

TTTS or TAPS SCREENING OB ULTRASOUND PROTOCOL

TTTS (Twin to Twin Transfusion Syndrome)

TAPS (Twin Anemia Polycythemia Sequence)

BILLING CODES TO BE USED AS NEEDED:

UOBL –For limited exams not including biometry. Only charge one per visit, do not charge individually for each fetus.

UOBUA – Umbilical Artery Doppler. Charge one for each fetus.

UOBMCA – Middle Cerebral Artery. Charge one for each fetus.

****TTTS surveillance should start at 16 weeks and be performed every 2 weeks with MVP and bladder assessment for both twins. General timeline for surveillance as established by MFM physicians:**

- **16 weeks: Formal EARLY ANATOMY** including TTTS surveillance
- **18 weeks: Informal bedside US** for TTTS surveillance
- **20 weeks: Formal DETAILED ANATOMY and TVCL** including TTTS surveillance
- **22 weeks Informal bedside US** for TTTS surveillance
- **24 weeks: Formal GROWTH** including TTTS surveillance
- **26 weeks: Informal bedside US** for TTTS surveillance
- **28 weeks: Formal GROWTH (and MCA dopplers** for TAPS if requested) including TTTS surveillance
- **Continue every 3-4 week: Formal GROWTH** including TTTS surveillance until 36 weeks

IMAGES TO OBTAIN FOR TTTS SURVEILLANCE

(Additional images to be included for anatomy and growth as needed.

See corresponding protocols for image requirements.)

FETAL POSITIONS:

- Document and label fetal positions on images and in Viewpoint report under the Presentation section.

FETAL MEMBRANES:

- Document the free-floating membrane between each fetus and ensure membrane is not adhered to fetus.

FETAL HEART RATES:

- M-mode sweep with fetal heart rates measured.

AMNIOTIC FLUID VOLUMES:

- Maximum vertical pocket (MVP) for each fetus.
- For Mono/Mono gestations, use a four pocket AFI measurement.

FETAL ANATOMY:

- Bladder in transverse
- Bilateral Lateral Ventricles to assess for ventriculomegaly and IVH.
- Document presence or absence of fetal hydrops. Evaluate for:
 - Abdomen – Ascites
 - Extremities and scalp- integumentary edema
 - Chest -pericardial effusion or pleural effusion

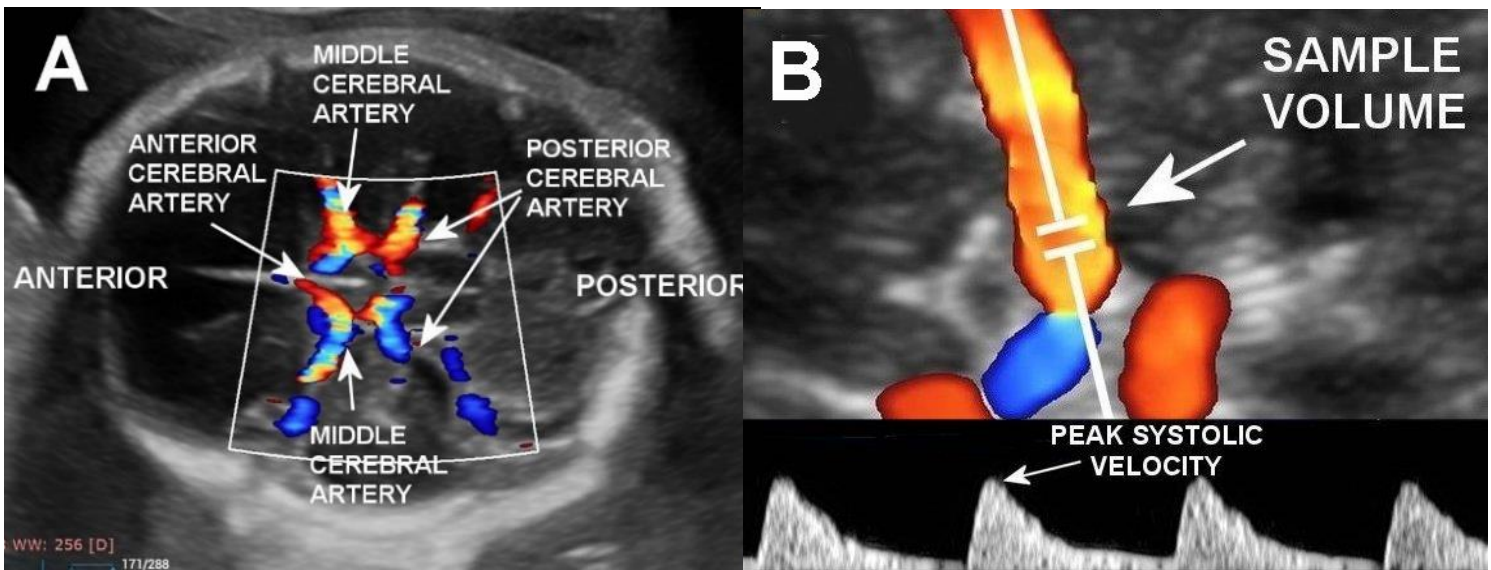
ADDITIONAL IMAGES AS REQUESTED

UMBILICAL ARTERY DOPPLER: Done at 24 weeks or greater for FGR. If needed for either twin, UA doppler should be obtained for BOTH twins. This should be clearly stated on the order

- Perform UA Doppler as requested, or if either of the following is determined- AC is <10% or if EFW is <10%
- Technique:
 - 3 spectral doppler samples of the umbilical artery are taken at the middle section of the umbilical cord.
 - The sample with the highest S/D ratio is documented in the OB report.
 - Avoid being close to the fetus or placental cord insertions. If necessary, the cord can be traced from fetal cord insertion to ensure the proper fetal cord is documented in cases where it is challenging to determine which cord corresponds to a certain fetus. In this case, it should be clearly stated on the report that the doppler was obtain at the fetal end to accurately compare to prior and future measurements.
 - If a dramatic difference is seen in S/D ratios between exams, BOTH umbilical arteries should be sampled and compared. There are cases where one artery has normal flow, and the other is abnormal. Describe this in the report if this is the case.
- An Umbilical Artery S/D ratio of > 95th percentile is considered abnormal.
- If absent end diastolic flow (or reversed diastolic flow) is seen, this needs to be reported urgently via a phone call to the clinical team before the patient leaves. The patient may be admitted.
- If absent or end diastolic flow present, follow flow chart for additional imaging of MCA and ductus venosus as indicated.
- Absent diastolic flow does not mean that the S/D is = 1 (same with reversed diastolic flow.) Report these as “Absent diastolic flow or Reversed diastolic flow”.

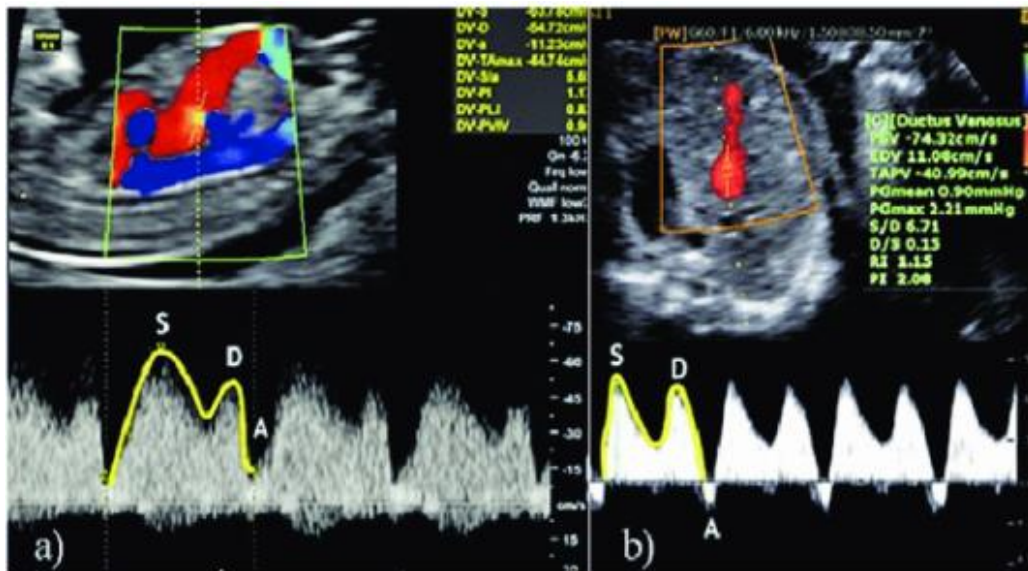
MIDDLE CEREBRAL ARTERY DOPPLER: MCA dopplers may be ordered after 26 weeks to assess for TAPS (Twin Anemia Polycythemia Sequence) in MCDA twins. Increased peak systolic velocity in the MCA can be suggestive of developing fetal anemia.

- Perform MCA Doppler as requested, or if absent or reversed umbilical artery doppler is observed.
- Technique:
 - Be careful not to apply too much pressure to the fetal head as this can affect intracranial pressure on the vessels. This can lead to false readings.
 - MCA peak systolic velocity should be taken at a zero-degree angle
 - Only the most anterior MCA should be used for obtaining velocity.
 - MCA should course directly toward the transducer with no angulation of vessel to the side.
 - Visualize the entire length of the MCA and enlarge the area of the MCA so that it occupies 50% or more of the screen.
 - Place spectral doppler cursor just outside its origin.
 - Measurement should be taken at least 3 times.
 - Using the highest of the 3 sample velocities taken.
 - The risk of anemia is highest in fetuses with a pre-transfusion peak systolic velocity of 1.5 times the median or higher.



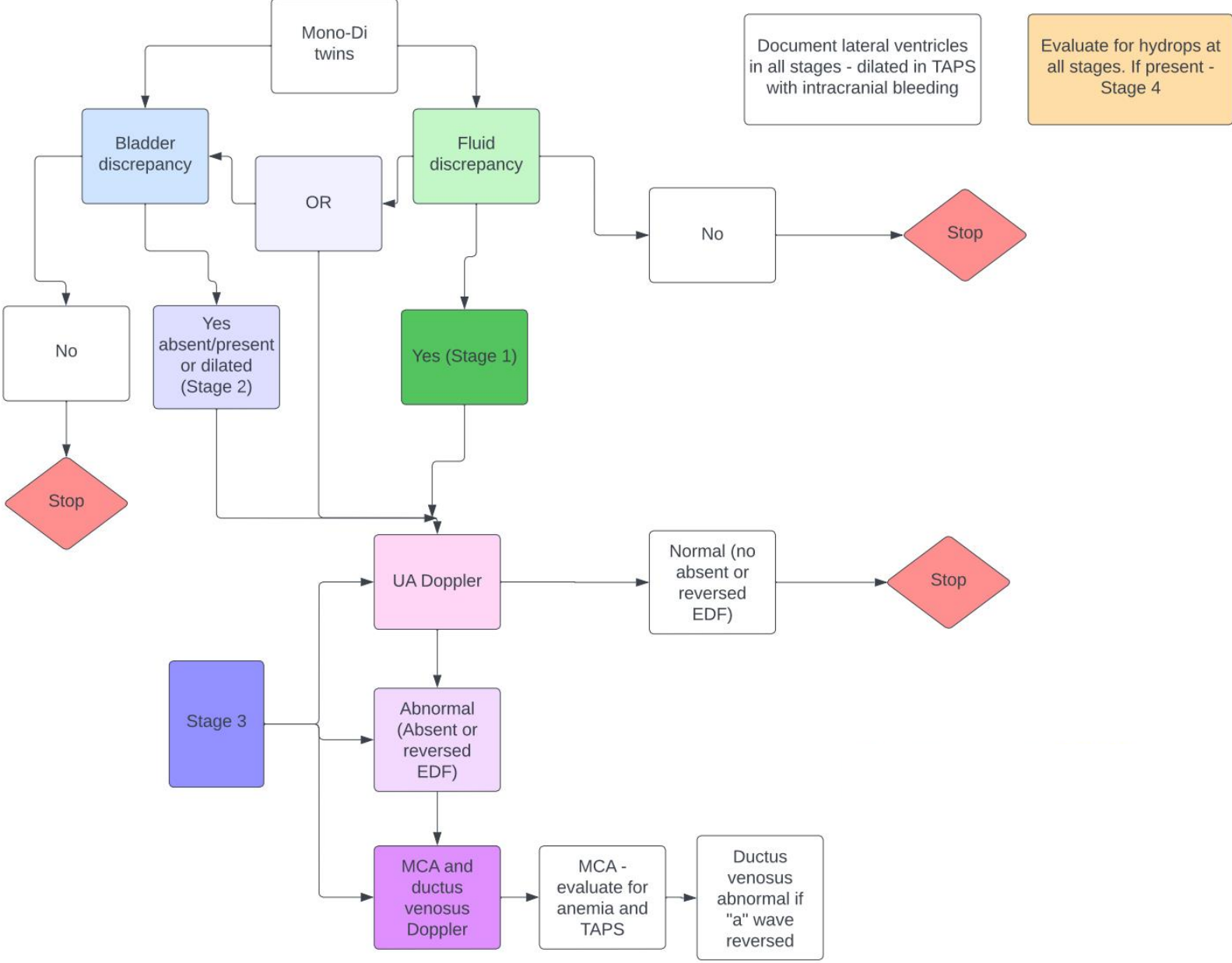
DUCTUS VENOSUS:

- Perform DV Doppler as requested, or if absent or reversed umbilical artery doppler is observed.
- Technique:
 - Sample where the umbilical vein joins the ductus venosus and where color aliasing can often be seen.
 - The sweep speed should be set high enough for best assessment of the A wave.
 - Set the wall filter low enough so that the A wave is not obscured
 - Fetus should be as still as possible, variability in the heights of the S and D waves may indicate fetal breathing, which is normal, but wait for the fetus to be more still before evaluating.
- Flow in the ductus venosus has a characteristic triphasic waveform. Flow should always be in a forward direction towards the heart. This triphasic waveform comprises of:
 - S wave: corresponds to fetal ventricular systolic contraction and is the highest peak
 - D wave: corresponds to fetal early ventricular diastole and is the second highest peak
 - A wave: corresponds to fetal atrial contraction and is the lowest point in the wave form albeit still being in the forward direction, reversal of the A wave is always abnormal.



Doppler of the ductus venosus with normal triphasic flow (a) obtained with the sample volume of the pulsed Doppler in the sagittal plane and reverse A wave (b). S = systolic wave; D = diastolic wave; A = pre-systolic wave.

FLOW CHART FOR TTTS/TAPS EVALUATION



TTTS/TAPS SCREENING PROTOCOL HISTORY

	Date	Changes made	By whom
Created	5/17/2022		TTTS meeting attendees: Alyssa Stephenson-Famy, Manjiri Dighe, Shani Delaney, Shaun Bornemeier, Becky Marion, Renee Betit Fitzgerald
Added	12/6/2022	Lateral Ventricle added to anatomy requirements	Manjiri Dighe Renee B Fitz
Added	12/15/2022	Ductus venosus section Flow chart added for additional imaging if abnrml.	Manjiri Dighe Renee B Fitz
Change	12/15/2022	MCA dopplers will not be performed as part of the routine TTTS surveillance unless requested by provider Changed to - Perform MCA Doppler as requested, or if absent or reversed umbilical artery doppler is observed.	Manjiri Dighe Renee B Fitz