The use of ultrasound in the management of monochorionic twin pregnancies guideline	Version: 3.0
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Document Status

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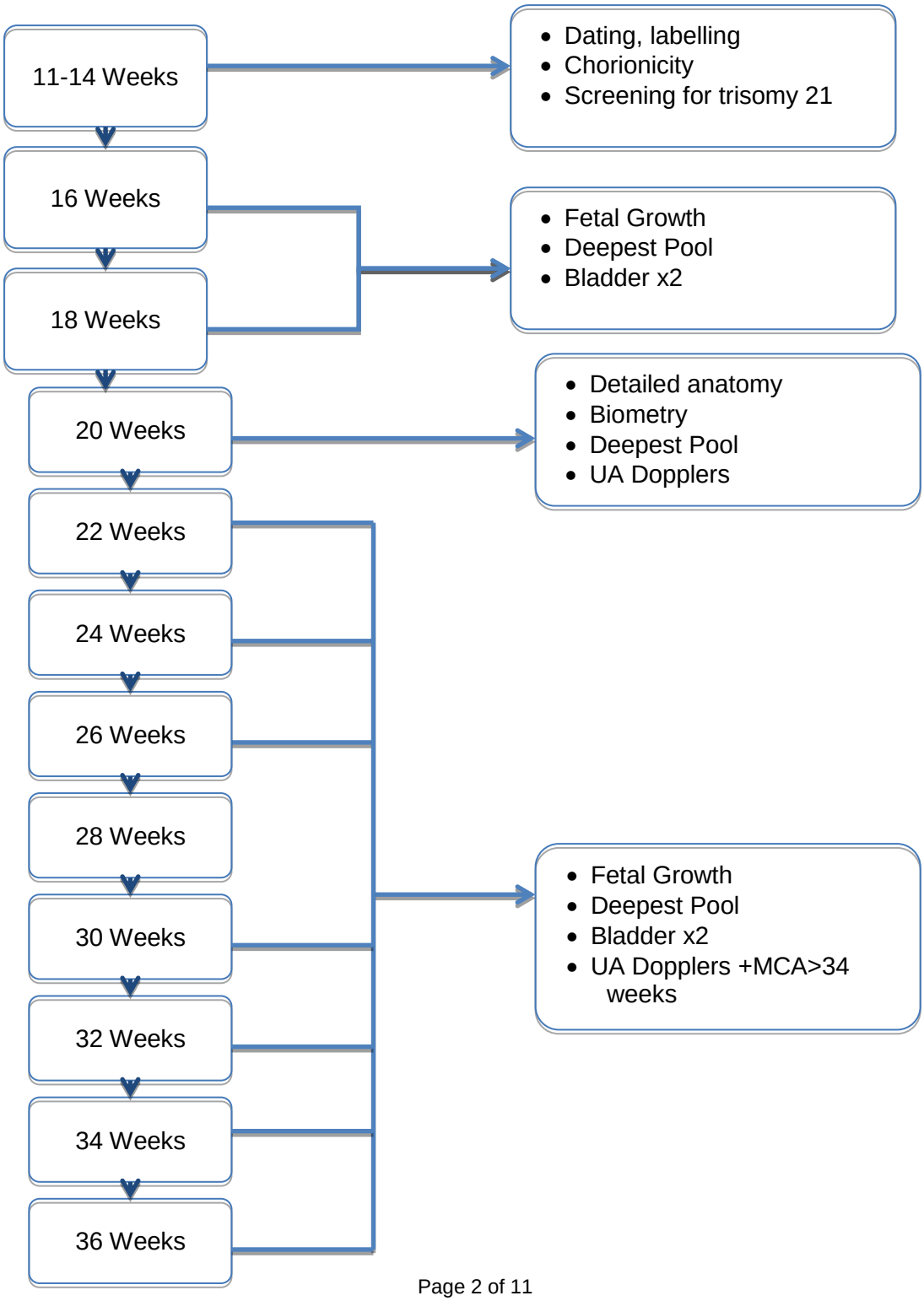
Executive Summary

- ALL must be aware of signs of acute TTTS
- Any mothers presenting with relevant symptoms (uterine distension and or abdominal pain) must have an USS measuring deepest pool and seeing both bladders[1]



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1. Introduction, Scope and Purpose

This applies to all staff caring for women with monochorionic pregnancies.
The aim is to improve consistency in the management of these pregnancies within the regional network and hence potentially change the outcome.

Ultrasound assessment is used to monitor twins at risk of adverse outcomes such as twin to twin transfusion syndrome (polyhydramnios/oligohydramnios), fetal growth restriction and twin anaemia-polycythaemia sequence (TAPS). These pregnancies have a higher risk of both maternal and fetal complications

2. Definitions

MC – Mono chorionic
MCDA – mono-chorionic di-amniotic
MCMA – mono-chorionic mono-amniotic
CRL – Crown-rump length
USS – ultrasound
TOPS Twin oligohydramnios polyhydramnios sequence (twin transfusion syndrome)
TAPS - twin anaemia-polycythaemia sequence
DCDA – di-chorionic di-amniotic
DP – deepest pool

3. Guideline

3.1 Dating of pregnancy

- Twin pregnancies should be dated when the CRL is between 45-84mm (11+0 to 13+6 gestation)
- In spontaneous pregnancies – the largest CRL should be used to estimate the gestational age

3.2 Determining the chorionicity

- Chorionicity should be determined before 13+6 weeks identifying the T sign or the lambda sign. (see appendix 1)
    - USS images should be kept on PACS
- If the membrane is not visualised, the mother should be referred to fetal medicine at 14 weeks for discussion about MCMA pregnancies

3.3 Labelling twins

- Labelling should be consistent and documented early in the woman's notes. This can be done by identifying the sac as below
    - Left/right (aim to always include this)

    Upper/lower (if unable to describe left/right)

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3.4 Subsequent Scans

Fortnightly scans from the diagnosis of MCDA twins looking for signs of TOPS Prognosis of TOPS is determined by the stage of disease and can improve with timely intervention

Expected measurements from scanning

- Fetal biometry
- Visualisation of both bladders and comment if there is a persistent discrepancy between bladder size
- Visualisation of the membrane well away from each fetus. Be cautious about infolding of the membrane around the fetus as that may be the initial presentation of the difference in liquor volumes.
- Measurement of deepest pool (DP) in each sac
    - <20/40 TOPS is recognised if <2cm in one sac and >8cm in the other
    - >20/40 TOPS is recognised if >10cm in one sac
- Umbilical artery Dopplers are recommended after 20 weeks
- MCA Doppler after 34 weeks

Anomaly scan

- Increased incidence of structural abnormalities in twins, particularly monozygotic twins:
    - 1:6 MCMA, 1:15 MCDA, 1:25 DCDA
- Pregnancies should be examined with care and with extended cardiac views in line with FASP recommendations

3.5 Twin oligohydramnios polyhydramnios sequence (TOPS)- (Twin transfusion syndrome, TTTS)

- If any suspicion of TOPS or TTTS then refer to Fetal Medicine
- The placenta contains vascular anastomoses that connect the two fetal circulations.
- Monochorionic twins are at risk of developing TOPS when there are unbalanced AV anastomoses
- Affects 10-15% of MCDA pregnancies
- Left untreated it leads to fetal demise in up to 90% of cases
- Timely detection of TOPS has been shown to improve perinatal outcomes.

Staging of TOPS

- Staging is done by the Quintero system
    - Of note the Quintero staging system does not always follow the chronological evolution of TOPS

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Stage	Classification
I	Polyhydramnios – oligohydramnios sequence: DP >10cm after 20 weeks, >8cm before 20 weeks in recipient twin and DP <2cm in donor twin
II	Bladder in donor twin not visible on ultrasound
III	Absent or reversed umbilical artery diastolic flow, reversed ductus venosus a-wave flow, pulsatile umbilical venous flow in either twin. Pulsatile umbilical venous flow in either twin
IV	Hydrops in one of both twins
V	Death of one or both twins

Management of TTTS

- Indication for referral decided by FMULaser ablation is the treatment of choice for TTTS at Quintero stages II and above [1]Conservative management with close surveillance can be considered for Quintero stage I
- When laser treatment is not available then serial amnioreduction can be considered after 26 weeks

Management post laser

- Less neurological morbidity with laser
  - Cerebral abnormalities 5% post laser and 21% following expectant management [1]
- Weekly ultrasound for first 2 weeks following treatment reducing if clinical evidence of improvement
  - As guided by the operating centre
- Consider brain imaging later in pregnancy in the third trimester
- Neurodevelopmental assessment at 2-3 years

3.6 MC TWIN clinic

- As soon as MC twins are diagnosed locally, they are seen in the MC clinic where they are reviewed with USS every 2 weeks
- At the first appointment
  - Management of the pregnancy is discussed
  - Twin sticker placed in notes
  - Patients are told to present to hospital with any worries about increasing abdominal size and not to leave hospital without an ultrasound scan to measure liquor volume and to ensure both bladders are seen.
  - Leaflets given:
    - Antenatal care for women who are pregnant with twins or triplets
    - Patient information factsheet: monochorionic twins

- Any evidence of TOPS or selective IUGR will be referred to the Fetal medicine department for specialist advice.

3.7 TAPS

Twin anaemia-polycythaemia sequence

- It is thought that TAPS occurs when there are tiny <1mm arteriovenous anastomosis present. This leads to a slow transfusion of blood from donor to recipient twin leading to significantly different haemoglobin levels at birth.
- Incidence of spontaneous TAPS is 5% in MCDA twins but may complicate up to 13% of cases of TTTS following ablation. [2]
- TAPS should be screened for following laser ablation for TOPS by serial middle cerebral artery peak systolic velocity [3]
- Little evidence regarding the outcome and optimal management so all cases referred to FMU where they will be managed individually

Stage[1]	**Antenatal staging**	**Postnatal staging (intertwin Hb difference g/dL)**
I	Donor MCA-PSV > 1.5 MoM and recipient MCA-PSV < 1.0 MoM, without other signs of fetal compromise	>8.0
2	Donor MCA-PSV > 1.7 MoM and recipient MCA-PSV < 0.8 MoM, without other signs of fetal compromise	>11.0
3	Stage 1 or 2 and cardiac compromise in donor (UA-AREDF, UV pulsatile flow, or DV increased or reversed flow)	>14.0
4	Hydrops of donor twin	>17.0
5	Death of one or both fetuses, preceded by TAPS	>20.0

3.8 Selective Growth restriction in MC twins

- These women are managed in Fetal Medicine
- Estimated fetal weight discordance of more than 20% is associated with an increase in perinatal risk and therefore seen in FMU.
- Umbilical artery Doppler helps determine prognosis. Those with absent, reversed or intermittent umbilical artery Doppler waveforms are at increased risk of perinatal mortality and morbidity
- In MC twin pregnancy complicated by sFGR, fetal dopplers should be assessed at each scan. The frequency of scans should be determined by the degree of growth restriction and Doppler abnormality.

3.9 TRAPS

Twin reversed arterial perfusion sequence

- Managed in Fetal Medicine
- Rare complication of MC twin pregnancy (approx. 1% of MC pregnancies)
- Acardiac twin being perfused by anatomically normal 'pump' twin through large artery-artery anastomosis on the placental surface
- **Should always exclude this when USS demonstrates that one twin may have demised (may be an acardiac twin)**
- Survival might be improved by intervention at 12-14 weeks of gestation
- Pump twin at risk of developing hydrops.

4. Roles and Responsibilities

This guideline applies to all clinical staff employed or contracted by University Hospital Southampton (UHS) Foundation Trust who provide care to women. Staff have a responsibility to ensure that they are aware of this guideline and its contents. They should clearly document their rationale if they have not complied with the recommendations detailed in this guideline. It is the responsibility of department managers, consultants, team leaders and education leaders to ensure staff are aware of this guideline.

5. Related Trust Policies

Multiple Birth Guideline
UHS or regional USS GL
Patient information leaflets

6. Implementation

The guideline will be displayed on the Staffnet, and sent to the relevant Care Group clinical teams. The team leaders will be expected to cascade to all relevant staff groups. All medical, nursing and midwifery staff caring for women and newborns should have support and training in implementing the contents of the guideline. In addition, the guidelines will be included in local induction programmes for all new staff members.

The author is responsible for ensuring the effective dissemination of this guideline.
To ensure dissemination takes place and to avoid duplication of work, do not assume others will do this based on their involvement in guideline consultation process.

Methods of dissemination may include :

- Discussion at the Fetal medicine meeting
- Email correspondence e.g.
  - Sonographers
  - consultantobstetricians@uhs.nhs.uk,
- Consider how you will audit/measure uptake of new guidance

7. Process for Monitoring Compliance/Effectiveness

The purpose of monitoring is to provide assurance that the agreed approach in the guidance is being followed to ensure we get things right for patients, use resources well and protect our reputation. Our monitoring will therefore be proportionate, achievable and deal with specifics that can be assessed or measured.

Audit results will be circulated and presented at the multidisciplinary audit meetings, identified in the monitoring table. Any areas of non-compliance or gaps in assurance that arise from the monitoring of this guideline will result in an action plan detailing recommendations and proposals to address areas of non-compliance and/or embed learning. Monitoring of these plans will be coordinated by the group/committee identified in the monitoring table.

Those responsible for instigating the resulting actions will be identified in the audit meeting minutes and the action plans and results will also be reviewed by *Maternity Service Group.* The resulting actions will be reviewed or followed up at the subsequent multidisciplinary audit meeting(s).

Key aspects of the procedural document that will be monitored:

What aspects of compliance with the document will be monitored	What will be reviewed to evidence this	How and how often will this be done	Detail sample size (if applicable)	Who will co-ordinate and report findings (1)	Which group or report will receive findings
The chorionicity of all pregnancies should be identified and documented (1st trimester)	Ultrasound records of women with twin pregnancies	Every 3 years commencing 6 months following implementation of the guideline	10	Fetal Medicine Consultant	Maternity Service Group
2 weekly scans for MC twins from 14 weeks	Ultrasound records of women with twin pregnancies	Every 3 years commencing 6 months following implementation of the guideline	10	Fetal Medicine Consultant	Maternity Service Group

(1) State post not person.

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Where monitoring identifies deficiencies, actions plans will be developed to address them.

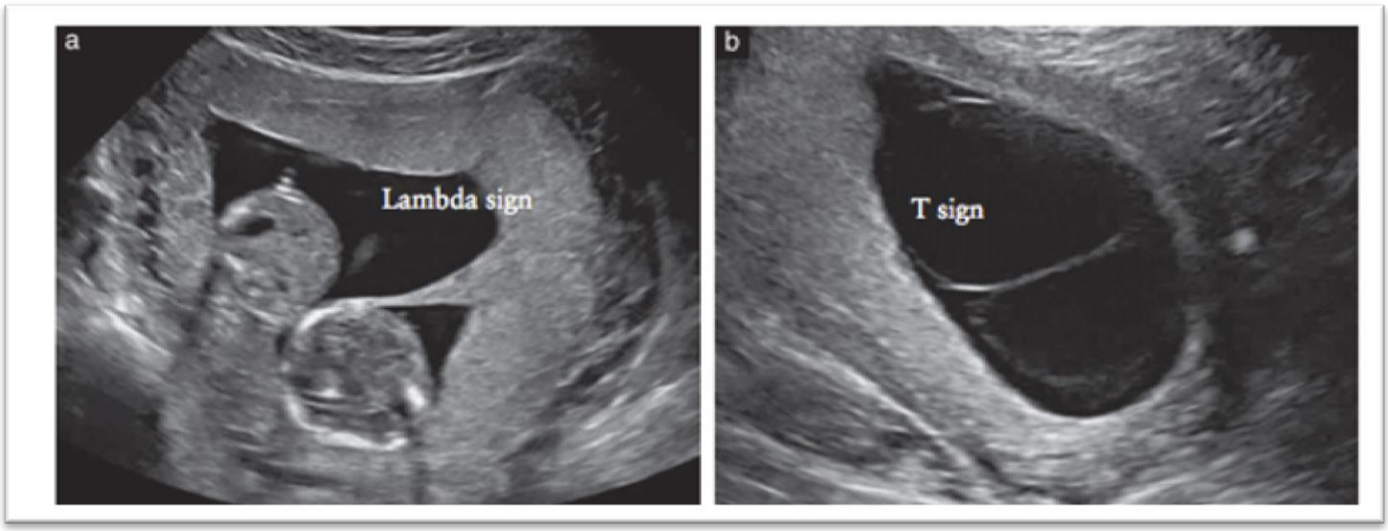
8. Arrangements for Review of the Policy

Guideline to be reviewed after three years or sooner as a result of audit findings or as any changes to practice occurs.

9. References

1. ISUOG Practice Guidelines: role of ultrasound in twin pregnancy: Ultrasound Obstet Gynecol 2016; 47: 247–263
2. Robyr R, Lewi L, Salomon LJ, Yamamoto M, Bernard JP, Deprest J, Ville Y. Prevalence and management of late fetal complications following successful selective laser coagulation of chorionic plate anastomoses in twin-to-twin transfusion syndrome. Am J Obstet Gynecol 2006; 194: 796–803
3. Kilby MD, Bricker L on behalf of the Royal College of Obstetricians and Gynaecologists. Management of monochorionic twin pregnancy. BJOG 2016; 124:e1–e45

Appendix 1



Ultrasound appearance of the membrane attachment to the placenta
Reference: Khalil A, Rodgers M, Baschat A, Bhide A, Gratacos E, Hecher K, et al. ISUOG Practice Guidelines: role of ultrasound in twin pregnancy. Ultrasound Obstet Gynecol 2016;47:247–6

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Document Monitoring Information	
Approval Committee:	Women and Newborn Governance Steering Group
Date of Approval:	3rd April 2020
Ratification Committee:	Women and Newborn Governance Steering Group
Date of Ratification:	3rd April 2020
Signature of ratifying Committee Group/Chair:	Ash Monga – Women and Newborn Governance Steering Group
Lead Name and Job Title of originator/author or responsible committee/individual:	Rajeswari Parasuraman – Consultant in Fetal and Maternal Medicine Ineke van Herwijnen Consultant Obstetrician
Name of responsible individual:	Freya Pearson – Divisional Clinical Director
Policy Monitoring (Section 6) Completion Date:	Every 3 years commencing 6 months following implementation of the guideline
Policy Monitoring to be presented to responsible committee or PRAMG:	Maternity Services Group
Target audience:	Fetal Medicine
Key words:	USS Monochorionic twins
Main areas affected:	Maternity
Summary of most recent changes if applicable:	Updated to confirm with the 2016 guidelines from ISUOG Authors have considered amalgamating this guideline with the Multiple Pregnancy Guideline, and have concluded it should remain as a separate document.
First Consultation: (delete as applicable, include date and/or additional stakeholders)	**07/11/2019 – 22/11/2019** W&N Obstetric Guideline Consultation Group W&N Midwifery Guideline Consultation Group W&N Neonatal Guideline Consultation Group W&N Anaesthetic Guideline Consultation Group W&N Gynaecology Guideline Consultation Group Fetal Medicine Midwives
Second Consultation: (delete as applicable, include date and/or additional stakeholders)	Not required
Comments received from:	Matthew Coleman, Karen Brackley
Is there any non compliance with NICE guidance?	No

Equality Impact Assessment completion date:	N/A
Number of pages:	11
Type of document:	Clinical guideline level 2
Does this document replace or revise an existing document	Revision on an existing guideline
Should this document be made available on the public website?	No
Is this document to be published in any other format?	No

The Trust strives to ensure equality of opportunity for all, both as a major employer and as a provider of health care. This document has therefore been equality impact assessed to ensure fairness and consistency for all those covered by it, regardless of their individual differences, and the results are available on request.