternity service in consultation with a Level 5 or 6 maternity service where maternal fetal medicine specialist consultation is readily available, and birth at Level 5 or 6 maternity service in line with *NSW Maternity and Neonatal Service Capability Framework GL2016\_018*.

This Guideline does not attempt to address all elements of clinical practice in the care of women with a twin pregnancy.

### **1.2 Key definitions**

#### **Monochorionic (MC)**

Multiple pregnancy with a single, shared placenta

#### **Dichorionic (DC)**

Multiple pregnancy with two separate placentas

#### **Diamniotic (DA)**

Two amniotic sacs

#### **Monoamniotic (MA)**

Single amniotic sac

#### **Identical (monozygous) twins**

May have DCDA, MCDA, or MCMA placentation

#### **Non identical (dizygous) twins**

Have DCDA placentation.

#### **Selective intra-uterine growth restriction**

one fetus has an estimated fetal weight <10th centile and the intertwin discordance is  $\geq 25\%$ <sup>[3]</sup>.

### **Twin to twin transfusion Syndrome (TTTS)**

Unequal sharing of blood between the fetuses across placental anastomoses which occurs in 10-15% of MC twin pregnancies. The condition is diagnosed on antenatal ultrasound by the finding of oligohydramnios in one amniotic sac and polyhydramnios in the other amniotic sac. TTTS is staged using the Quintero Classification System<sup>[4]</sup> (see [Appendix 2](#)).

### **Twin anaemia polycythaemia syndrome (TAPS)**

A rare form of transplacental blood transfusion from one twin to another. In this condition one twin becomes anaemic as indicated by a raised middle cerebral artery peak systolic velocity (MCA PSV) whilst the other twin becomes polycythaemic and with a low MCA PSV<sup>[6,7]</sup>.

## **1.3 Abbreviations**

DCDA	Dichorionic Diamniotic
IUGR	Intra-uterine growth restriction
MCMA	Monochorionic monoamniotic
MCDA	Monochorionic diamniotic
NIPT	Non-invasive prenatal (antenatal) screening test
NT	Nuchal Translucency
PHO	Public Health Organisation
RANZCOG	Royal Australian and New Zealand College of Obstetricians and Gynaecologists
TTTS	Twin-twin transfusion syndrome

## **1.4 About this document**

This Guideline provides best practice guidance for clinicians caring for women with MC twin pregnancies. It promotes consistent recognition, monitoring, reporting, management and appropriate referral within the NSW Tiered Perinatal Network to optimise fetal and maternal wellbeing in line with *Tiered Networking Arrangements for Perinatal Care in NSW* [PD2020\\_014](#).

This Guideline recommends:

- care is in line with the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) statement [Management of monochorionic twin pregnancy \(2014\)](#)<sup>[3]</sup>
- service provision in line with NSW *Maternity and Neonatal Service Capability Framework* [GL2016\\_018](#)
- a minimum standard for ultrasound scanning and reporting for women with MC twin pregnancy (see [Appendix 1](#)) is communicated to local service providers.

## 1.5 Relevant NSW Health Policy Directives and Guidelines

This Policy Directive should be read in conjunction with the following guidelines and policy directives:

- [PD2012\\_069 Health Care Records-Documentation and Management](#)
- [GL2016\\_018 NSW Maternity and Neonatal Service Capability Framework](#)
- [GL2018\\_025 Maternity - Fetal Heart Rate Monitoring](#)
- [PD2020\\_008 Maternity - National Midwifery Guidelines for Consultation and Referral](#)
- [PD2020\\_010 Recognition and Management of Patients who are Deteriorating](#)
- [PD2020\\_014 Tiered Networking Arrangements for Perinatal Care in NSW](#)

## 1.6 Tiered Perinatal Network responsibilities

Maternity services should have an agreed approach for maternal and fetal surveillance and/or referral in line with the *Maternity and Neonatal Service Capability Framework* [GL2016\\_018](#) and *Tiered Networking Arrangements for Perinatal Care in NSW* [PD2020\\_014](#).

For women with MC twin pregnancies this will include:

- antenatal care at a minimum of Level 4 maternity service, in consultation with the Level 5 or 6 maternity services where maternal fetal medicine specialist consultation is readily available, and birth at a Level 5 or 6 maternity service.
- communication pathways for referral and reporting ultrasound scan results between ultrasound providers and maternity care providers.

## **2 RANZCOG RECOMMENDATIONS FOR MONOCHORIONIC TWINS**

This Guideline endorses RANZCOG statement [Management of monochorionic twin pregnancy 2014](#) <sup>[3]</sup>. The recommendations are as follows:

### **2.1 Chorionicity (Recommendation 1)**

Chorionicity is a critical consideration in the management of twin pregnancies and should be determined by ultrasound and documented in all twin pregnancies prior to 14 weeks gestation <sup>[3]</sup>.

**NOTE:** If there is difficulty determining chorionicity and/or amnionicity, referral should be made for a maternal fetal medicine review, where possible within the Tiered Perinatal Network, ideally before 14 weeks gestation.

### **2.2 Ultrasound frequency (Recommendation 2)**

All women with monochorionic pregnancies should receive ultrasound surveillance for TTTS and IUGR. Following an **ultrasound scan at 11-14 weeks** for assessment of chorionicity, nuchal translucency and early anatomy, **ultrasound should be performed every 2 weeks from 16 weeks' gestation**. Ultrasound should be undertaken by a centre with sufficient experience to recognise these complications and refer appropriately if they occur <sup>[3]</sup>.

### **2.3 Ultrasound measurements (Recommendation 3)**

Ultrasound examination in monochorionic twins should include growth, amniotic fluid volume in each sac, bladder volume, umbilical artery and, (after 20 weeks) middle cerebral artery Doppler wave forms <sup>[3]</sup> (see [Appendix 1](#)).

### **2.4 Laser ablation (Recommendation 4)**

Laser ablation of vascular connections is the recommended treatment for the majority of pregnancies with TTTS that require intervention, and referral to a laser surgery facility should be considered - even where this may require interstate transfer. Early referral is recommended (within the Tiered Perinatal Network maternal fetal medicine unit, when TTTS is diagnosed, or is suspected), to allow optimal treatment before the onset of severe disease and cervical shortening <sup>[3]</sup>.

### **2.5 Timing of birth (Recommendation 5)**

Monochorionic twins, without IUGR or TTTS, appear to have a higher stillbirth rate than other twin pregnancies despite intensive surveillance. Therefore, it is recommended that women with monochorionic twin pregnancy should birth by 37 weeks gestation <sup>[3]</sup>.



### **3 COMMUNICATION AND ESCALATION**

#### **3.1 Communication with women**

It is essential that maternity care providers establish effective communication with women to build relationships that are respectful and inclusive. This should include the use of interpreter services where necessary <sup>[5]</sup>.

In early pregnancy, women with MC twin pregnancies should be provided with information regarding:

- screening for aneuploidy and fetal anomalies using nuchal translucency (NT) and/or non-invasive prenatal (antenatal) screening test (NIPT)
- ultrasound scanning every two weeks after 16 weeks gestation to monitor fetal wellbeing
- detailed morphology ultrasound scan at 18-20 weeks gestation
- increased antenatal fetal and maternal surveillance due to;
  - potential maternal complications: anaemia; hypertensive disorders; gestational diabetes
  - possible hospital admission for complications of pregnancy and transfer to higher level maternity service
  - the higher risk of stillbirth
- the increased incidence of preterm birth and caesarean section.

Women with MC twin pregnancies should be advised to report sudden increases in abdominal size, low back pain, vaginal discharge, breathlessness or reduced fetal movement, as these may be a sign of TTTS <sup>[3]</sup>.

#### **3.2 Communication by maternity care providers**

Maternity services should communicate with local service providers to establish a minimum standard for ultrasound scanning and reporting for women with MC twin pregnancies (see [Appendix 1](#)). This will enable timely identification and escalation of developing complications.

Maternity care providers referring women with MC twin pregnancy for ultrasound assessment should:

- refer women to an ultrasound service that is able to meet the standard for reporting MC twin pregnancy (see [Appendix 1](#))
- follow-up all scan results and communicate these results to the woman within an appropriate time frame.

Where complications are identified on ultrasound examination, each clinician should be familiar with the process for escalation within the Tiered Perinatal Network to a maternal fetal medicine unit.

## **4 CARE PLANNING**

Assessment and management strategies for women with MC twin pregnancy should be developed in an environment of woman centred care that enables informed decision making, reflecting a woman's self-determination, autonomy and control [5].

Women with a MC twin pregnancy will benefit from both medical and midwifery continuity of care providers within an interdisciplinary framework.

Where care planning includes transfer of care to another maternity care provider and or another maternity service in the Tiered Perinatal Network it is important to consider the individual needs and cultural context of the family and the support they may need.

It is particularly important that health professionals engage and work in partnership with Aboriginal women and where appropriate, involve their family and Aboriginal and Torres Strait Islander health professionals. Where care is provided by an Aboriginal Maternal Infant Health Service (AHMIS) that care should continue in partnership with relevant specialists.

Women should be encouraged to contact the [Australian Multiple Birth Association](https://www.amba.org.au/) (<https://www.amba.org.au/>) as a valuable source of information and long term support.

## **5 MC TWIN PREGNANCY COMPLICATIONS**

When complications of MC pregnancies develop and care has been provided in a Level 4 maternity service in consultation with a Level 5 or 6 maternity service, care should be escalated to a Level 5 or 6 maternity service for ongoing management and care planning. Complications of MC pregnancies include:

- monochorionic monoamniotic (MCMA) twin pregnancy
- twin to twin transfusion syndrome (TTTS)
- monochorionic diamniotic (MCDA) twin pregnancy with fetal abnormality
- selective intra-uterine growth restriction
- twin anaemia polycythaemia syndrome (TAPS)
- acardiac twin (twin reversed arterial perfusion sequence).

### **5.1 Laser treatment for twin to twin transfusion syndrome:**

When twin to twin transfusion is diagnosed (see [Appendix 2](#)), or suspected, the most timely referral pathway for laser surgery is recommended. See [Appendix 3](#) for locations of laser treatment centres for TTTS [3].

## **6 MONITORING CLINICAL PRACTICE AND OUTCOMES**

The Maternity Clinical Risk Management Committee or local Morbidity and Mortality Meetings should routinely review clinical outcomes of all MC pregnancies to identify quality improvement opportunities.

## 7 REFERENCES

1. Ghalili, A., et al., *Outcomes of monochorionic diamniotic twin pregnancies: a comparison of assisted and spontaneous conceptions. Australia and New Zealand Journal of Obstetrics and Gynaecology*, 2013. **53**(5): p. 437-442.
2. Kilby, M. and Bricker, L. on behalf of the Royal College of Obstetricians and Gynaecologists *Management of Monochorionic Twin Pregnancy Green top Guideline number 51. British Journal Obstetric and Gynaecology*, 2016. **124**, e1-e45.
3. Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG). *Management of monochorionic twin pregnancy. C-Obs 42 2011 2017* [cited 2018; Available from: <https://www.ranzcog.edu.au/Statements-Guidelines/Obstetrics>].
4. Quintero R, Morales WJ, MD, Allen MH, Bornick PW, Johnson P, Kruger M. *Staging of twin-twin transfusion syndrome. J Perinatol*, 1999 **19**: p. 550–555
5. Australian Government Department of Health. *Pregnancy Care Guidelines*. National Health and Medical Research Council (NHMRC) 2018 30/8/2018 [cited 2018; Available from: <https://beta.health.gov.au/resources/publications/pregnancy-care-guidelines>].
6. Slaghekke, F., et al., *Middle cerebral artery peak systolic velocity to predict fetal hemoglobin levels in twin anemia-polycythemia sequence. Ultrasound in Obstetrics and Gynecology*, 2015. **46**(4): p. 432-436.
7. Mari, G.A.F., *Middle cerebral artery peak systolic velocity for the diagnosis of fetal anemia: the untold story. Ultrasound in Obstetrics and Gynecology* 2005(4): p. 323-330.

## 8 LIST OF APPENDICES

1. Template for MC twin pregnancy ultrasound worksheet
2. The Quintero Classification System
3. Laser treatment centres for twin to twin transfusion syndrome
4. Implementation Checklist

APPENDICES

**Appendix 1: Sample MC twin pregnancy ultrasound worksheet**

Women who have MC twin pregnancies should have ultrasounds every two weeks with the following parameters to be reported, measured and plotted on growth charts

<b>Woman's name</b>		
<b>Woman's date of birth</b>		
Hospital		
Hospital medical record number		
<b>Referred by</b>	<b>Place of scan</b>	
	Scanned by	
<b>Consultant</b>	Reported by	
<b>Consultant contact details</b>	Reporting doctor contact details	
<b>Date of scan</b>		
<b>Calculated gestation</b>		
Agreed EDD and how calculated: Either LMP ( / / ) or dating scan date ( / / ) and gestation		
<b>Observation or calculation</b>	<b>Twin 1 or A</b>	<b>Twin 2 or B</b>
Presentation and location		
Fetal heart rate		
Bi-parietal diameter mm/centile	/	/
Head circumference mm/centile	/	/
Abdominal circumference mm/centile	/	/
Femur length mm/centile	/	/
Estimated fetal weight gm/centile	/	/
EFW discordance % (larger-smaller/larger)		
Bladder size	Normal / Large Small / Not seen	Normal / Large Small / Not seen
Amniotic fluid-deepest pool (cm)		
Umbilical artery systolic/diastolic ratio/centile		
Umbilical artery pulsatility Index/centile		
Umbilical artery comment (e.g. phasic pattern)		
Middle cerebral artery PSV/MoM (multiple of median) **		
Ductus venosus a-wave P/A/R		
Membranes comment (e.g. tightly around twin)		
Cord insertion (e.g. central, marginal, velamentous)		
Evidence of TTTS	Yes	No
Evidence of selective growth restriction	Yes	No
Cervical length (cm)*	Placenta location	

[EFW = estimated fetal weight, TTTS = twin to twin transfusion syndrome, PSV= peak systolic velocity]

\* if indicated

\*\* after 20 weeks gestation

APPENDICES

**Appendix 2: The Quintero Classification System**

The Quintero Classification System proposed by Quintero et al. is a staging system used to classify the severity of TTTS:

Stage	Quintero Classification system
I	There is a discrepancy in amniotic fluid volume with oligohydramnios of a maximum vertical pocket (MVP) <2 cm in one sac and polyhydramnios in other sac (MVP >8 cm). The bladder of the donor twin is visible and Doppler studies are normal.
II	The bladder of the donor twin is not visible (during length of examination, usually around 1 hour) but Doppler studies are not critically abnormal.
III	Doppler studies are critically abnormal in either twin and are characterised as abnormal or reversed end-diastolic velocities in the umbilical artery, reverse flow in the Ductus venosus or pulsatile umbilical venous flow
IV	Ascites, pericardial or pleural effusion, scalp oedema or overt hydrops present
V	One or both babies are dead

Quintero R, Morales WJ, MD, Allen MH, Bornick PW, Johnson P, Kruger M. *Staging of twin-twin transfusion syndrome. J Perinatol* 1999; 19: 550– 555

**Appendix 3: Laser treatment centres for twin to twin transfusion syndrome**

As at date 6/05/2020

Maternal Fetal Medicine Unit Royal Hospital for Women Randwick, Sydney  Telephone 0437537448	Maternal Fetal Medicine Royal Prince Alfred Hospital Camperdown, Sydney  Telephone (02) 9515 8258 Switchboard (02) 95156111 to page Maternal Fetal Medicine Registrar
Fetal Monitoring Unit Monash Health Clayton, Melbourne  Telephone (03) 9594 2343	Mater Centre for Maternal Fetal Medicine Mater Mothers' Hospital Raymond Terrace, South Brisbane  Telephone (07) 3163 1896

APPENDICES

**Appendix 4: Implementation checklist**

<b>LHD/Facility:</b>			
<b>Assessed by:</b>		<b>Date of Assessment:</b>	
<b>IMPLEMENTATION REQUIREMENTS</b>	<b>Not commenced</b>	<b>Partial compliance</b>	<b>Full compliance</b>
1. Seek Executive sponsorship for the Guideline from the LHD or Clinical Service.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<u>Notes:</u>		
2. Identify stakeholders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<u>Notes:</u>		
3. Identify clinical leads.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<u>Notes:</u>		
4. Communication plan established and set date for implementation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Education re Guideline is scheduled relevant to appropriate clinicians in local context.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<u>Notes:</u>		
6. Local protocol or business rules outline communication between ultrasound providers and maternity clinicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<u>Notes:</u>		
7. Establish audit and feedback process for ultrasound reporting processes, and review of outcomes for monochorionic diamniotic pregnancies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<u>Notes:</u>		