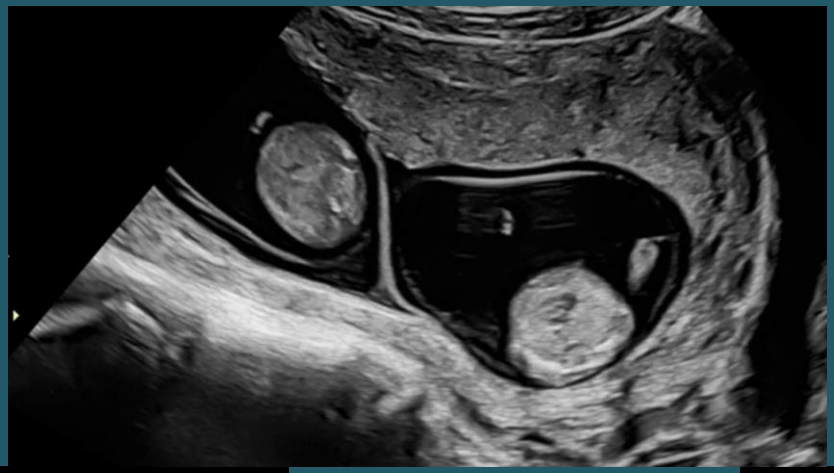
The follow up of multiple pregnancies

What should every neonatologist know?



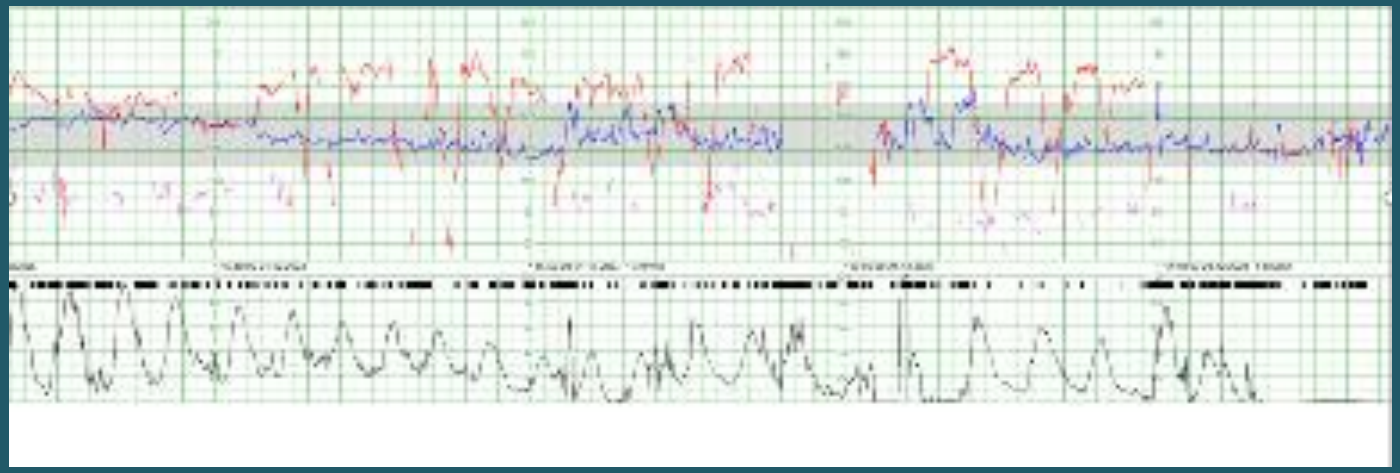
F Russo

27/11/2025

What is your diagnosis? Case 1

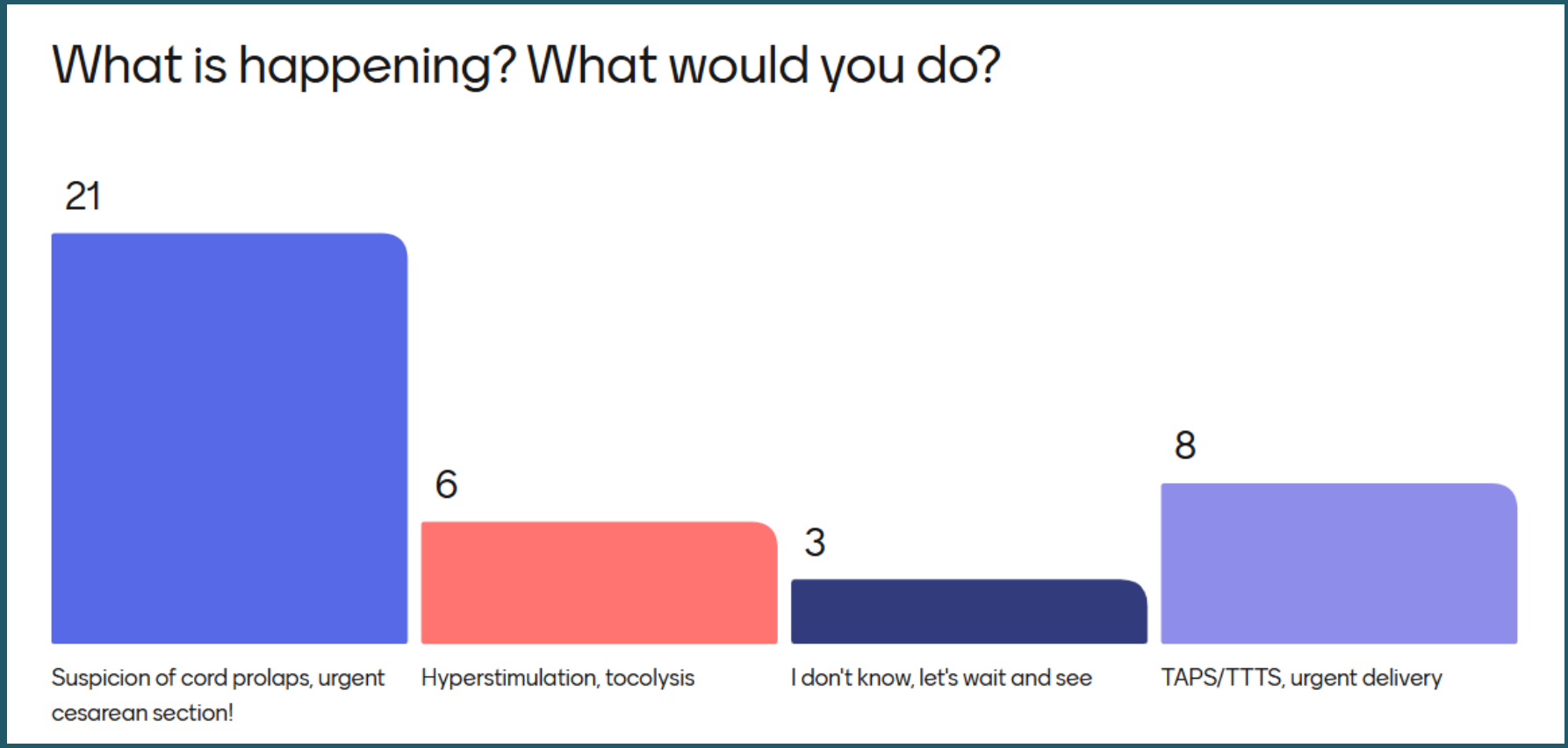
- G1, spontaneous MCDA twins
- Uneventful pregnancy
- US @35w: 2x vertex, normal fluid and dopplers, p22 and p24

- Induction @36w1d
- Vaginal prostaglandins, AROM @3cm



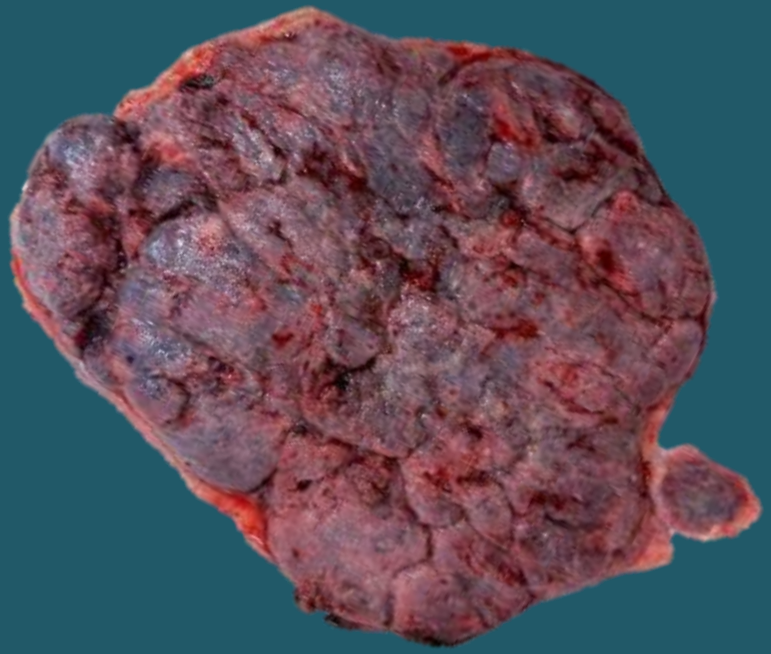
What is your diagnosis? What would you do?

What is your diagnosis? What would you do?



What is your diagnosis? Case 1

- Cesarean section

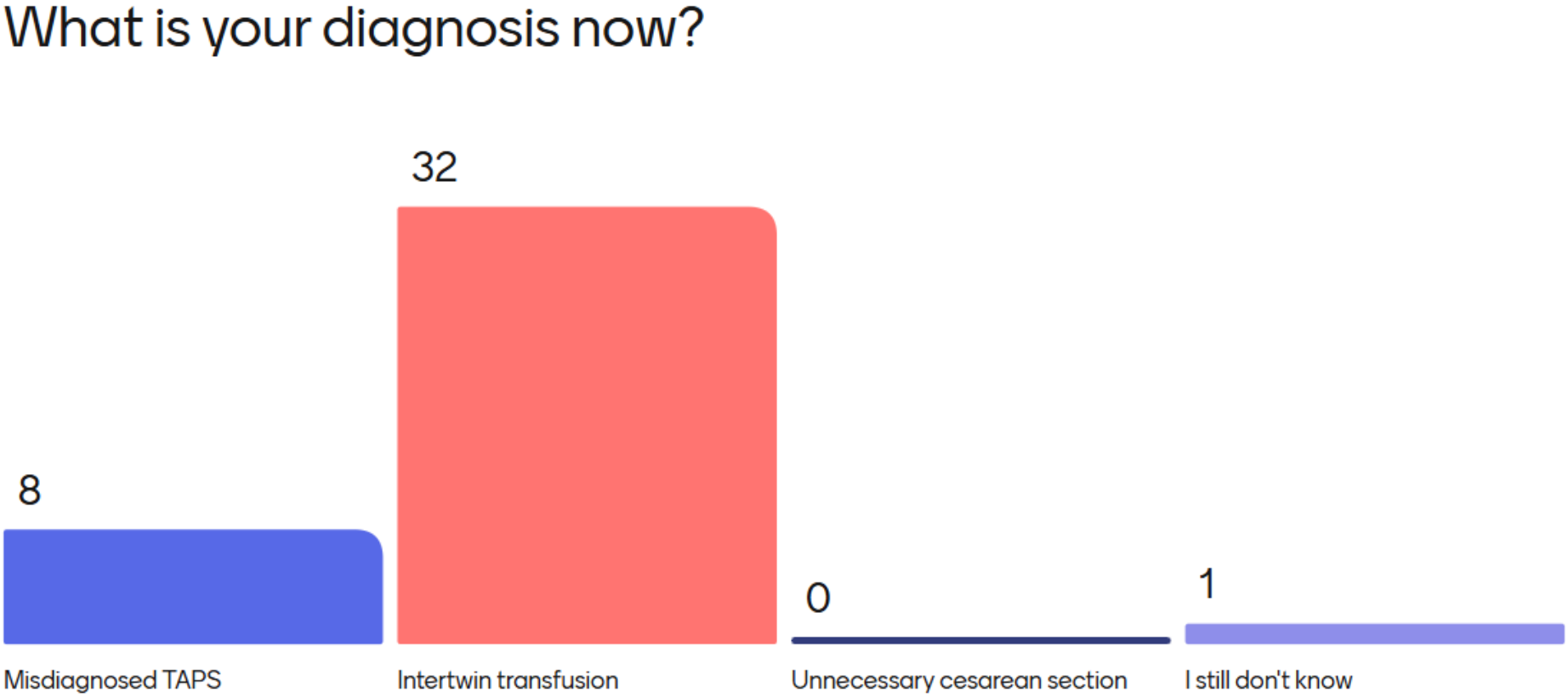


- pH 7.18
- Hb 12 gr/dL

- pH 7.22
- Hb 21 gr/dL

What is your diagnosis now?

What is your diagnosis now?



Type & epidemiology of twins

Dichorionic *versus* monochorionic twins

Complications unique to MC twin pregnancies

- TTTS
- TAPS
- Acute intertwin transfusion
- Acardiac twinning

Complications not unique to MC twin pregnancies

- Discordant anomalies
- Discordant growth
- Preterm birth

MOMAs and higher order pregnancies

Type of twins

70% dizygotic

dichorionic

Poly-ovulation

incidence depends on

Family History	
Ethnicity	black > asian
Maternal age	old > young
Parity	multips > primi
Mode of conception	ART >>> spontaneous

30% monozygotic

30% dichorionic

69% monochorionic diamniotic

1% monochorionic monoamniotic

≈ constant: 1 in 250 pregnancies

1 in 50 pregnancies after ART

Blickstein I, AJOG 2005; Derom C, Fertil Steril 2006; Stern JE, Fertil Steril 2007; Papanikolaou EG, Fertil Steril 2010

Epidemiology of twins

Natural incidence of twins	1 in 89 births

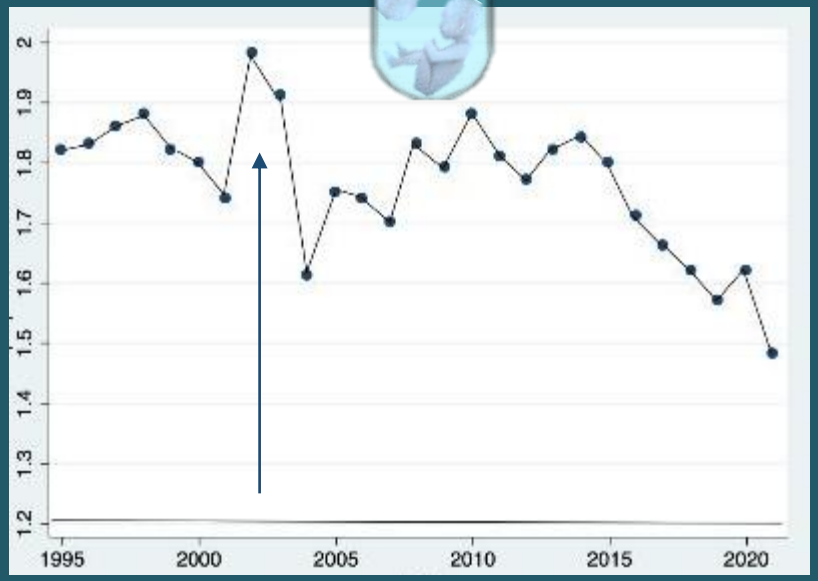
Epidemiology of twins

Natural incidence of twins

1 in 89 births

Flanders 2022 1 in 67 births

USA 2021 1 in 32 births



SPE rapport 2022; statista.com

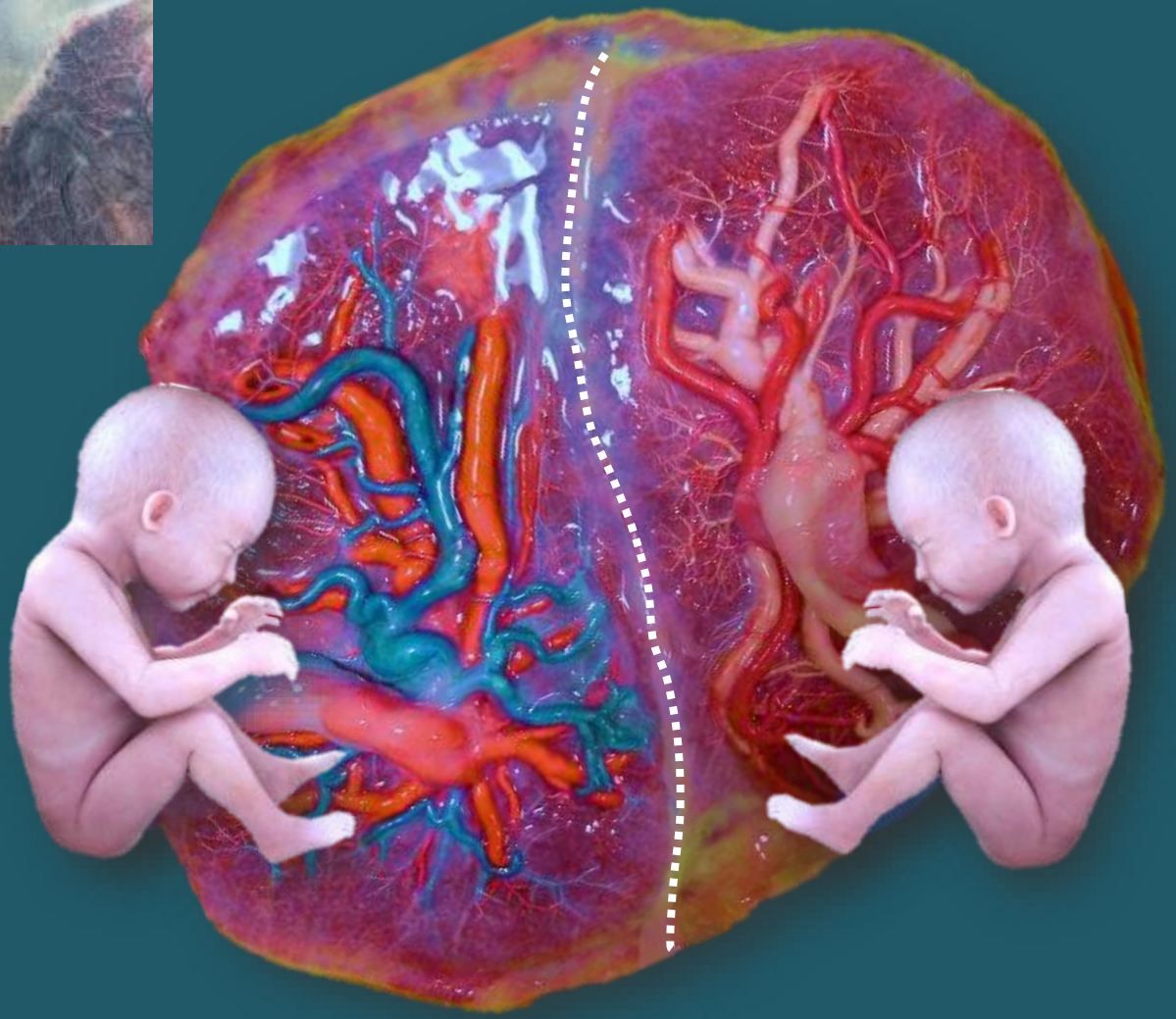
“There is NO diagnosis of twins”

There are only di- or monochorionic twins

Prof. Nicolaides, Bogota, 2010

“There is NO diagnosis of twins”

There are only di- or monochorionic twins

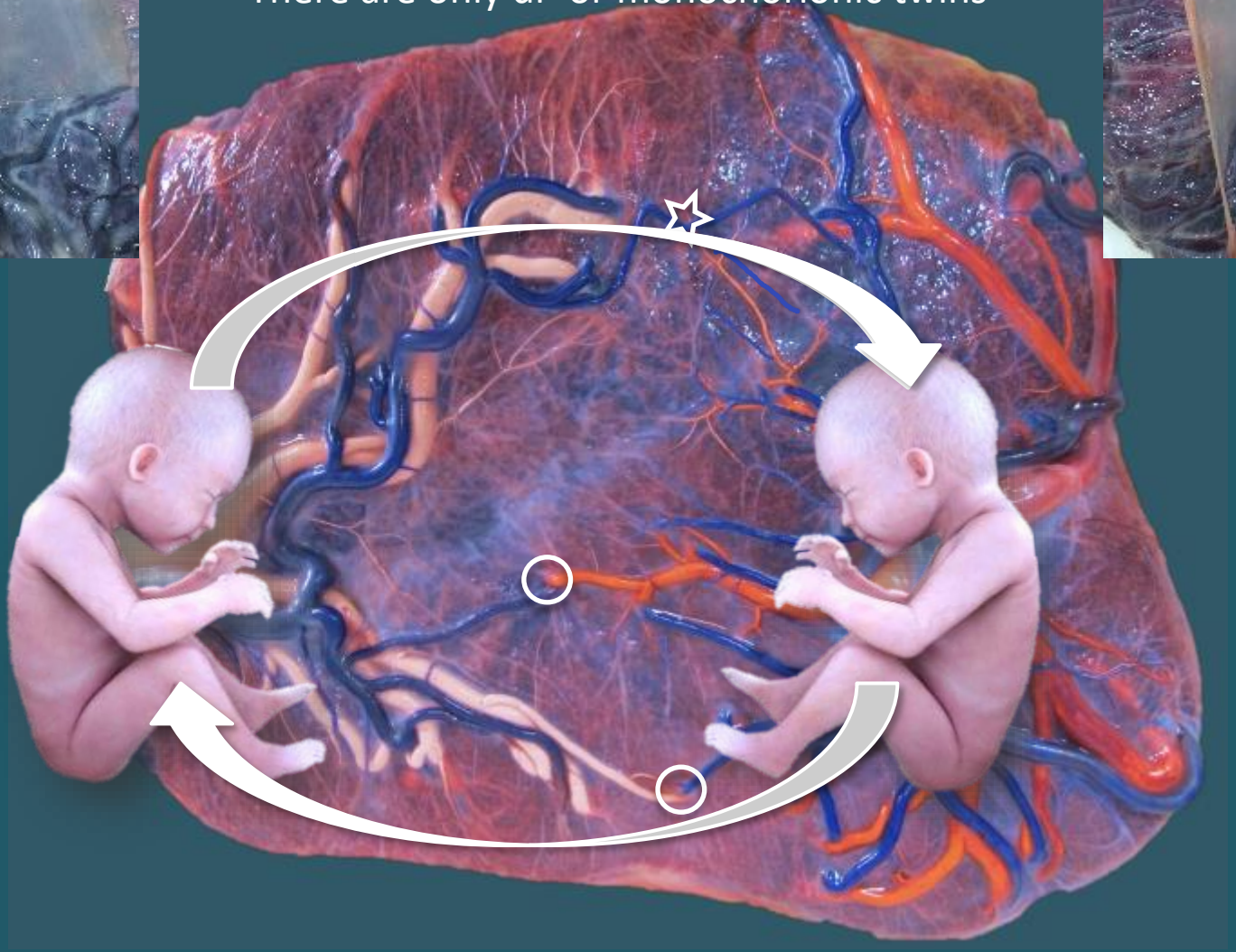


Dichorionic: separate circulations

Prof. Nicolaides, Bogota, 2010

“There is NO diagnosis of twins”

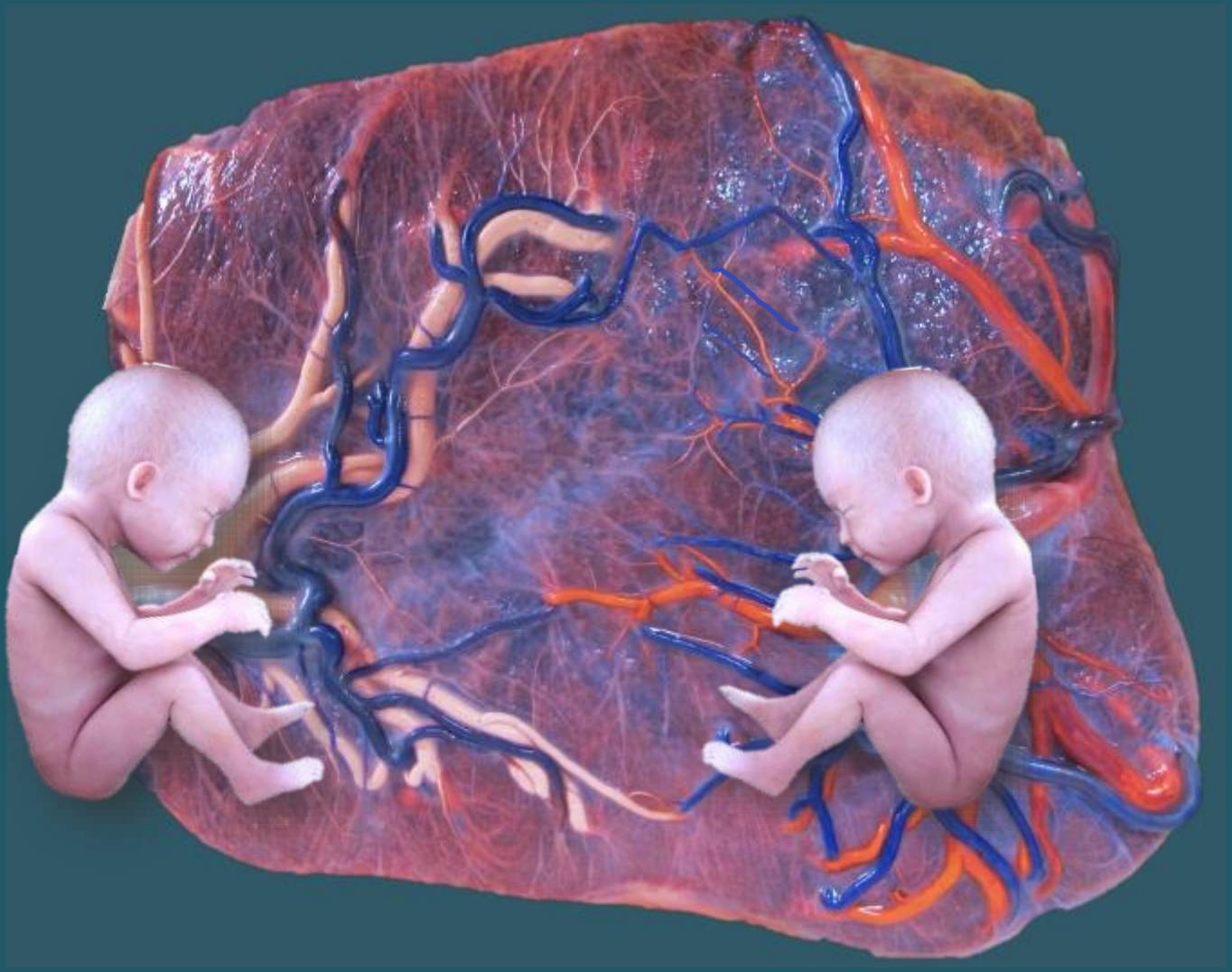
There are only di- or monochorionic twins



Monochorionic: shared circulations

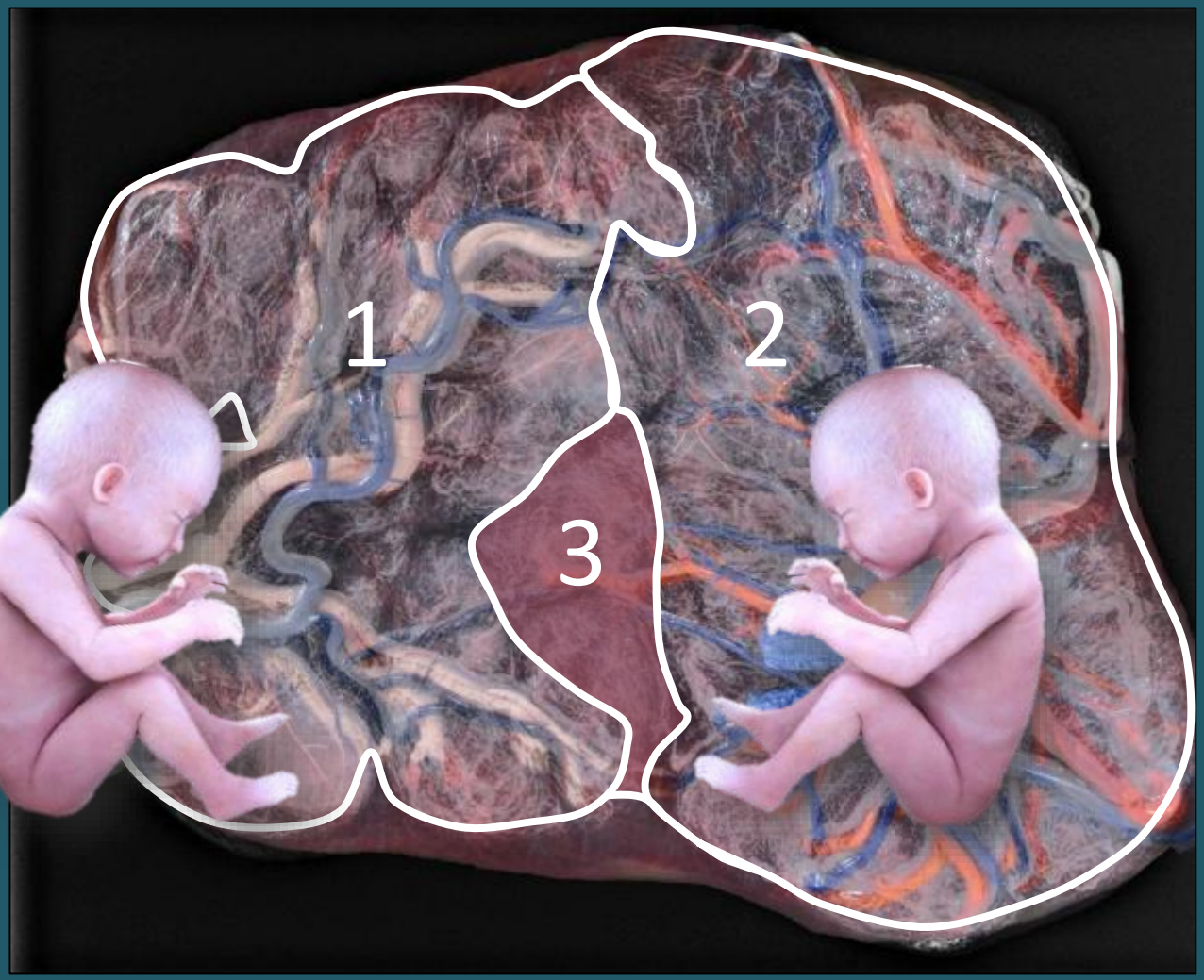
Denbow ML, AJOG 2000; Prof. Nicolaides, Bogota, 2010; Lewi L, AJOG FMF 2021

The monochorionic placenta and its vascular anastomoses



Denbow ML, AJOG 2000; Lewi L, AJOG FMF 2021

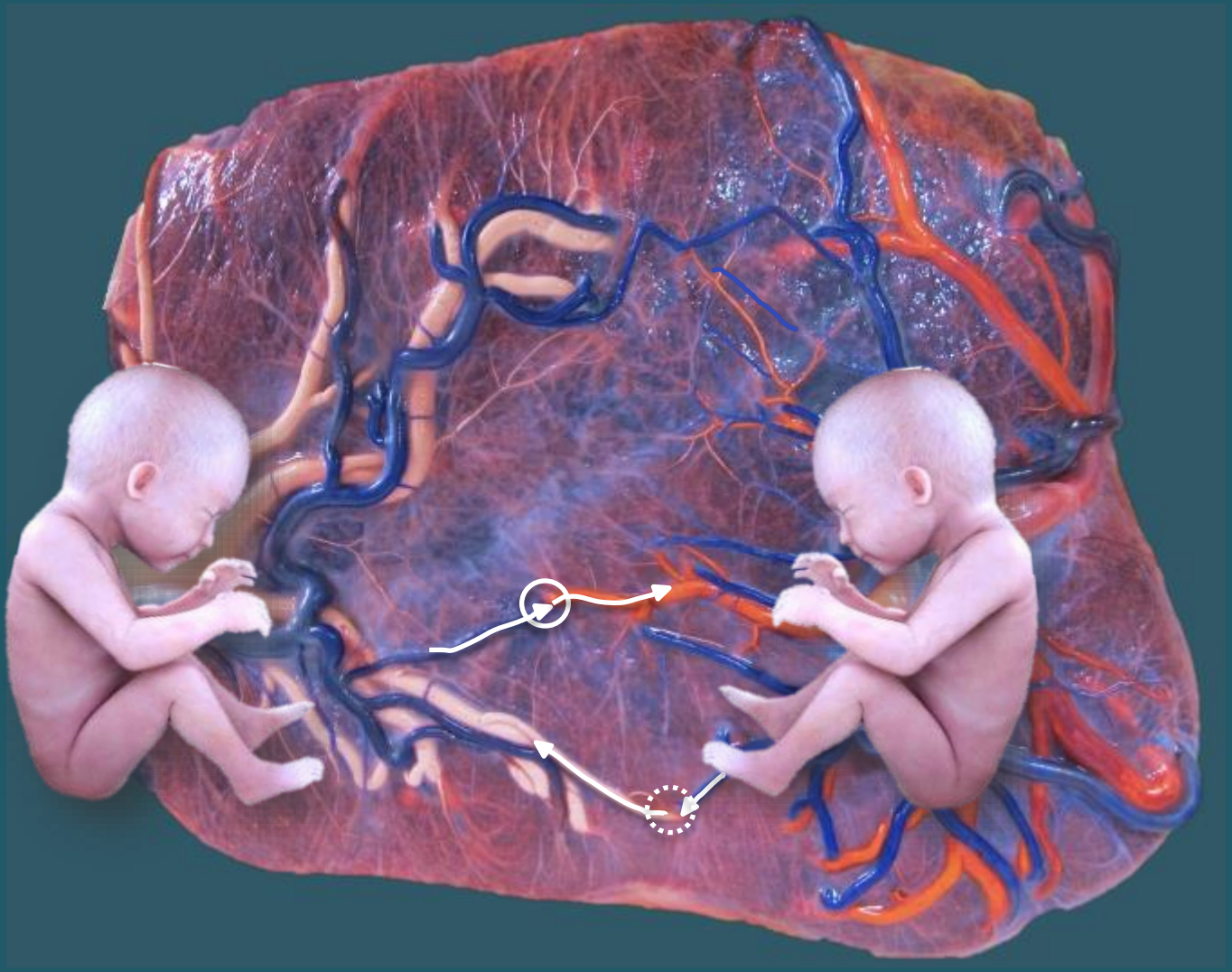
The monochorionic placenta and its vascular anastomoses



The third shared part

Denbow ML, AJOG 2000; Lewi L, AJOG FMF 2021

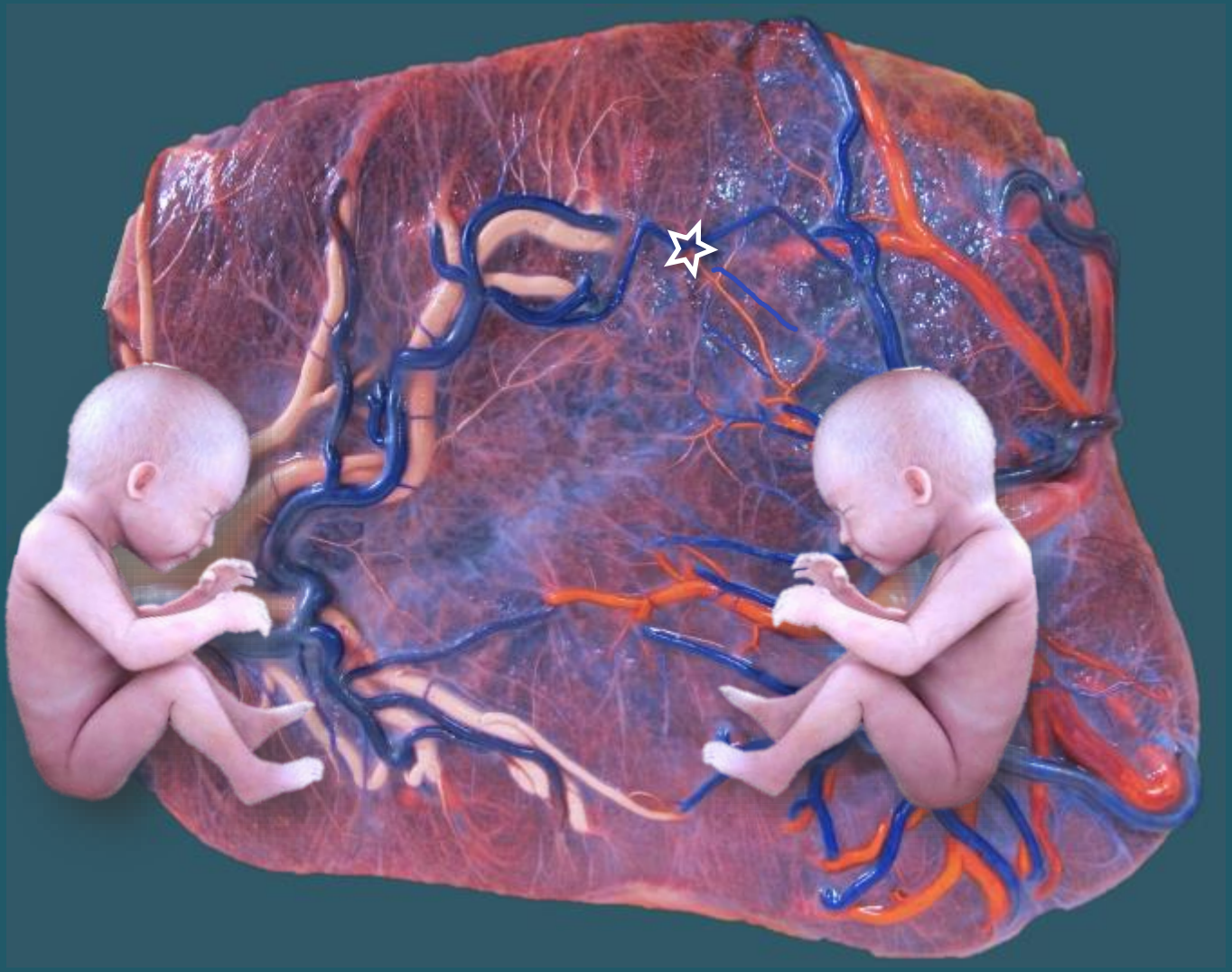
The monochorionic placenta and its vascular anastomoses



Deep unidirectional artery-to-vein (AV) anastomosis

Denbow ML, AJOG 2000; Lewi L, AJOG FMF 2021

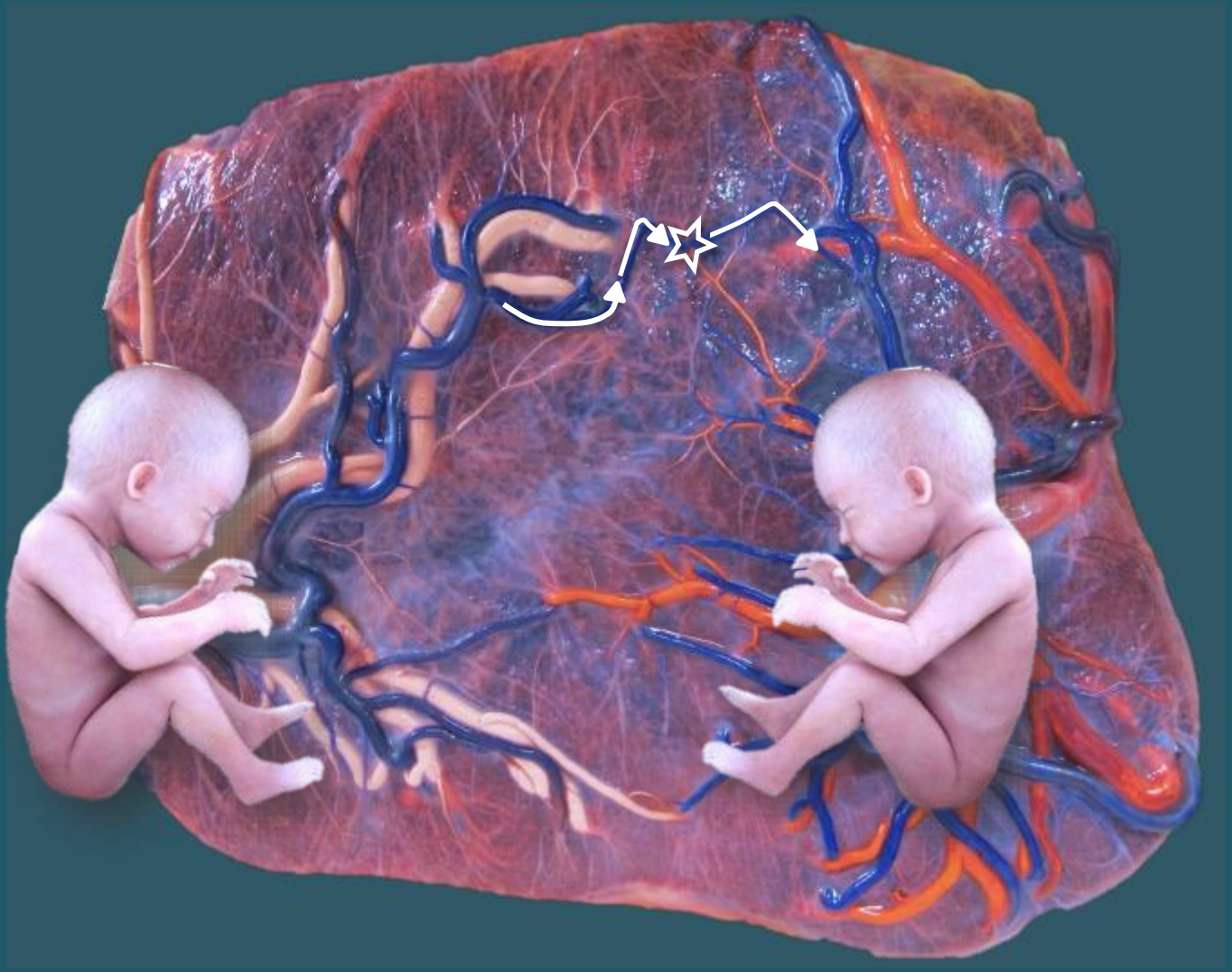
The monochorionic placenta and its vascular anastomoses



Superficial and bidirectional artery-to-artery (AA) anastomosis

Denbow ML, AJOG 2000; Lewi L, AJOG FMF 2021

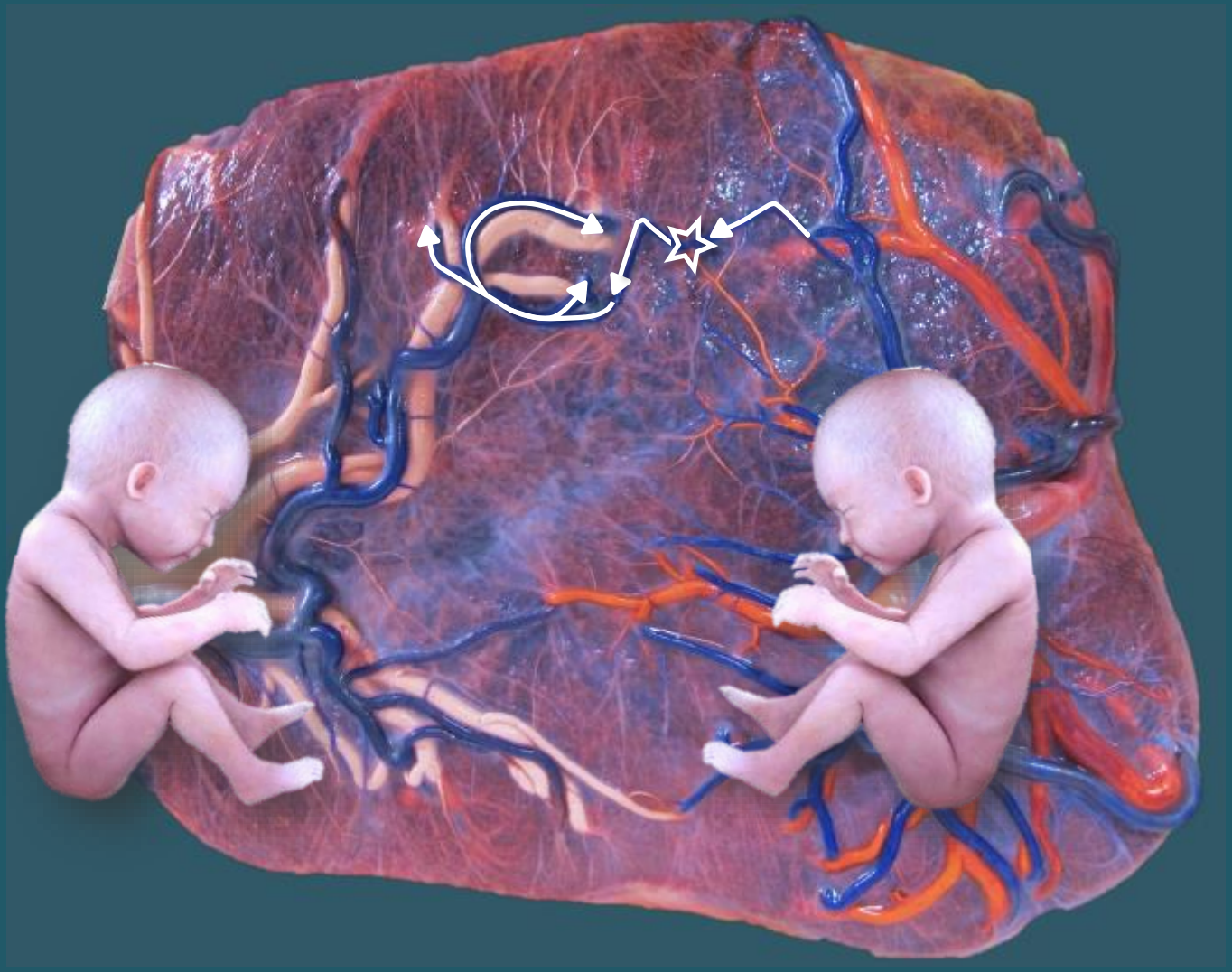
The monochorionic placenta and its vascular anastomoses



AA is a flexible AV anastomosis

Denbow ML, AJOG 2000; Lewi L, AJOG FMF 2021

The monochorionic placenta and its vascular anastomoses



AA is a flexible AV anastomosis

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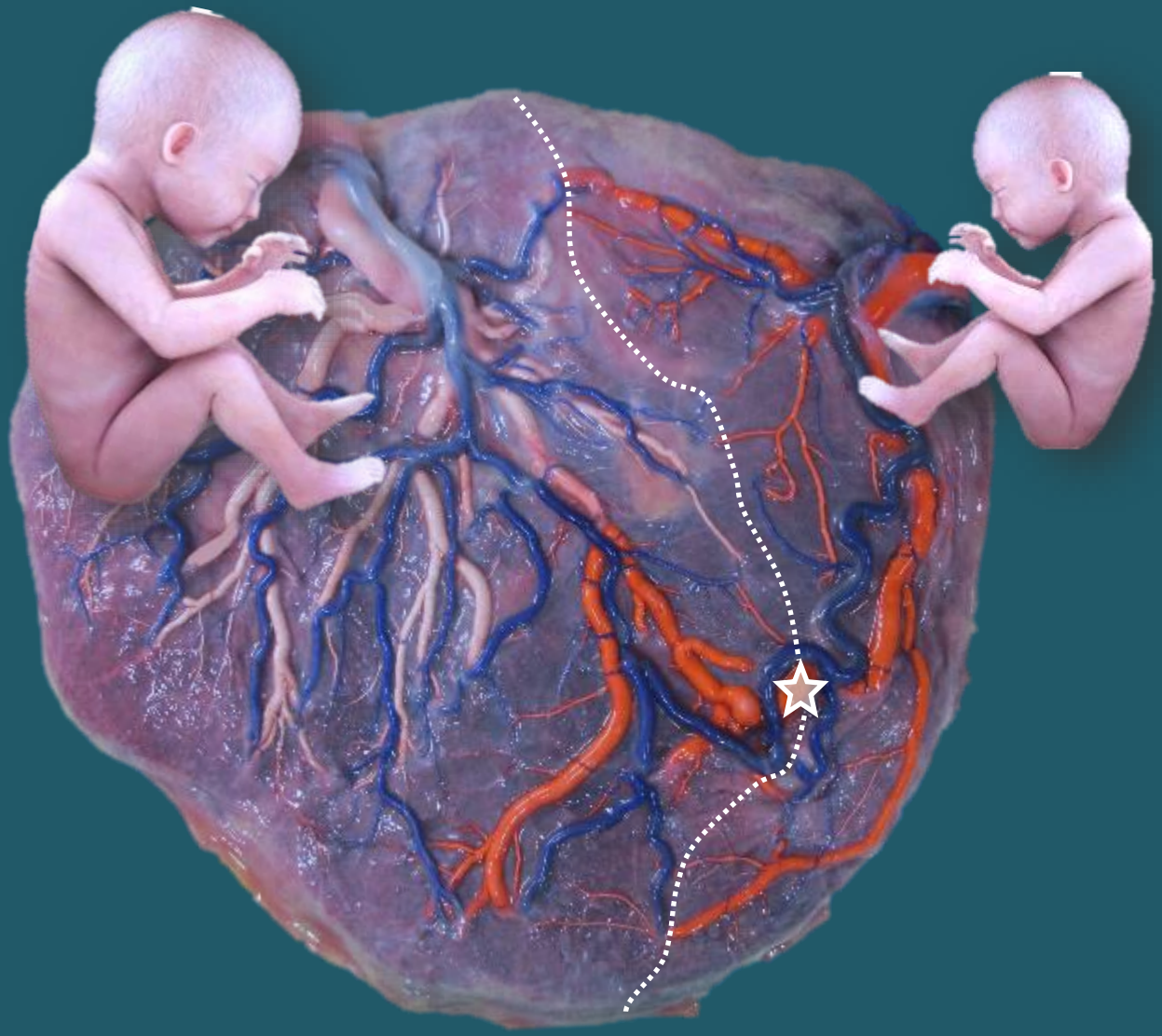
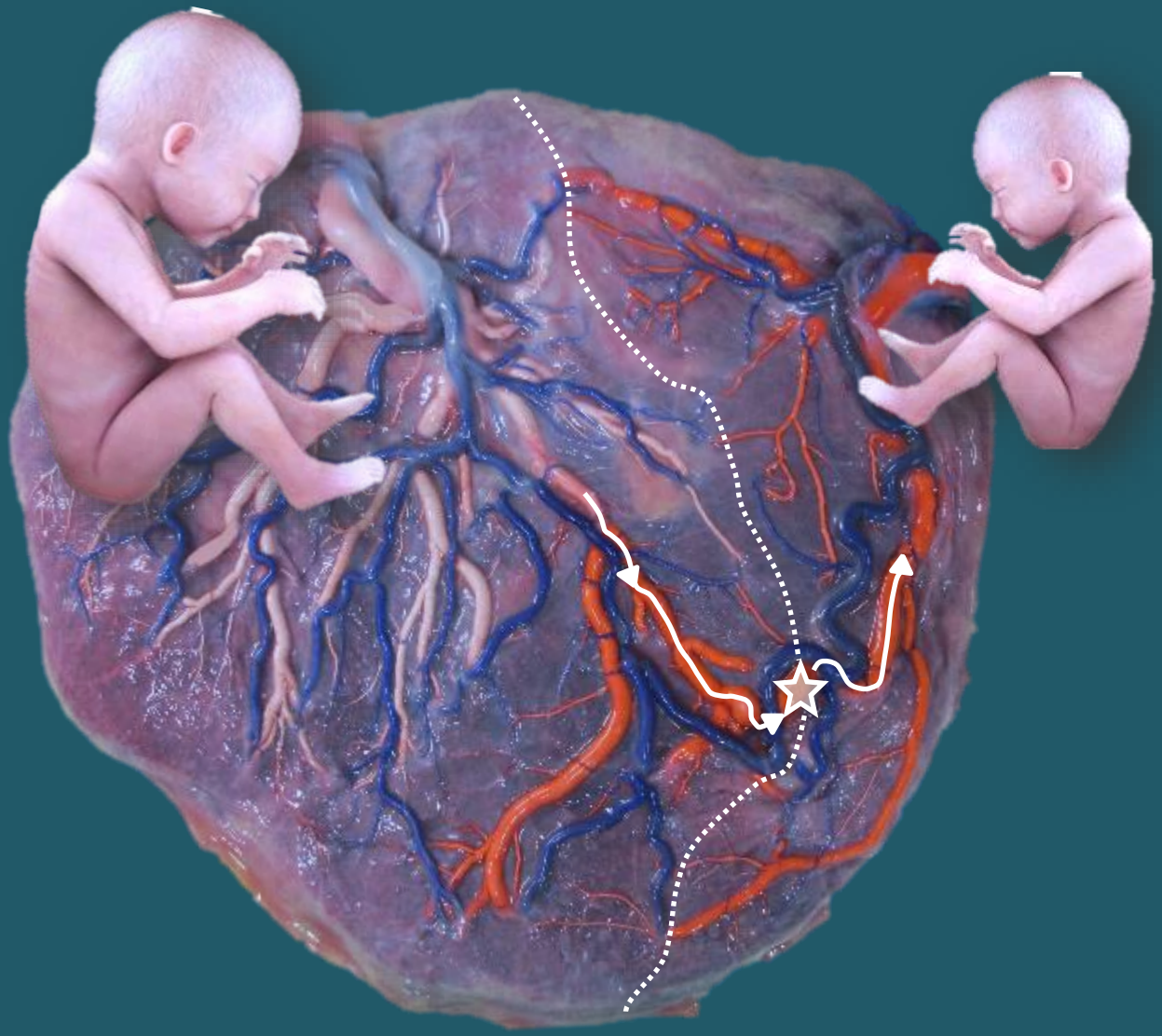


Superficial and bidirectional vein-to-vein (VV) anastomosis

Denbow ML, AJOG 2000; Couck I, Placenta 2022; Groene S, AJOG 2022

The monochorionic placenta and its vascular anastomoses



VV makes the placental sharing flexible

Denbow ML, AJOG 2000; Couck I, Placenta 2022; Groene S, AJOG 2022

“There is NO diagnosis of twins”

Mono- vs dichorionic twins

Outcome	Monochorionic	Dichorionic
Fetal loss < 24 wks	8%	2%
Perinatal death	2.5%	1%
Birth < 32 wks	14%	7%

Survival	88%	96%
Developmental delay	7-10%	4%
Cerebral palsy	2%	0,5%

Adegbite AL, AJOG 2004; Ortibus E, AJOG 2009; Prof. Nicolaides, Bogota, 2010; Hack K, PlosOne 2009; Litwinska E UOG, 2019

“There is NO diagnosis of twins”

Complications unique to MC twins

Complications not unique to MC twins

The follow up of twin pregnancies: how do we do it?

1st trimester

- Chorionicity and amnionicity determination
- Dating
- Labelling
- Detailed anatomy scan
- Screening and diagnosis of chromosomal anomalies

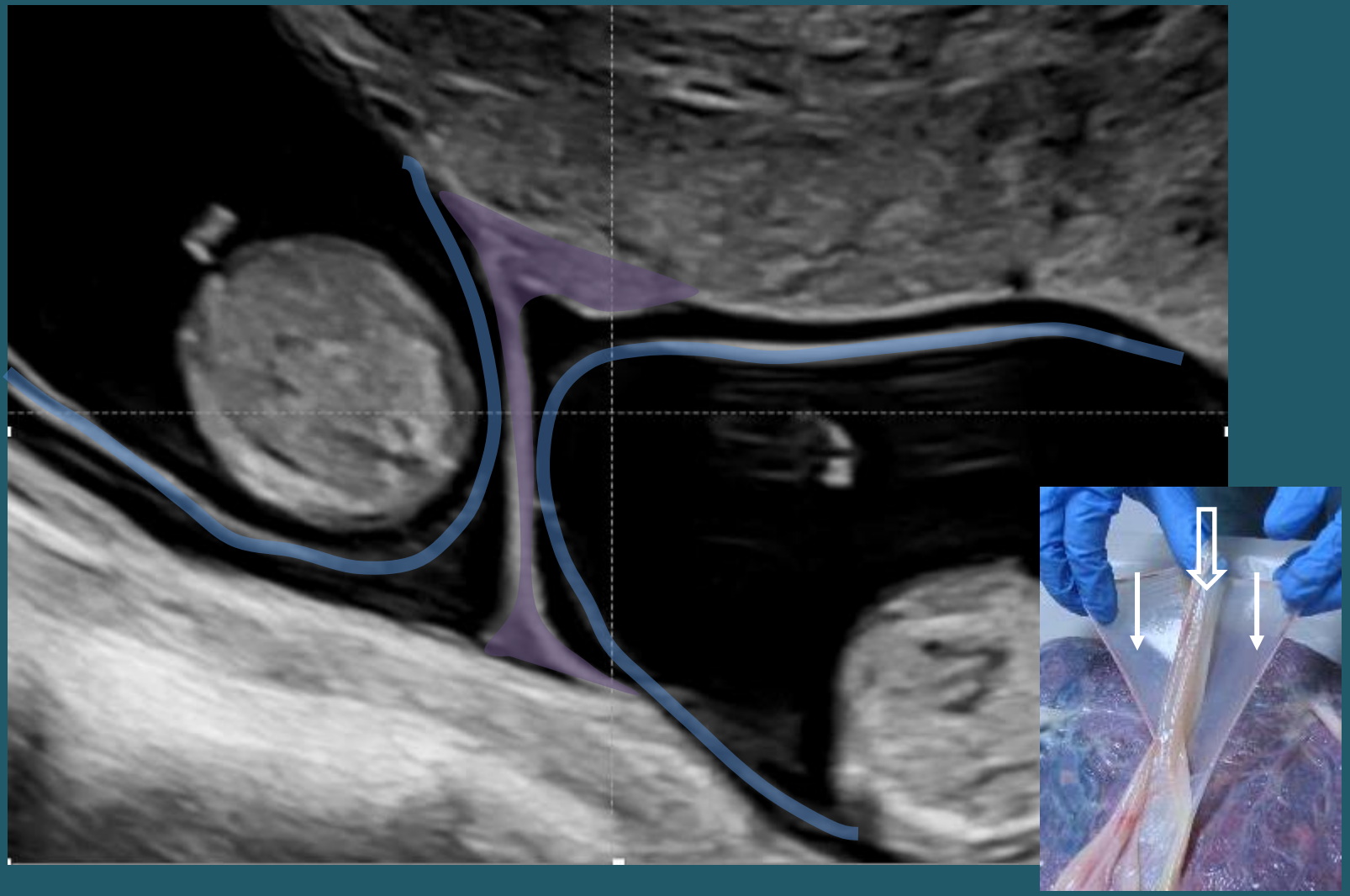
1st trimester: Chorionicity and amnionicity determination

Look at what separates the twins

DC twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

Look at what separates the twins



DC twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

Look at what separates the twins

DC twin at 12 weeks

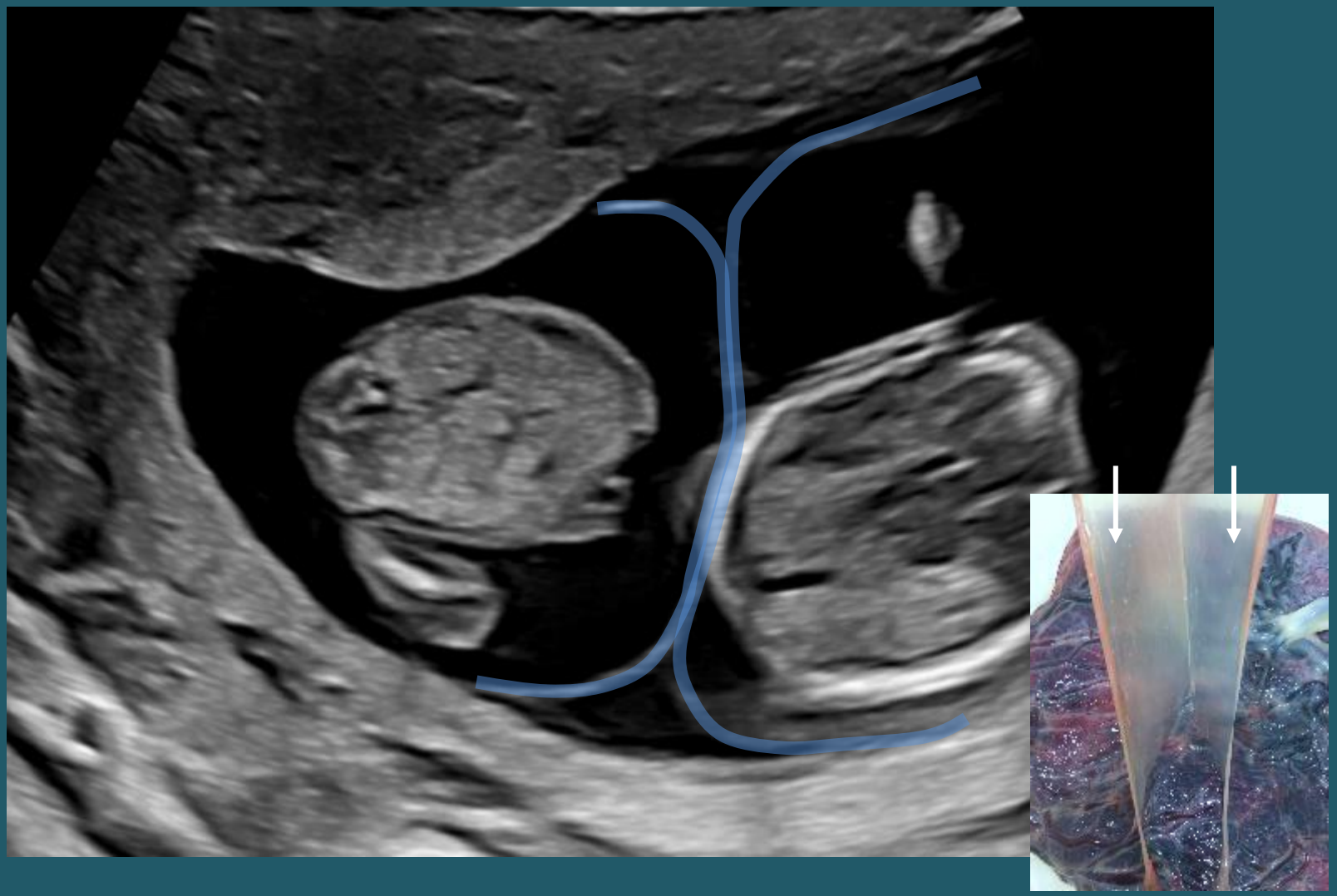
1st trimester: Chorionicity and amnionicity determination

Look at what separates the twins

MCDA twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

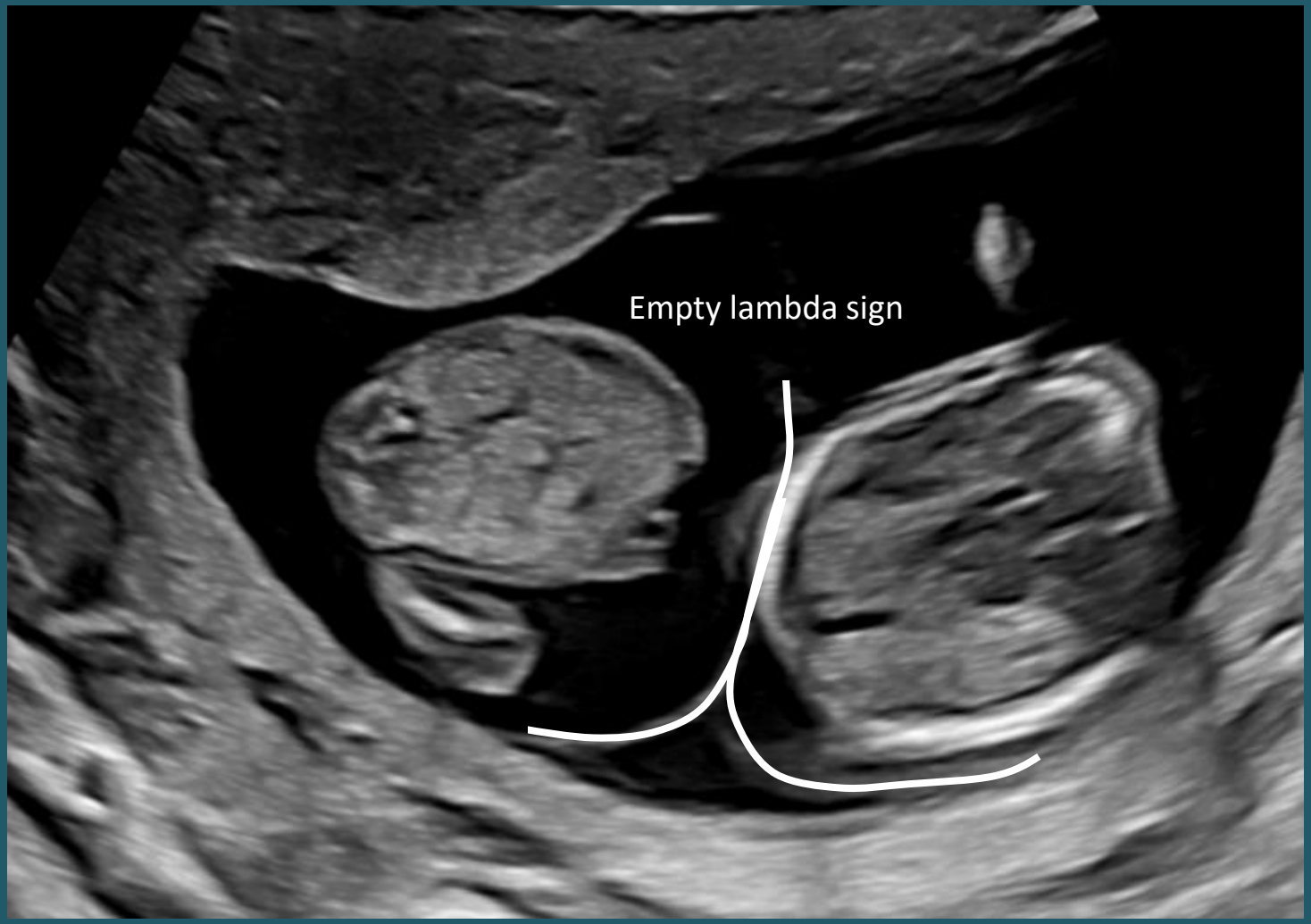
Look at what separates the twins



MCDA twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

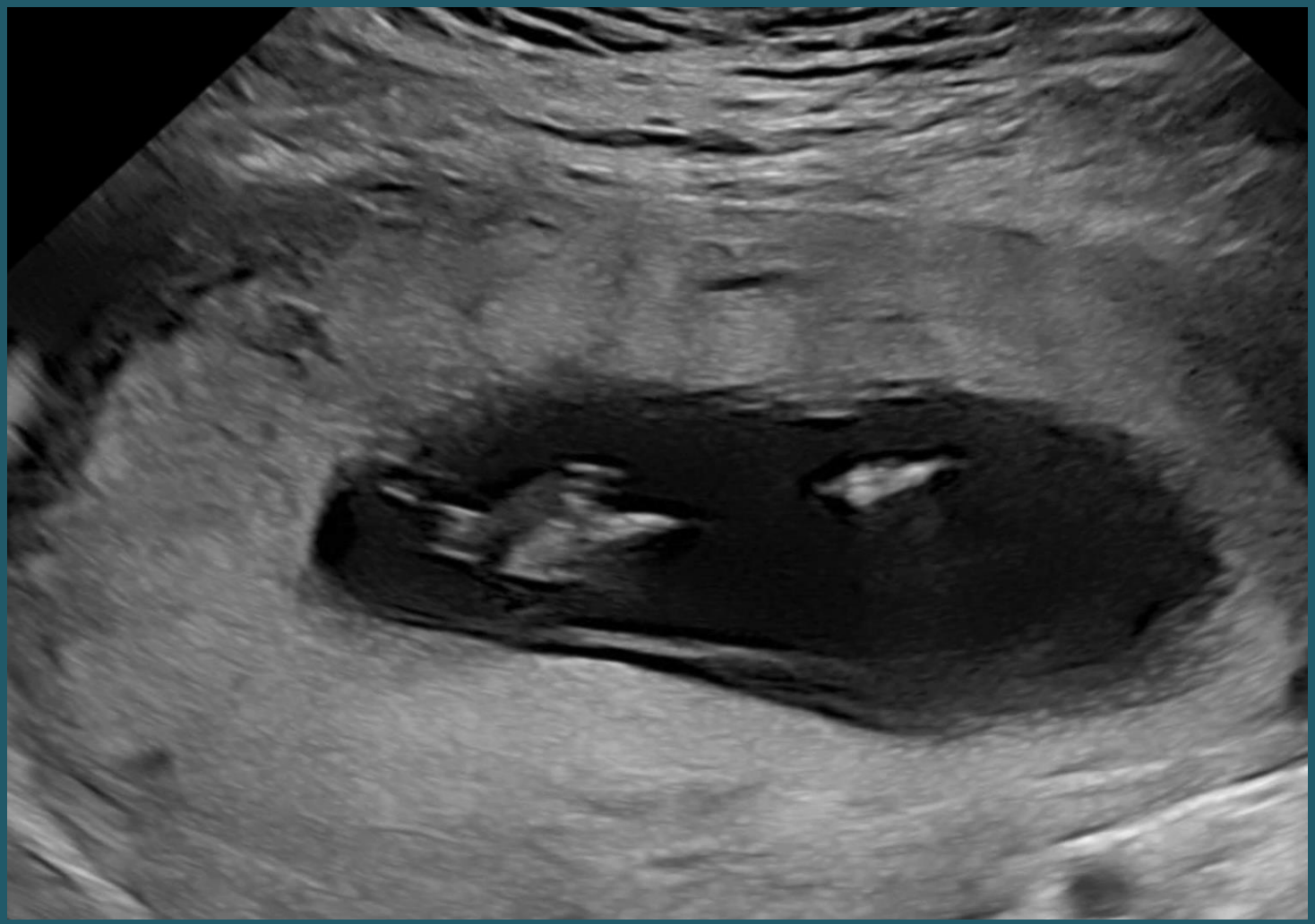
Look at what separates the twins



MCDA twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

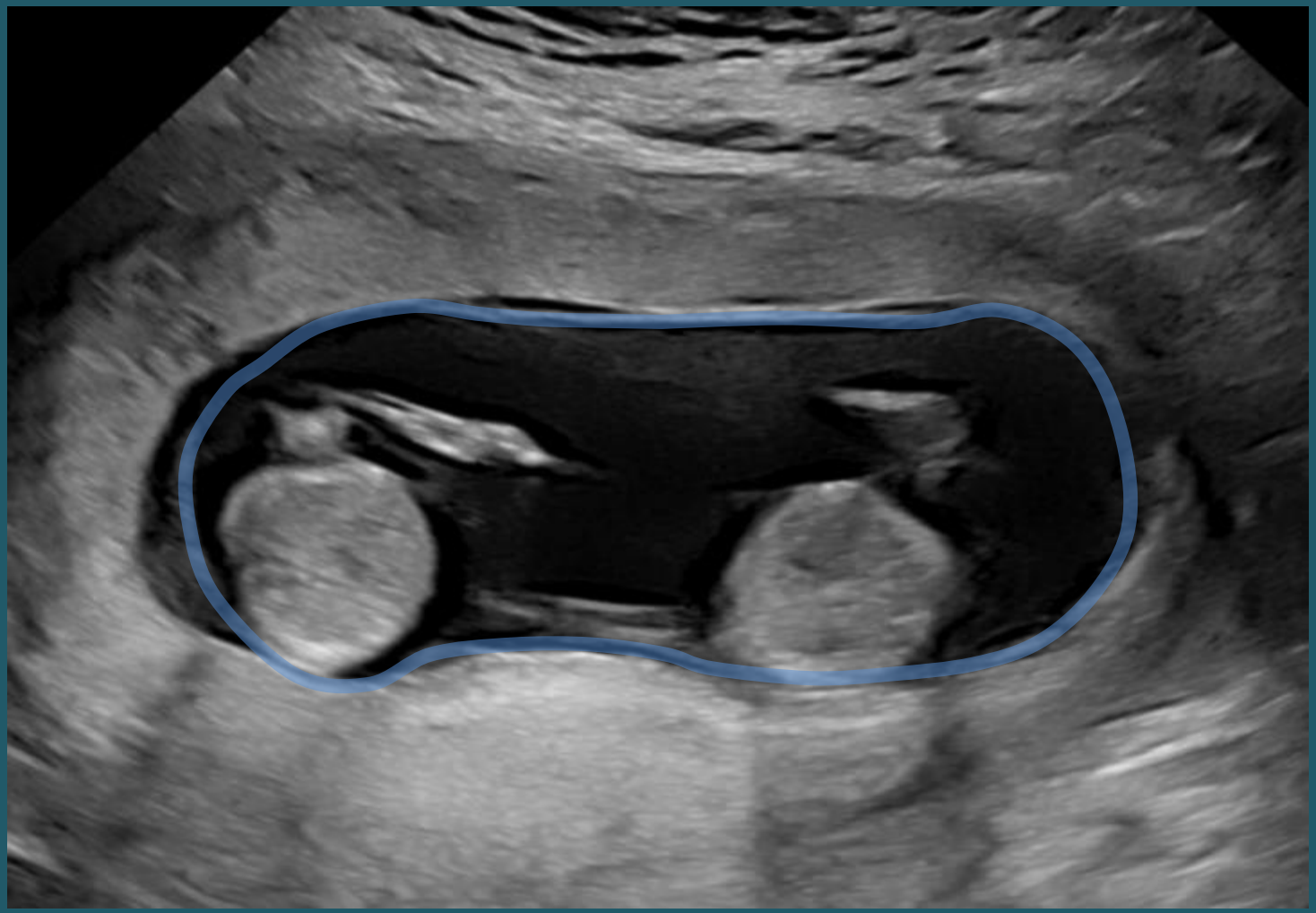
Look at what separates the twins



MCMA twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

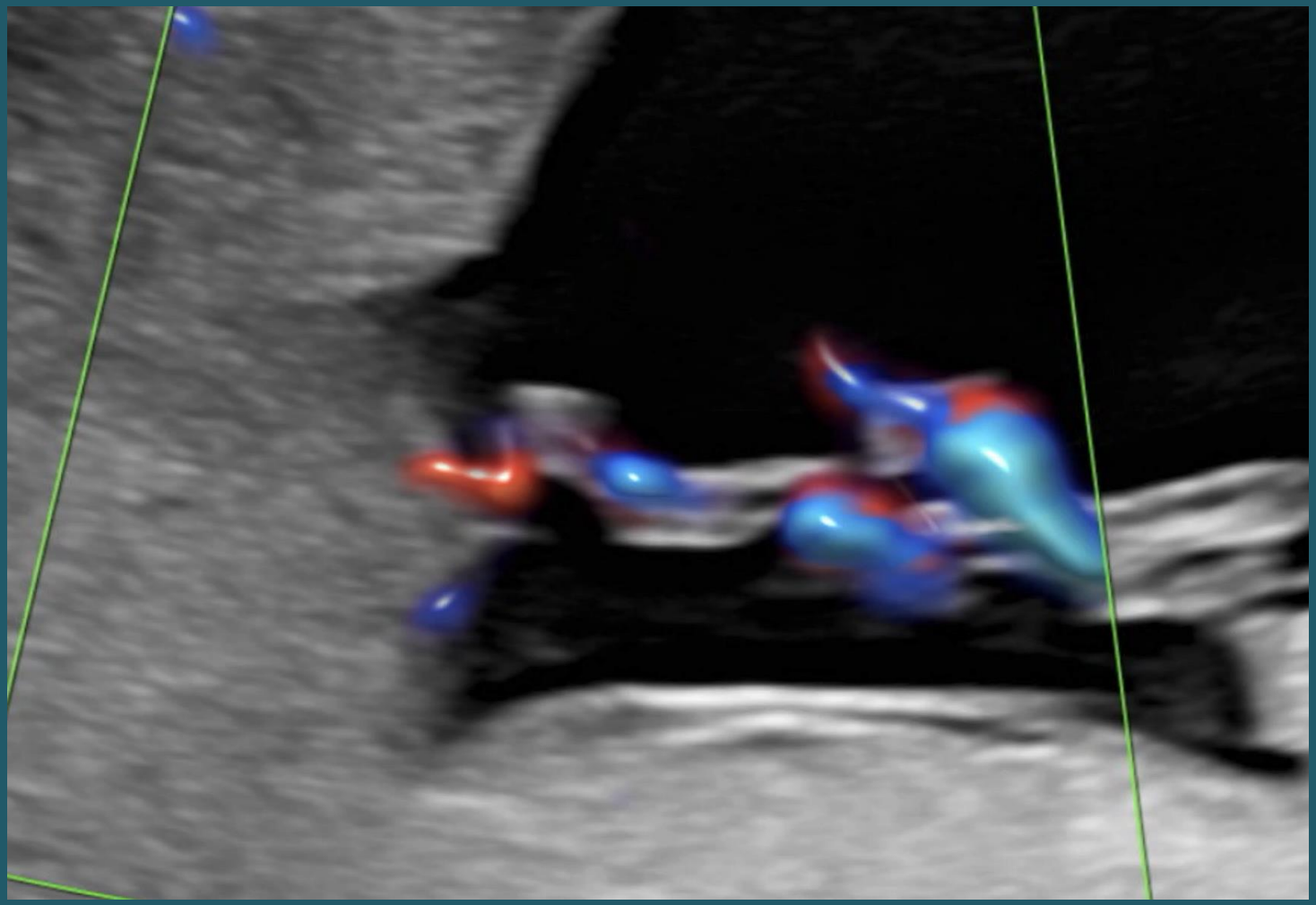
Look at what separates the twins



MCMA twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

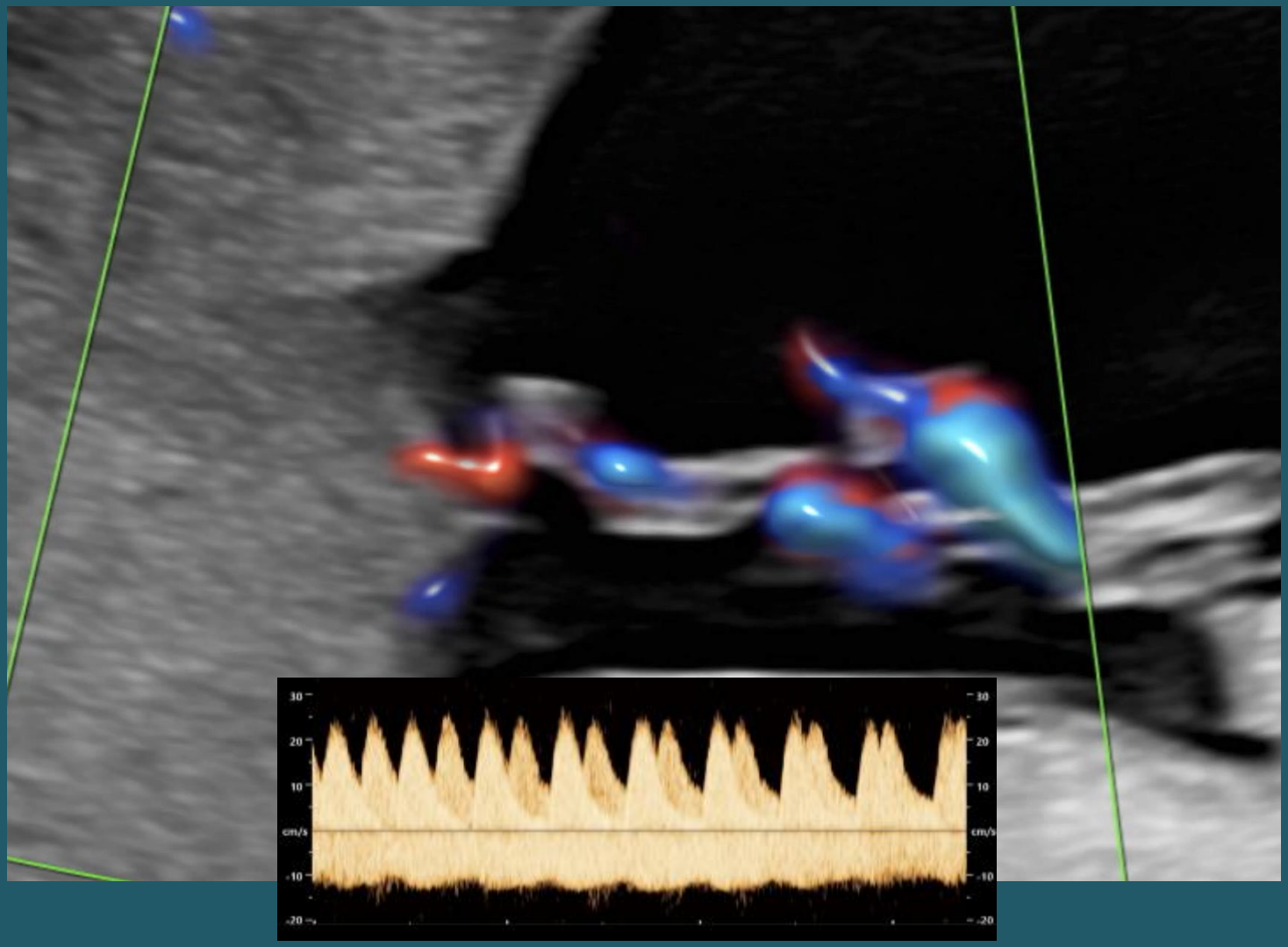
Look at what separates the twins



MCMA twin at 12 weeks

1st trimester: Chorionicity and amnionicity determination

Look at what separates the twins

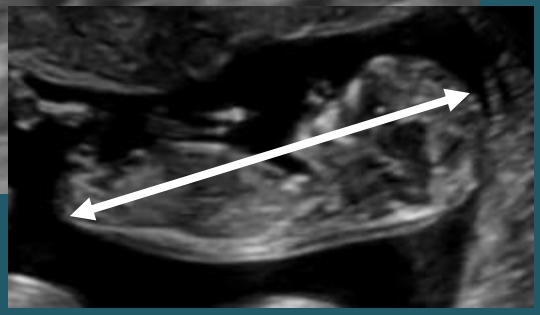


MCMA twin at 12 weeks

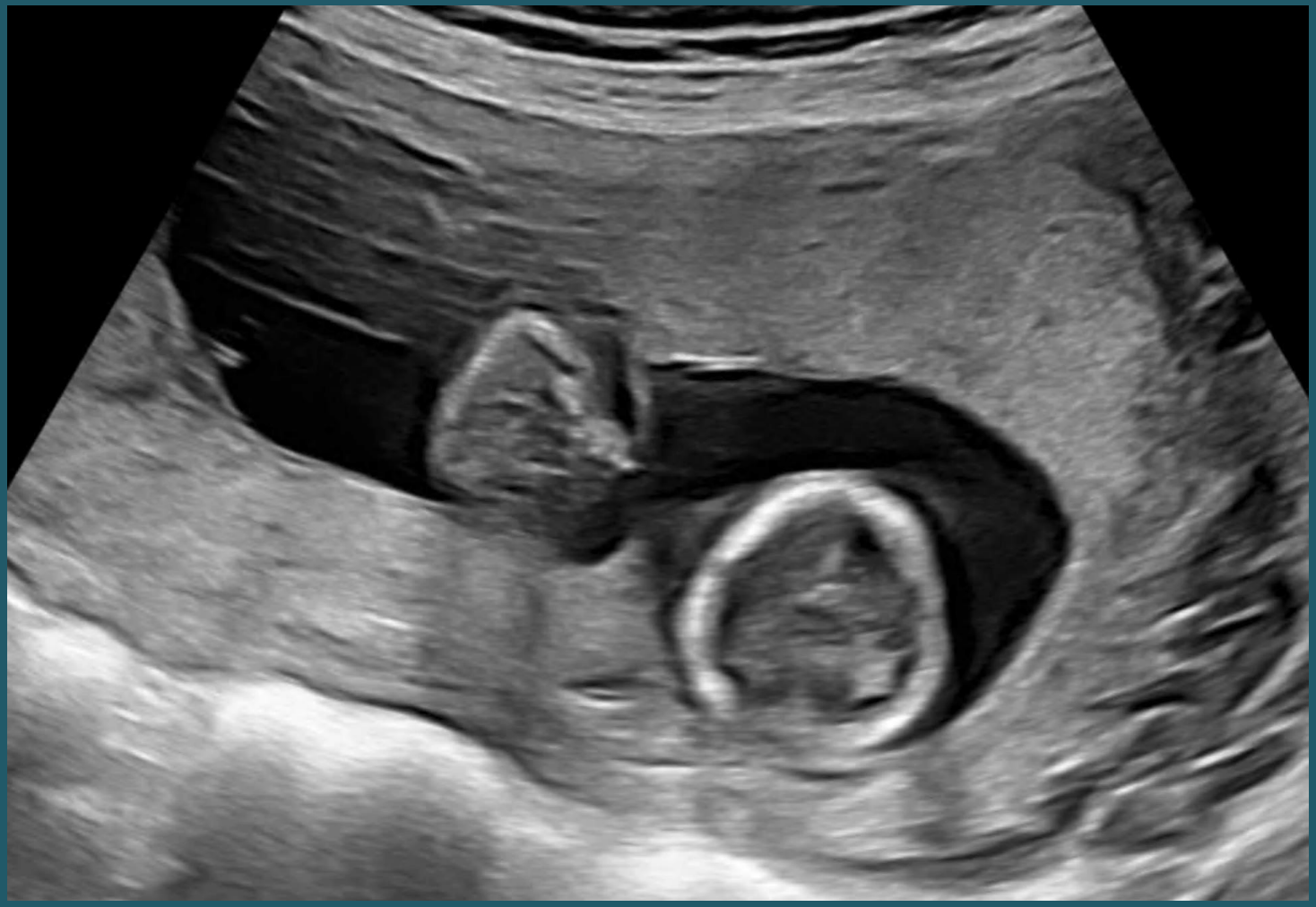
1st trimester: Dating

1st trimester: Dating

Use the CRL of the larger twin

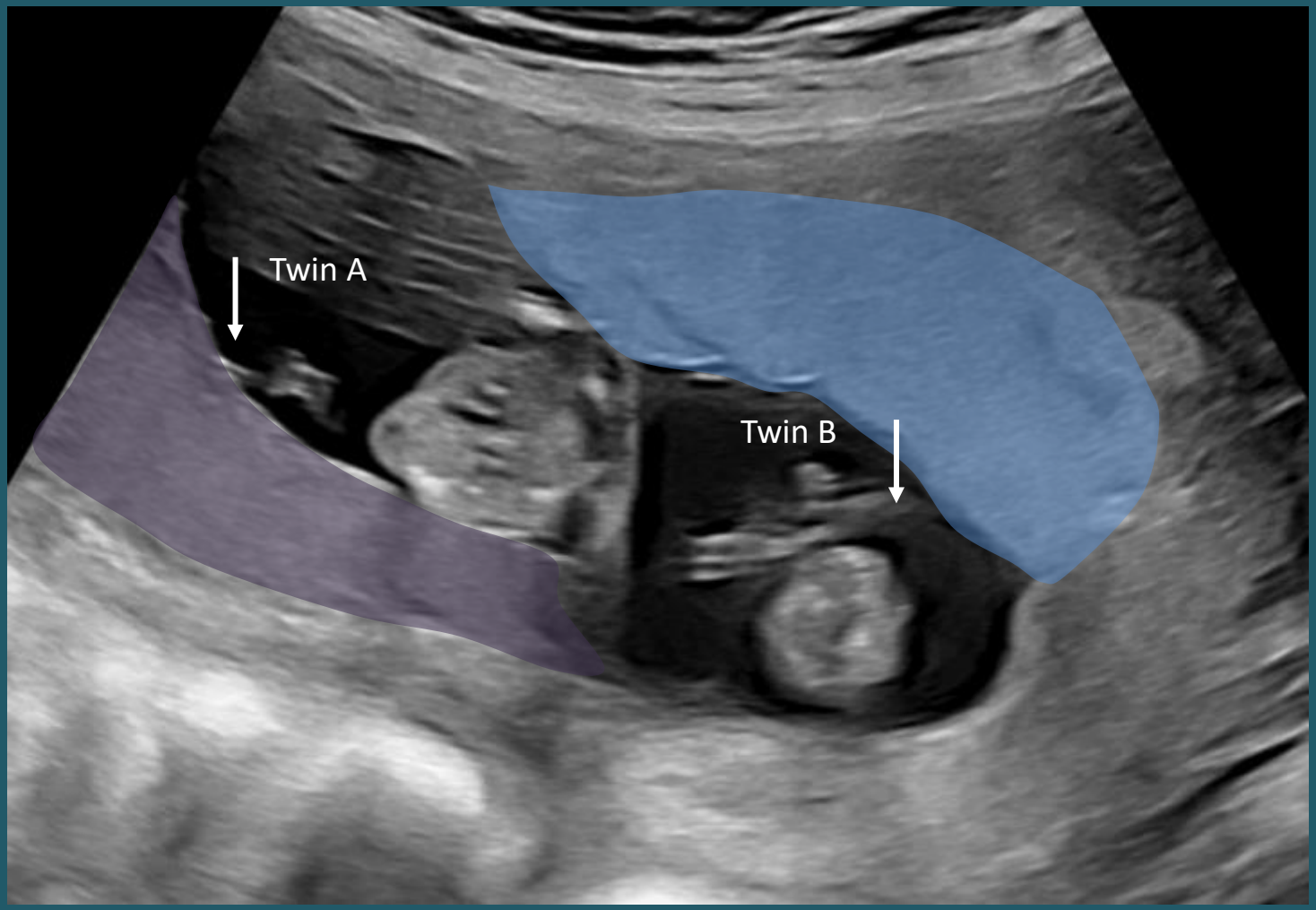


1st trimester: Labelling

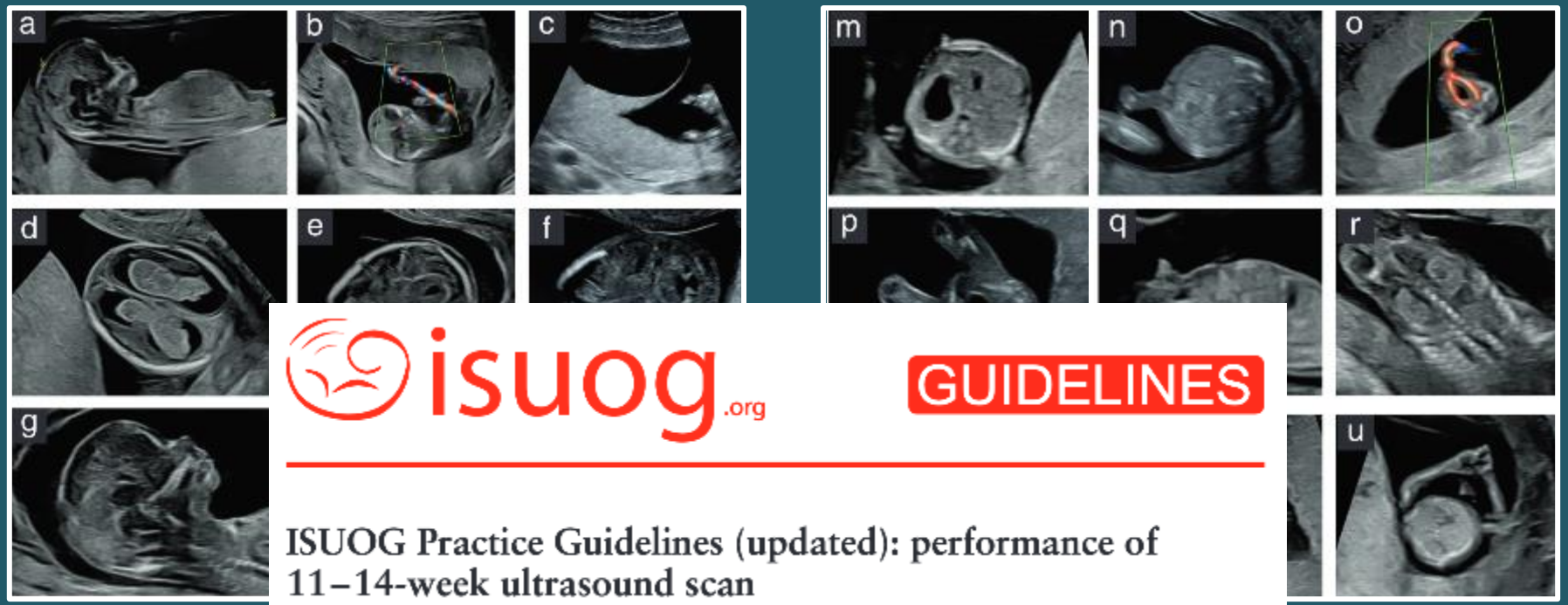


1st trimester: Dating

Use the position, placenta and cord insertion



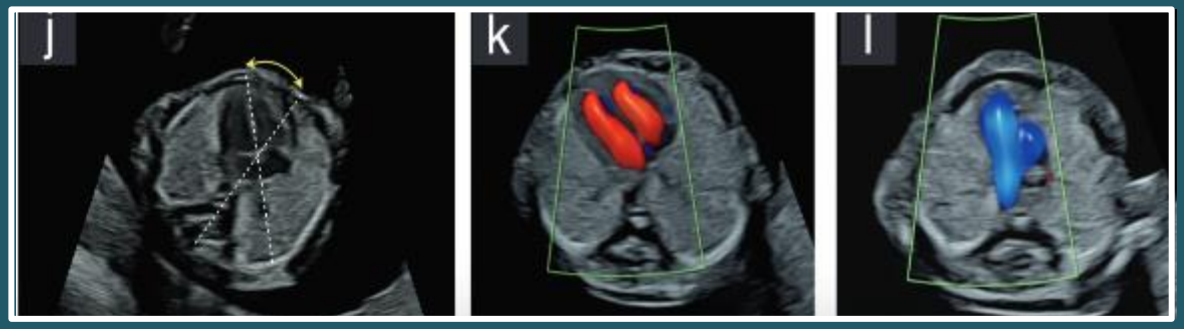
1st trimester: Detailed anatomy scan



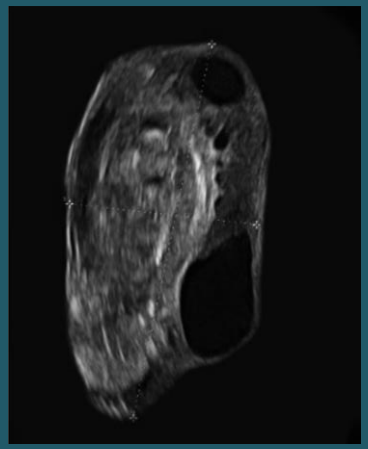
isuog.org

GUIDELINES

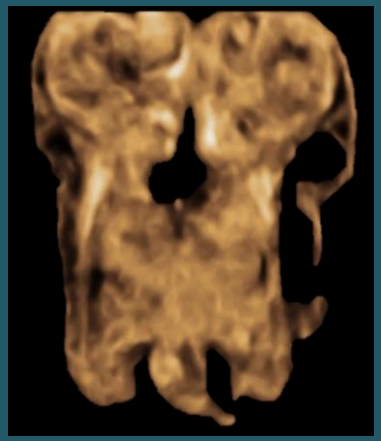
ISUOG Practice Guidelines (updated): performance of 11–14-week ultrasound scan



1st trimester: Detailed anatomy scan

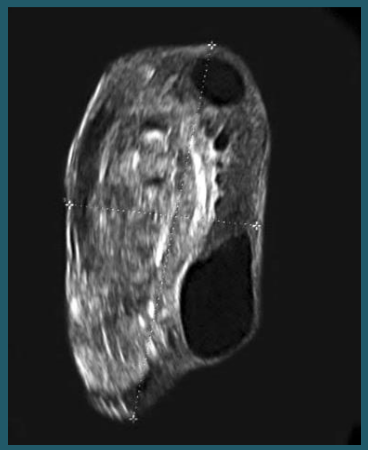


- Singletons 1 in 40
- DC twins 1 in 20 pairs
- MCDA twins 1 in 10 pairs
- MA twins 1 in 5 pairs

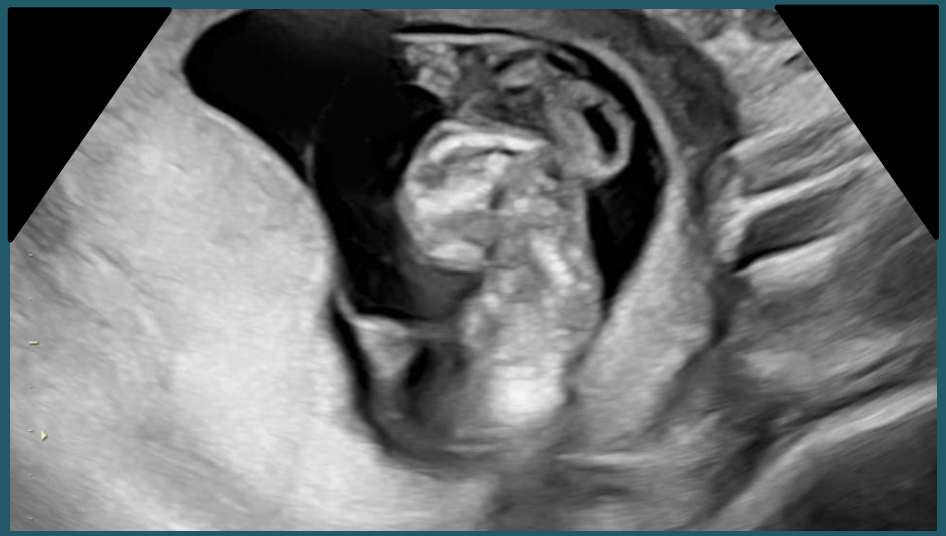


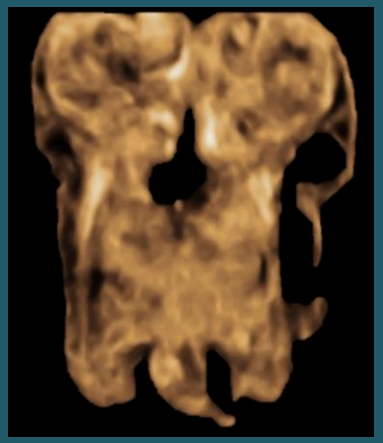
T Van Mieghem T, AJOG 2014; Syngelaki A, UOG 2019; Couck I, UOG 2020

1st trimester: Detailed anatomy scan



Acardiac twinning



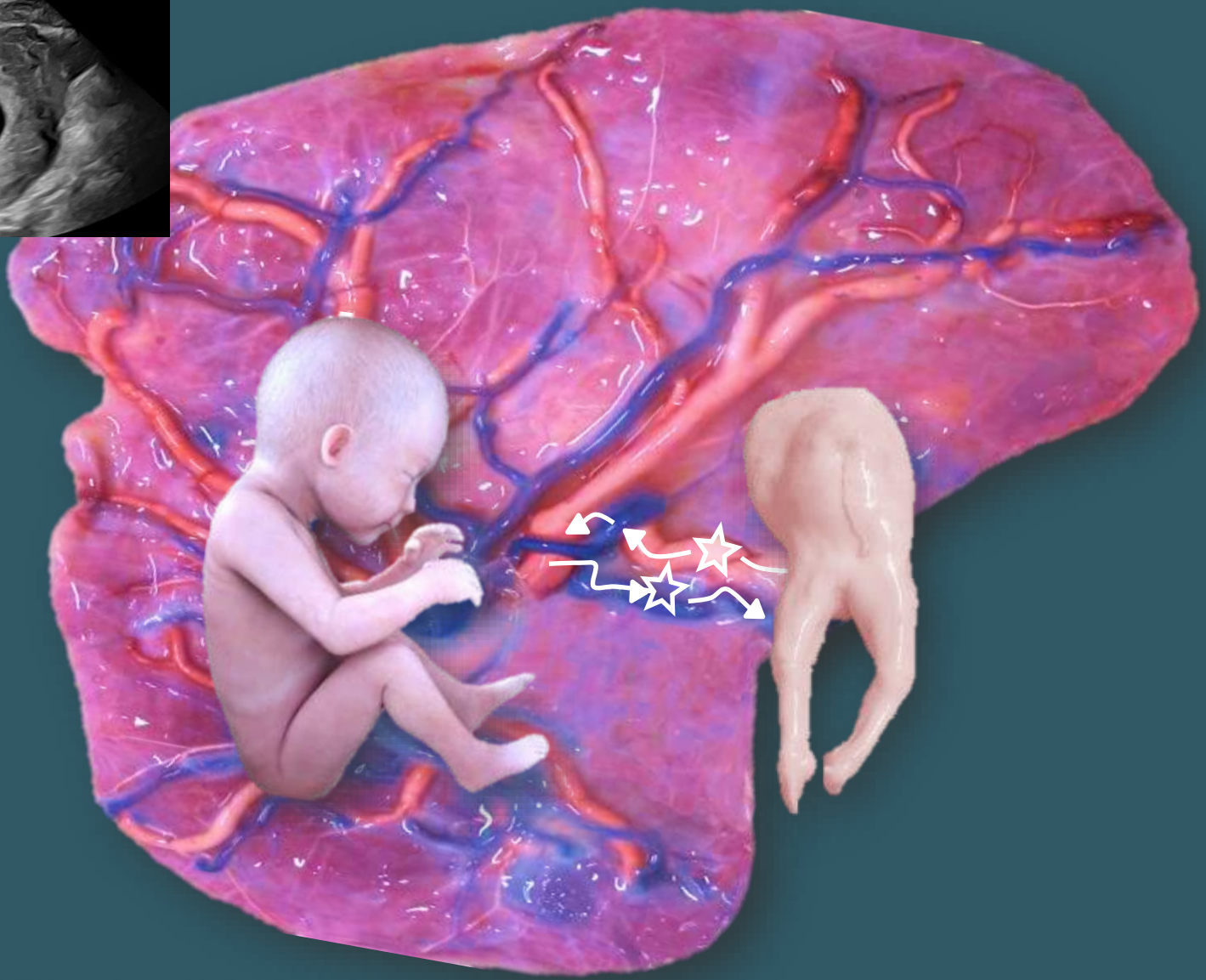


Conjoint twinning

First trimester: 50% of anomalies detected in MC twins and 25% in DC twins

Syngelaki A, UOG 2019

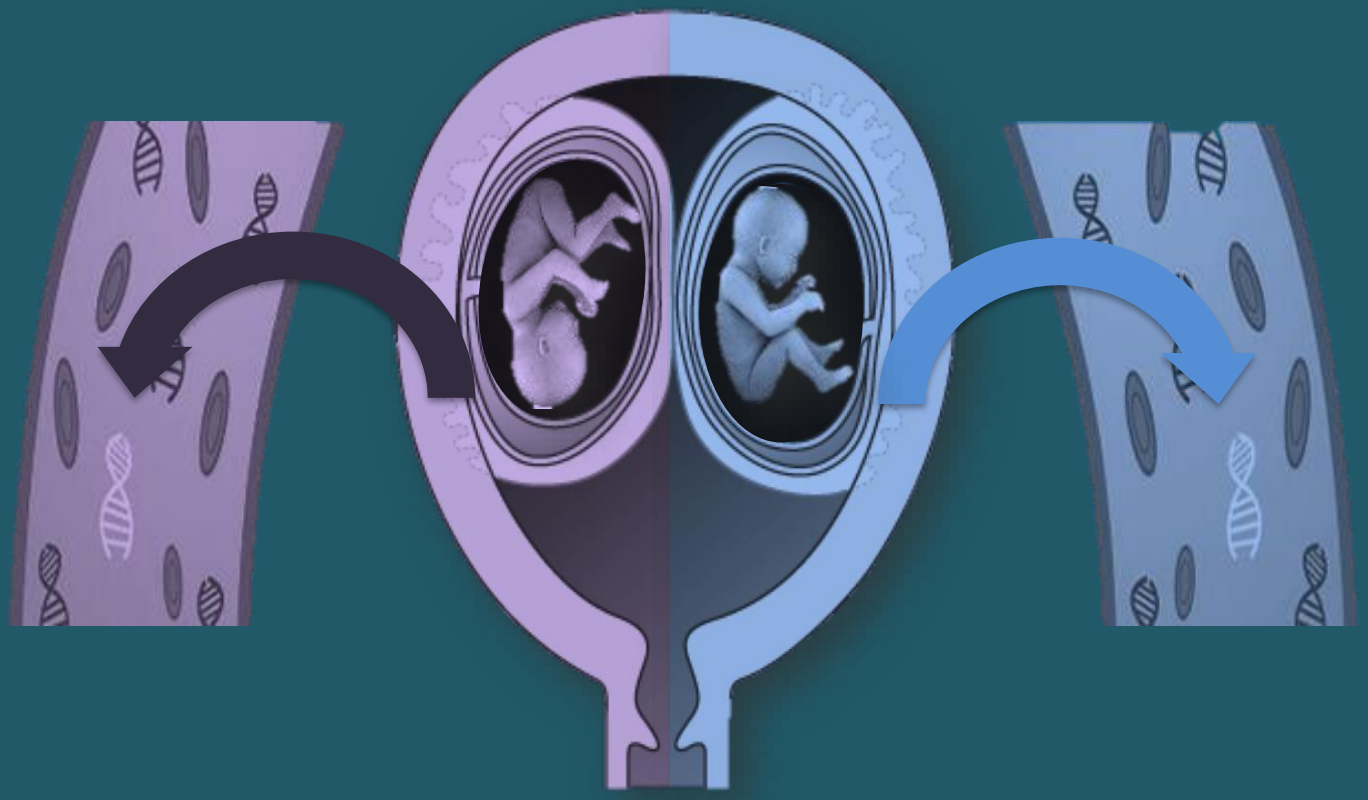
Complication unique to MC twins: Acardiac twinning



Moore TR, AJOG 1990; Lewi l, AJOG 2010; Van Gemert MJ, Birth Defects Res A Clin Mol Teratol 2015

1st trimester: Screening for chromosomal anomalies in DC twins

Cell-free fetal DNA testing or non-invasive prenatal testing (NIPT)

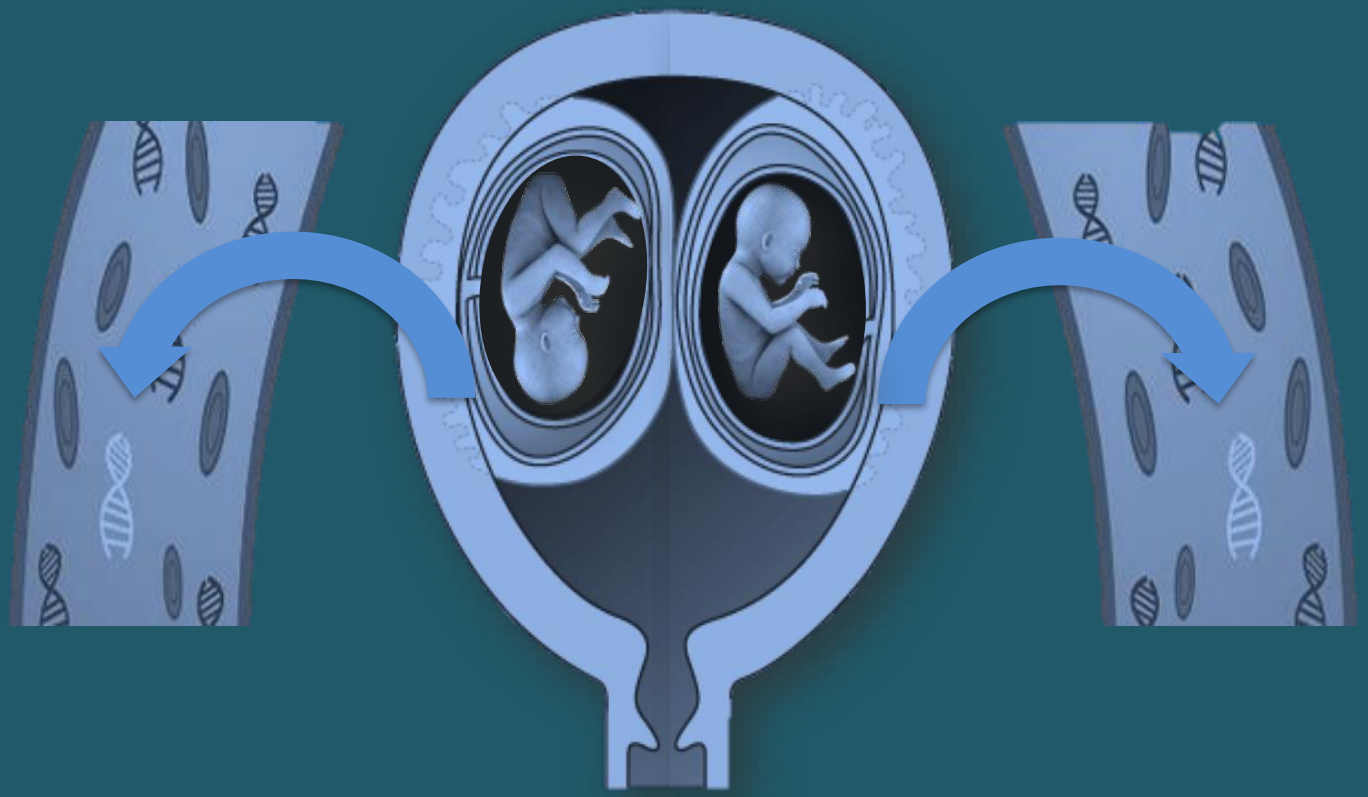


T21 DR of 99% at a 0.02% FPR

Le Conte G, Ultrasound Obstet Gynecol 2017; Taylor-Philips S, BMJ 2017; Gill MM, Ultrasound Obstet Gynecol 2017-2019; Khalil A, AJOG 2021; Judah H, UOG 2021

1st trimester: Screening for chromosomal anomalies in MC twins

Cell-free fetal DNA testing or non-invasive prenatal testing (NIPT)

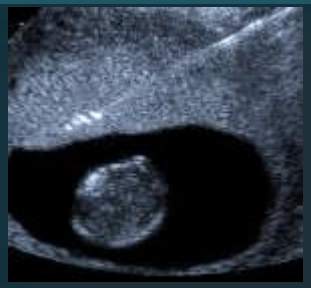


Accuracy in MC twins should be that of singletons but very few data

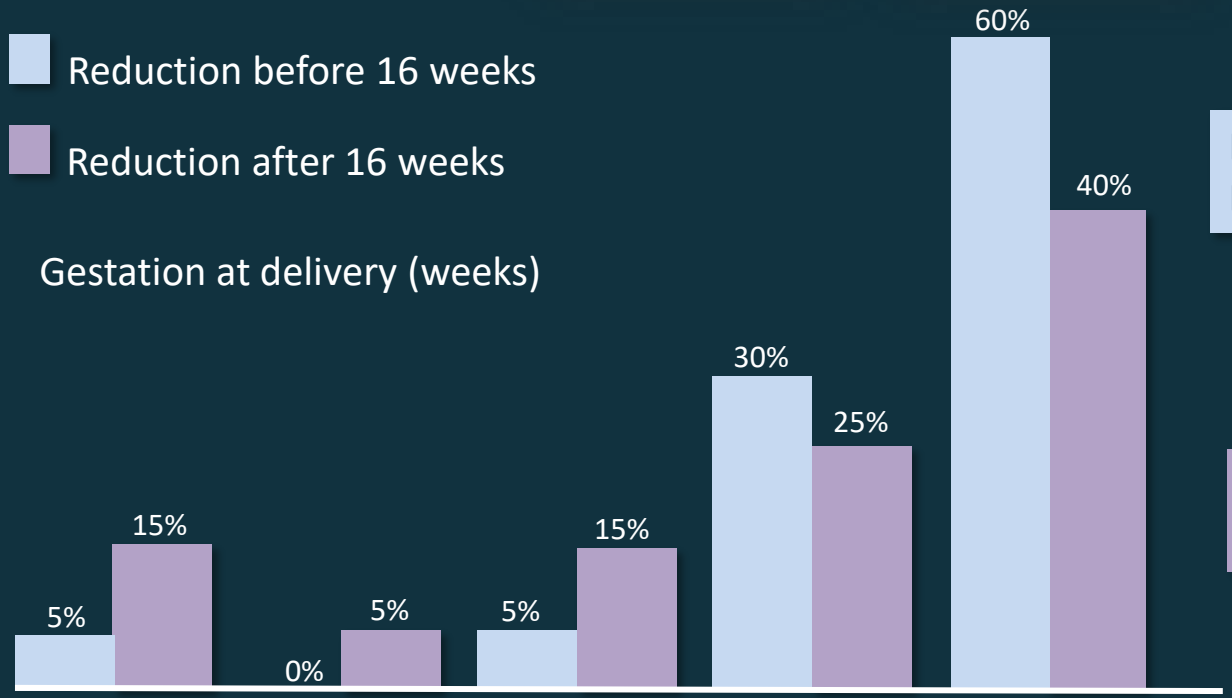
Le Conte G, Ultrasound Obstet Gynecol 2017; Taylor-Philips S, BMJ 2017; Gill MM, Ultrasound Obstet Gynecol 2017-2019; Khalil A, AJOG 2021; Judah H, UOG 2021

1st trimester: Diagnosis of chromosomal anomalies

Dual CVS in DC twins allows for a 1st trimester reduction



Low procedure-related loss



Before 16 weeks

Loss rate	5%
Birth <32 weeks	5%

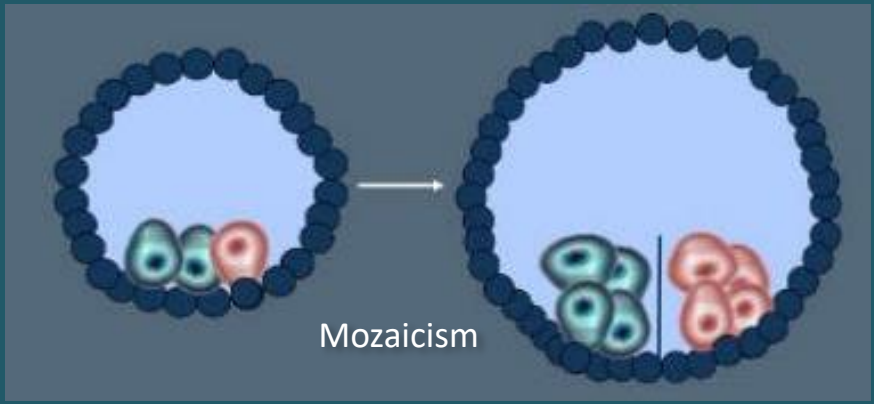
After 16 weeks

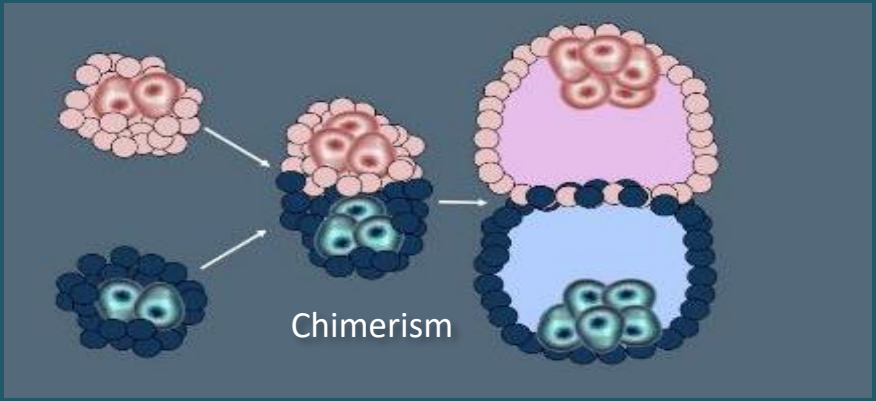
Loss rate	15%
Birth <32 weeks	20%

Evans MI, AJOG 1994; RCOG Green-top Guidelines 2016; Agarwal K, UOG 2012; Vieira LA, AJOG 2019; Di Mascio, UOG 2020; Elger T, UOG 2021

1st trimester: Diagnosis of chromosomal anomalies

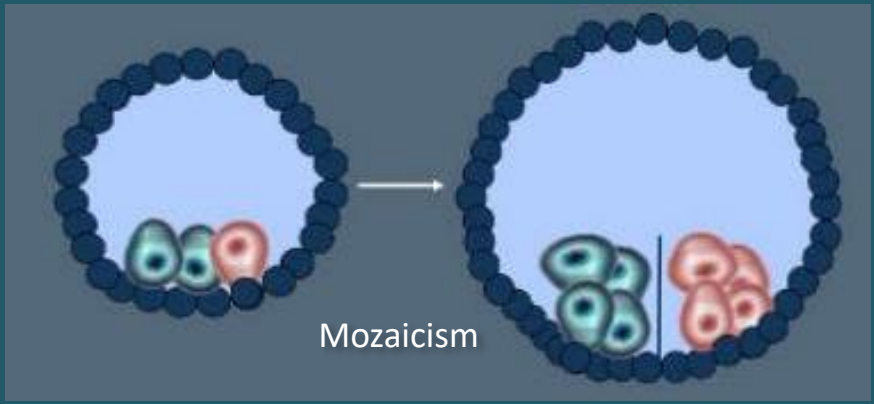
Rarely, MC twins may be discordant for chromosomal anomalies

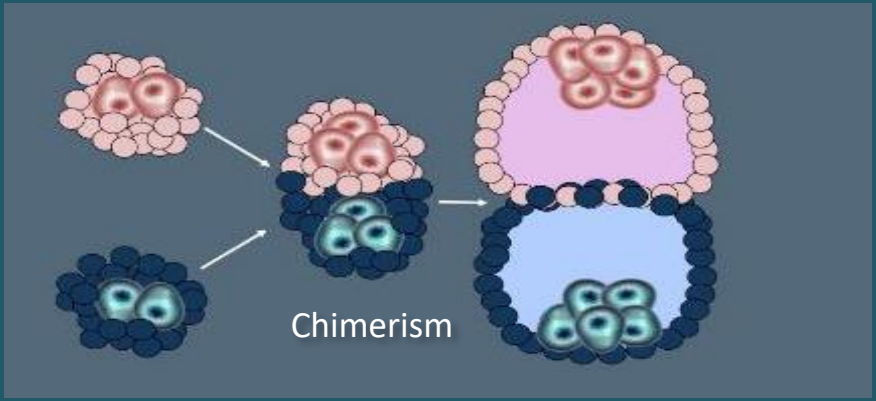




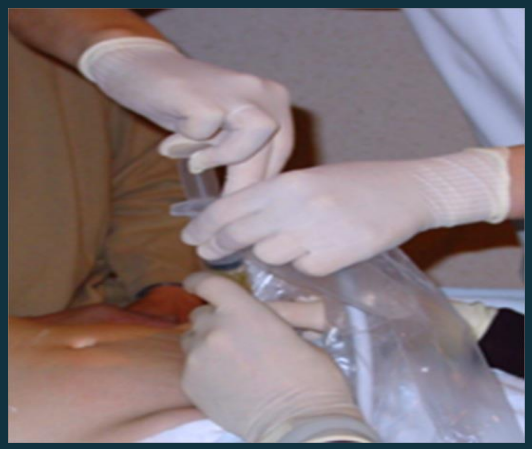
1st trimester: Diagnosis of chromosomal anomalies

Rarely, MC twins may be discordant for chromosomal anomalies





Dual amniocentesis with sampling of both sacs

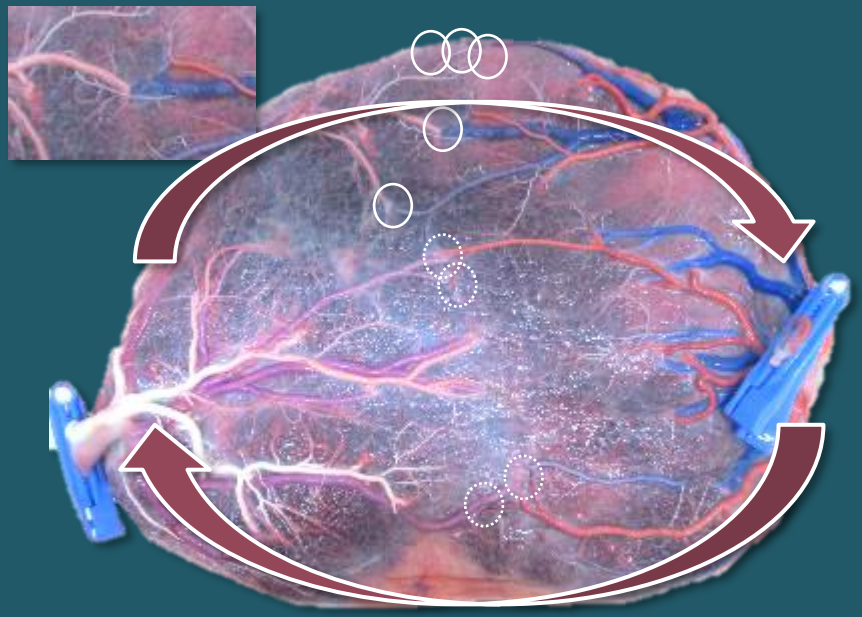


Machin GA, Am J Med Gen 1996; Redline RW, NEJM 2003; Lewi L, Am J Med Genet 2006; Essaoui M, Eur J Med Genet 2013; Salomon LJ, UOG 2019; Di Mascio D, UOG 2020

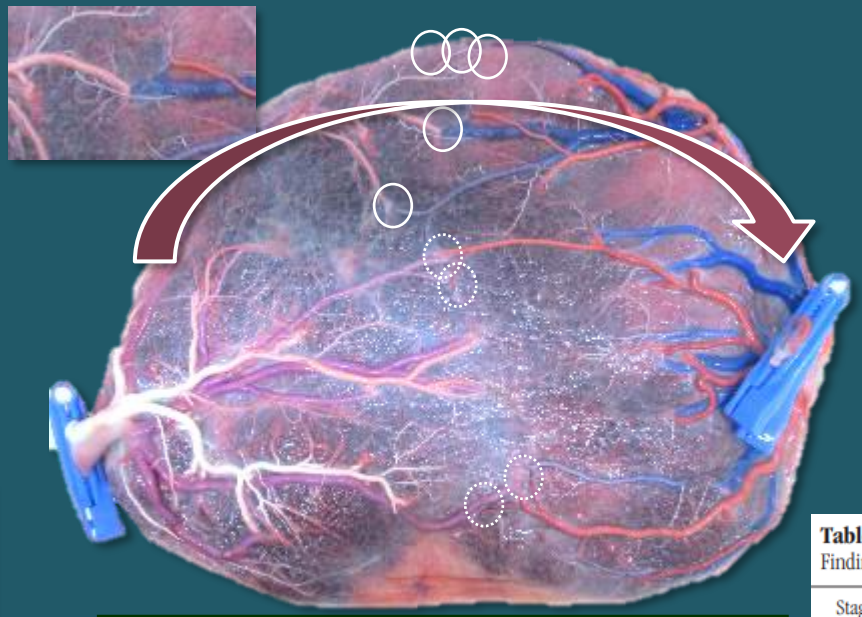
2nd – 3rd trimester

- Screening and treatment of TTTS
- Screening and treatment of TAPS
- Structural anomalies and selective reduction
- Poor growth and its management
- Cervical length screening and prevention of preterm birth

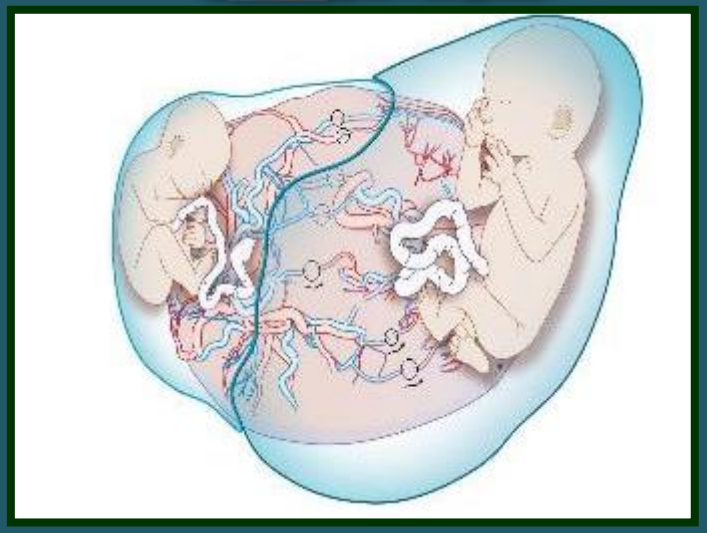
2nd – 3rd trimester: Unique for MCDA twins: Screening for TTTS



2nd – 3rd trimester: Unique for MCDA twins: Screening for TTTS



10-15% of MCDA twins
16-26 weeks



Progressive

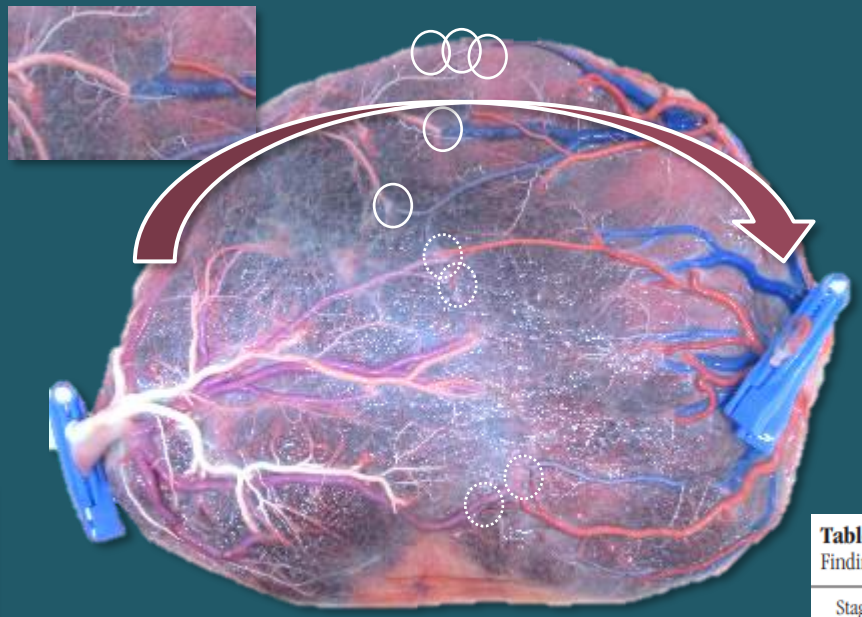
Table 1 Staging of TTTS Based on Sonographic and Doppler Findings

Stage	Poly/ oligohydramnios*	Absent bladder in donor	CADs†	Hydrops	Demise
I	+	–	–	–	–
II	+	+	–	–	–
III	+	+	+	–	–
IV	+	+	+	+	–
V	+	+	+	+	+

*Polyhydramnios, MVP of >8 cm; oligohydramnios, MVP of <2 cm.
†CADs, defined as the presence of at least one of the following: (1) UA AEDV/REDV, (2) RFDV, or (3) pulsatile umbilical venous flow (PUVF).

Atypical presentations possible!

2nd – 3rd trimester: Unique for MCDA twins: Screening for TTTS



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IV	+	+	+	+	–
V	+	+	+	+	+

*Polyhydramnios, MVP of >8 cm; oligohydramnios, MVP of <2 cm.
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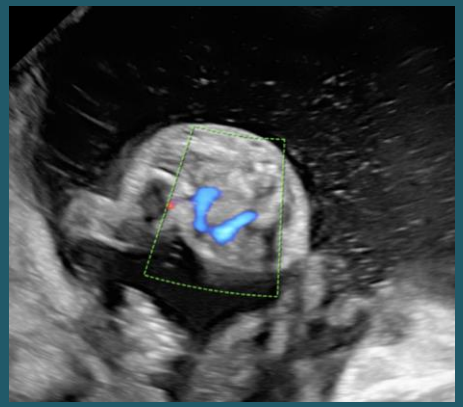
Atypical presentations possible!

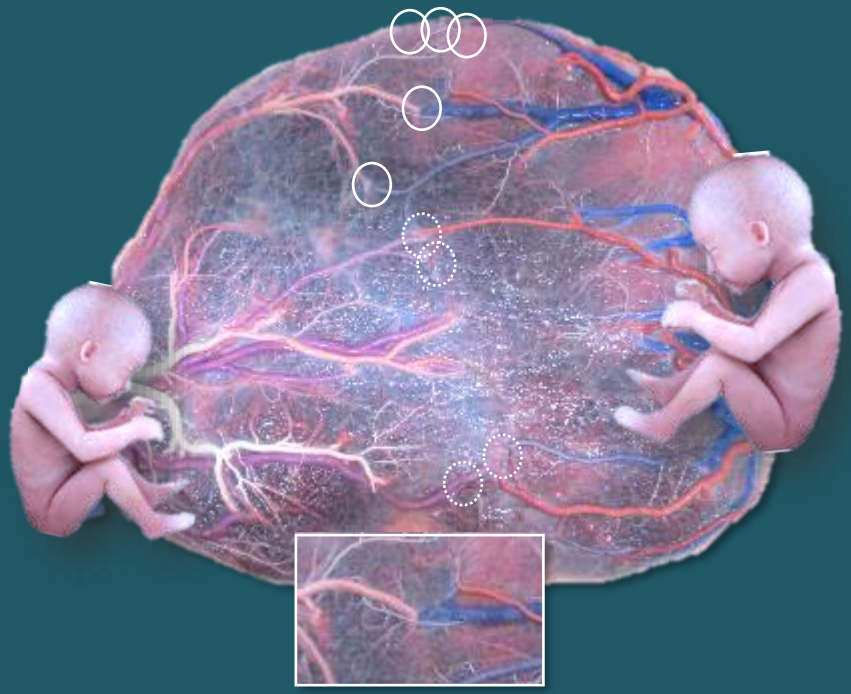
TTTS is the main cause of death or handicap in MC twins

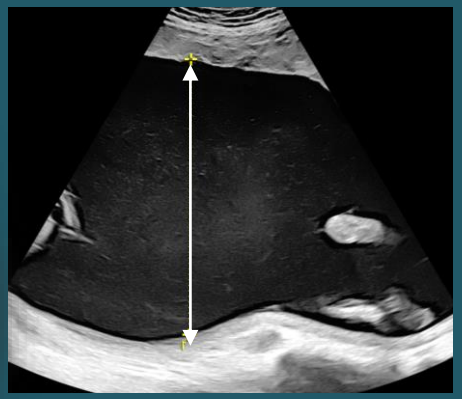
Senat MV, NEJM 2004; Dekoninck P, Ultrasound Obstet Gynecol 2013; Couck I, Fet Diagn Ther 2021

2nd – 3rd trimester: Unique for MCDA twins: Screening for TTTS

≤ 2cm







≥ 6 cm < 16 weeks
≥ 8 cm 16 to 20 weeks
≥ 10 cm > 20 weeks

2nd – 3rd trimester: Unique for MCDA twins: Screening for TTTS

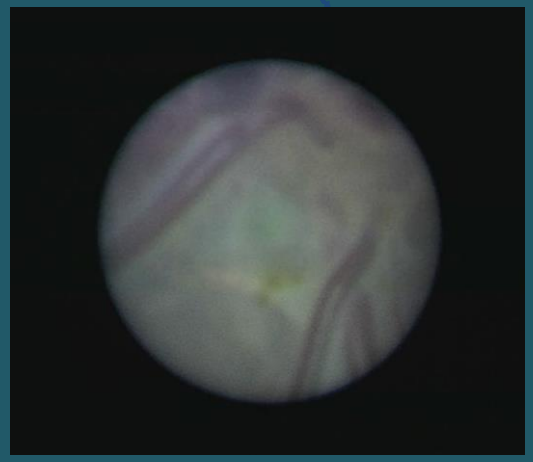
Look for the intertwin septum and bladders

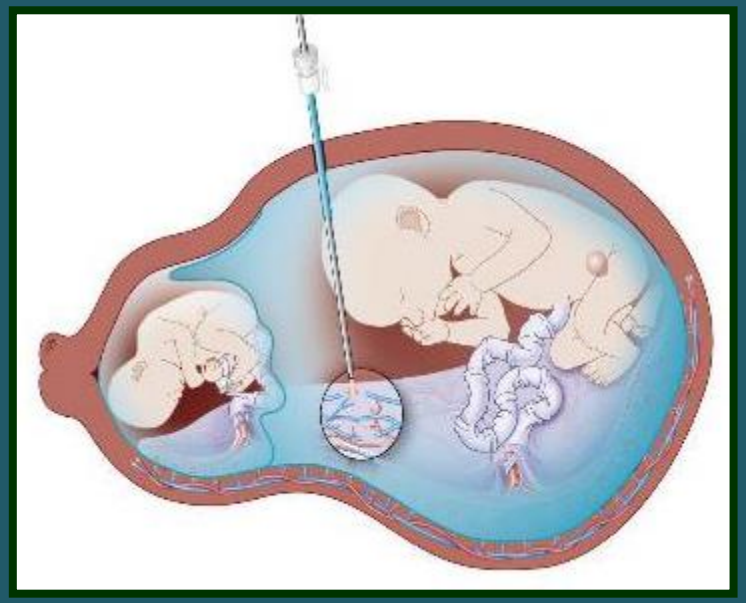
2nd – 3rd trimester: Unique for MCDA twins: Screening for TTTS

Look for the intertwin septum and bladders

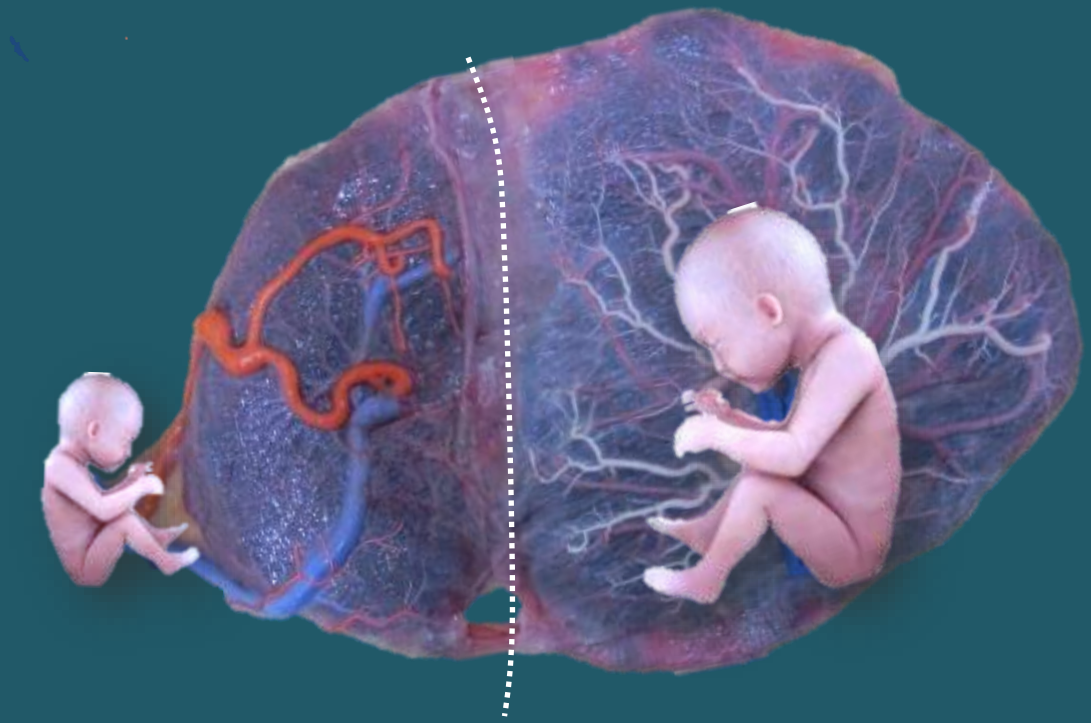
ISUOG Practice Guideline: role of ultrasound in twin pregnancies, 2016; NICE guideline, 2019

2nd – 3rd trimester: Treatment of TTTS





2nd – 3rd trimester: Treatment of TTTS



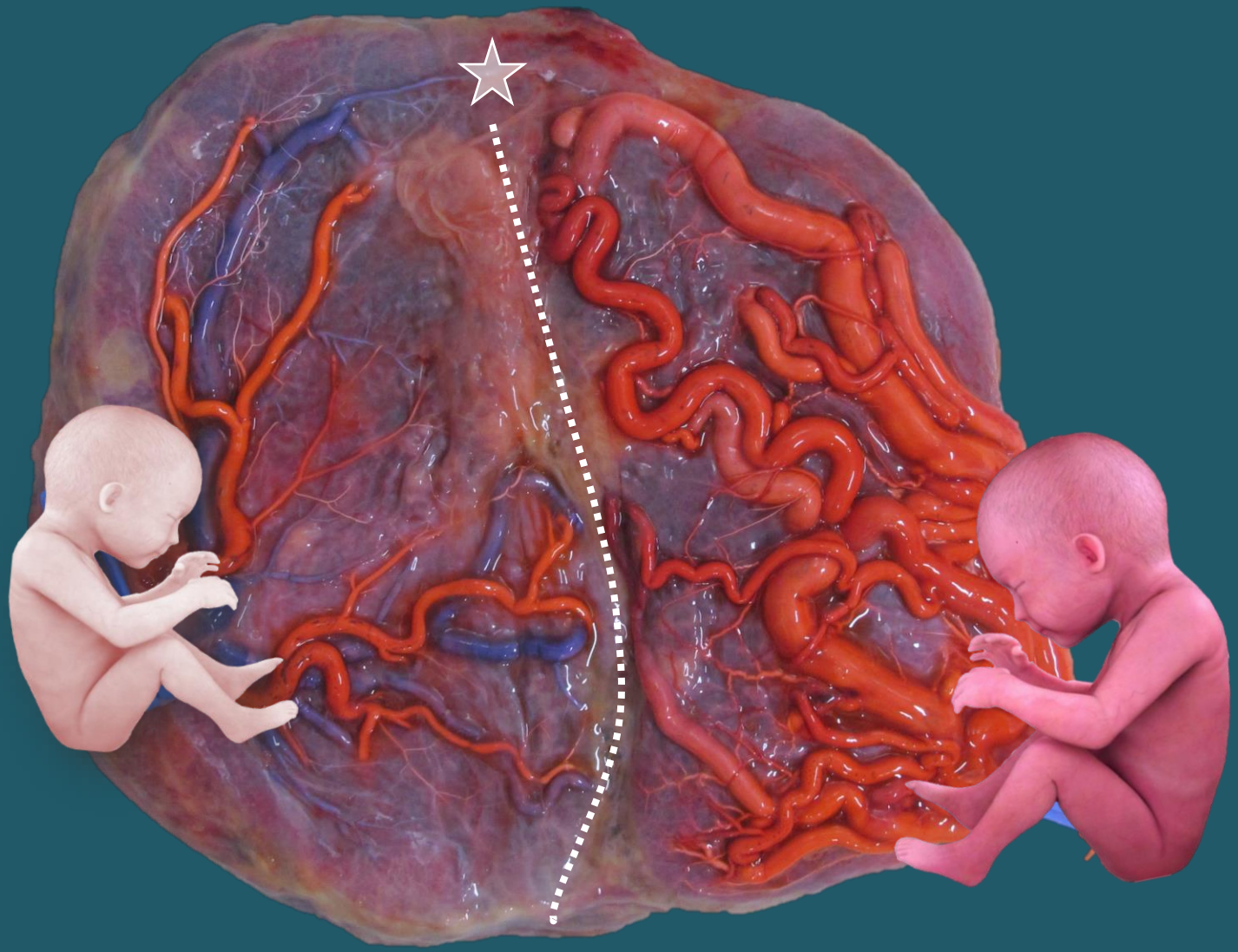
2 survivors	65%
1 survivor	20%
0 survivors	15%

GA at birth 32 weeks, overall 10% risk of impairment

Senat MV, NEJM 2004; Slaghekke F, Lancet 2014; Akkermans J, Fetal Diagn Ther 2015; Van Klink JM, Twin Res Hum Genet 2016

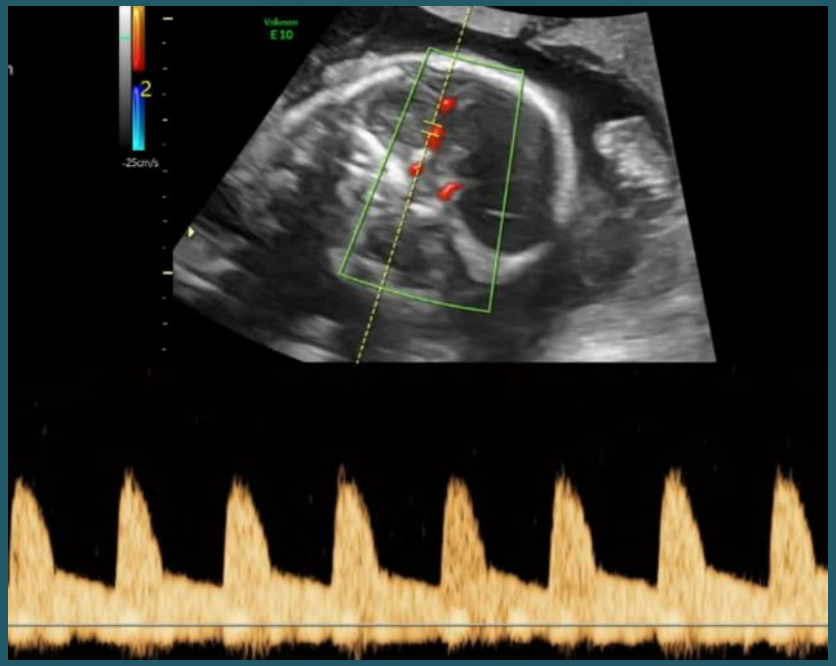
2nd – 3rd trimester: Treatment of TTTS

Missed anastomoses may result in TAPS



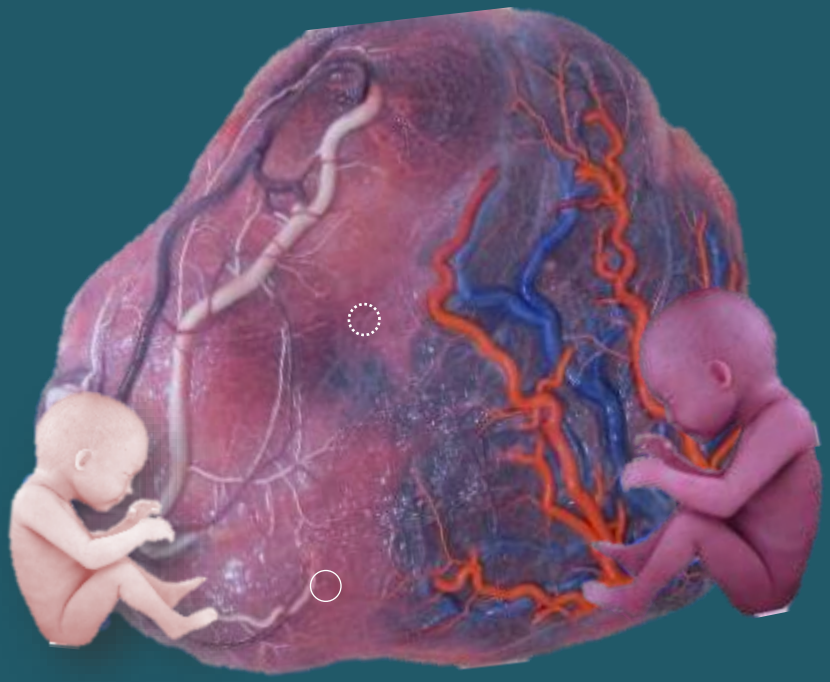
Lewi L, AJOG 2007; Slaghekke F, Lancet 2014

2nd – 3rd trimester: Unique for MCDA twins: Screening for TAPS



2nd – 3rd trimester: Unique for MCDA twins: Screening for TAPS

5% of MCDA twins
Often >26 weeks



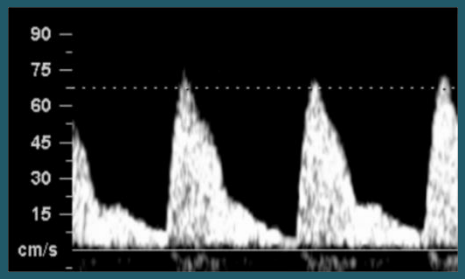
Progressive

Antenatal stage	Findings at Doppler ultrasound examination
Stage 1	MCA-PSV donor >1.5 MoM *and* MCA-PSV recipient <1.0 MoM, without other signs of fetal compromise
Stage 2	MCA-PSV donor >1.7 MoM *and* MCA-PSV recipient <0.8 MoM, without other signs of fetal compromise
Stage 3	as stage 1 or 2, with cardiac compromise of donor, defined as critically abnormal flow[a]
Stage 4	hydrops of donor
Stage 5	intrauterine demise of one or both fetuses preceded by TAPS

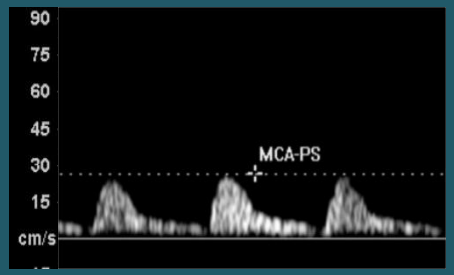
Postnatal stage	Intertwin Hb difference, g/dl
Stage 1	>8.0
Stage 2	>11.0
Stage 3	>14.0
Stage 4	>17.0
Stage 5	>20.0

Slaghekke F, Fet Diag Ther 2010

2nd – 3rd trimester: Unique for MCDA twins: Screening for TAPS

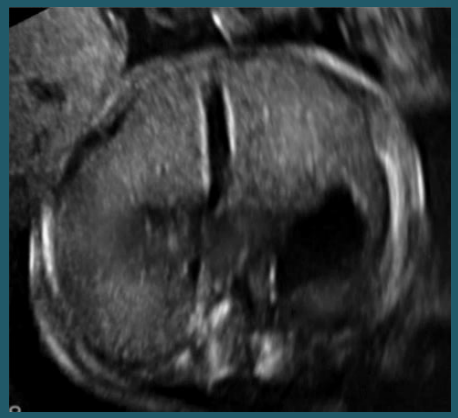


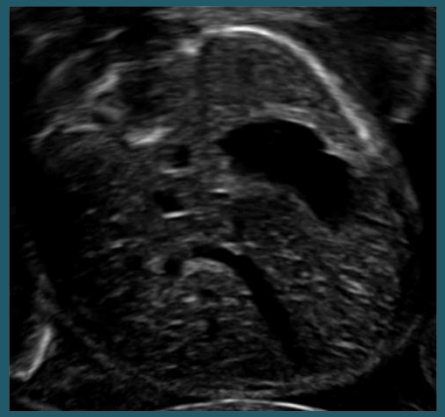
Δ MCA-PSV ≥ 1 MoM



MCA-PSV ≥ 1.5 MoM

MCA-PSV ≤ 0.8 MoM





Most have placental dichotomy

Lewi L, AJOG 2006-2008, Lopriore E, Placenta 2007; Khalil A, UOG 2020

2nd – 3rd trimester: management of TAPS

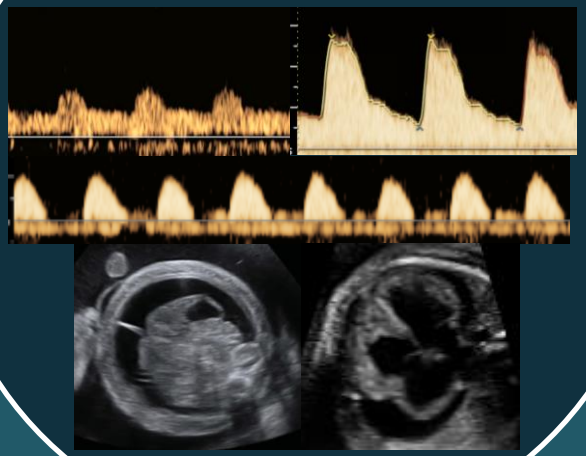
Individualized management

2nd – 3rd trimester: management of TAPS

Individualized management

Gestational age

Severity

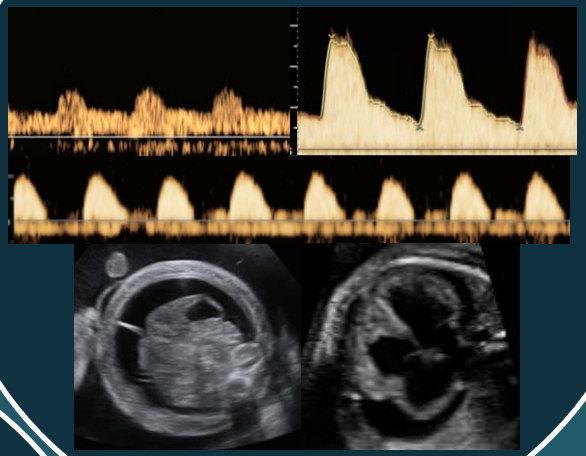


2nd – 3rd trimester: management of TAPS

Individualized management

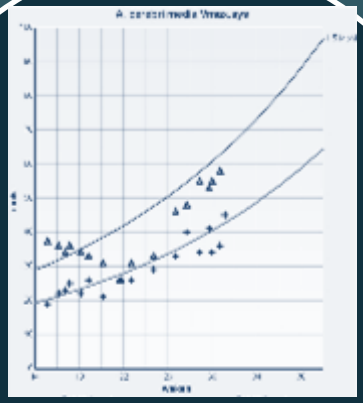
Gestational age

Severity



Technical aspects

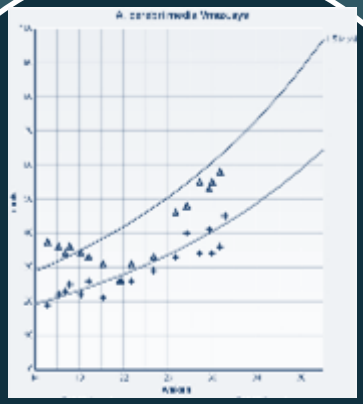
2nd – 3rd trimester: management of TAPS



Expectant

2nd – 3rd trimester: management of TAPS

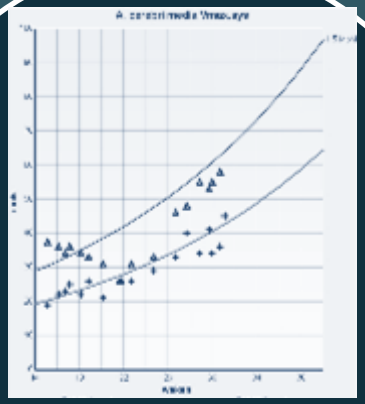
Fetoscopic laser surgery



Expectant

2nd – 3rd trimester: management of TAPS

Fetoscopic laser surgery

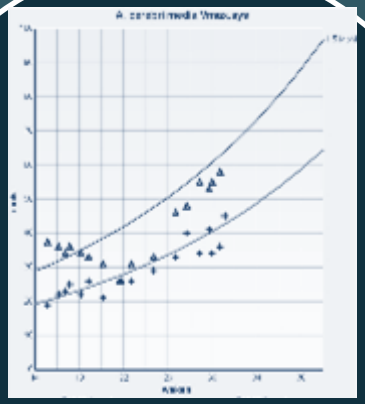


Expectant

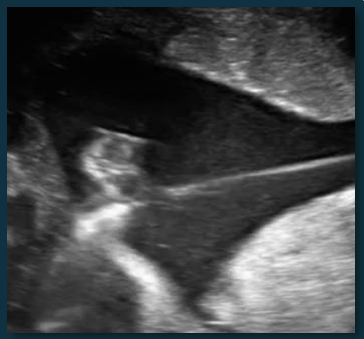
Selective reduction

2nd – 3rd trimester: management of TAPS

Fetoscopic laser surgery



Expectant

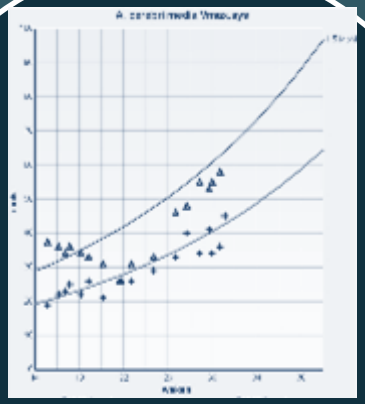


Selective reduction

Intrauterine transfusion

2nd – 3rd trimester: management of TAPS

Fetoscopic laser surgery



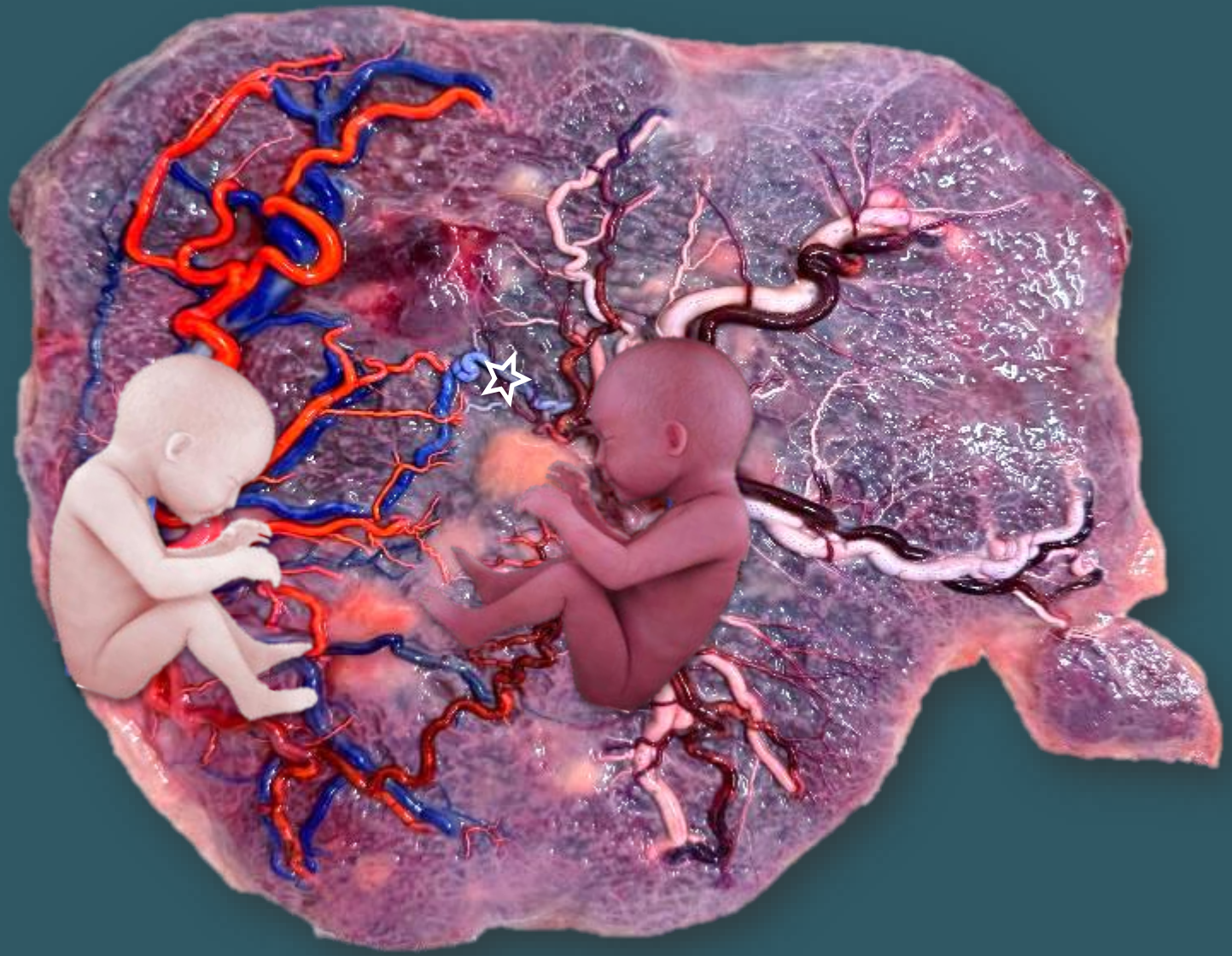
Expectant

Selective reduction

Intrauterine transfusion

Elective preterm birth

2nd – 3rd trimester: Unique for MCDA twins: Acute intertwin transfusion



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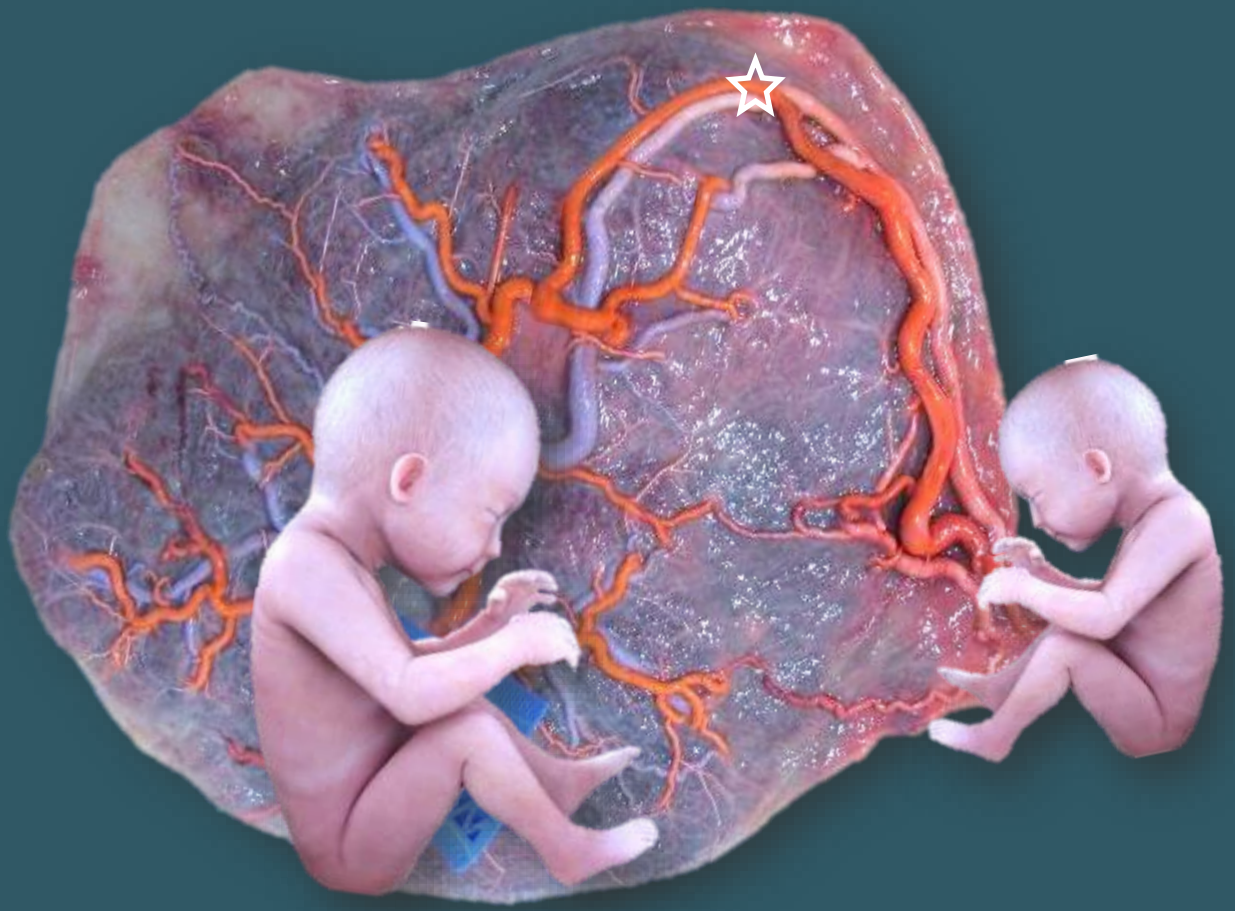

Sebire N, BJOG 1997; Bajoria R, Hum Reprod 1999; Mackie FL, BJOG 2019

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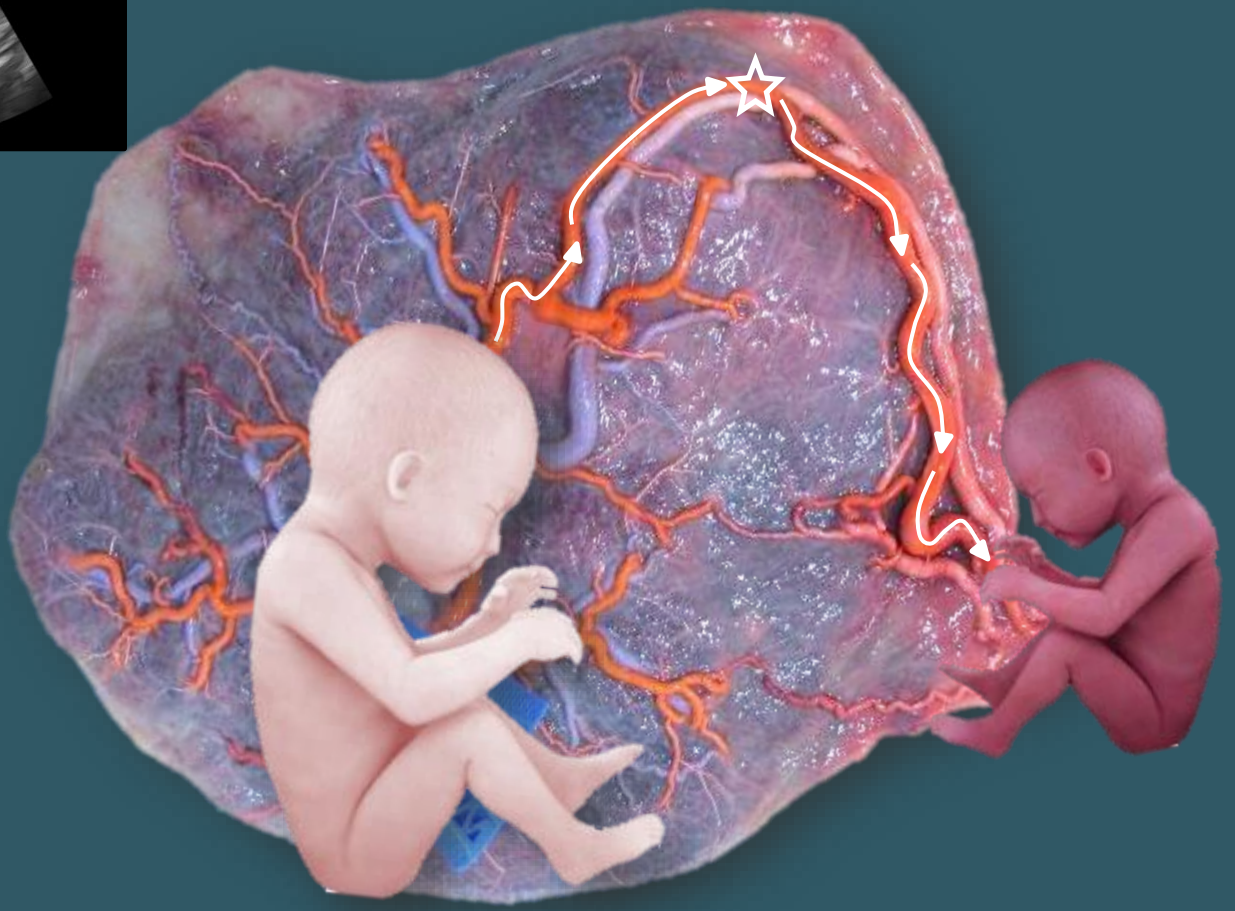

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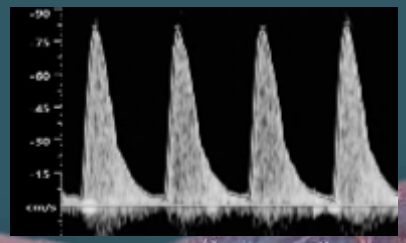
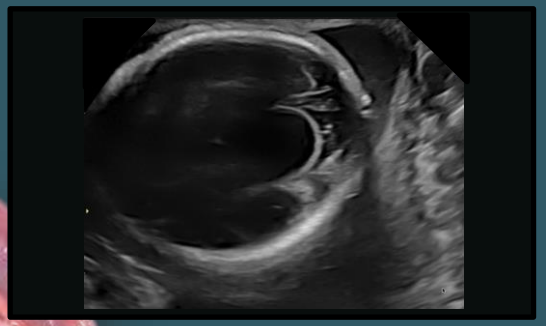
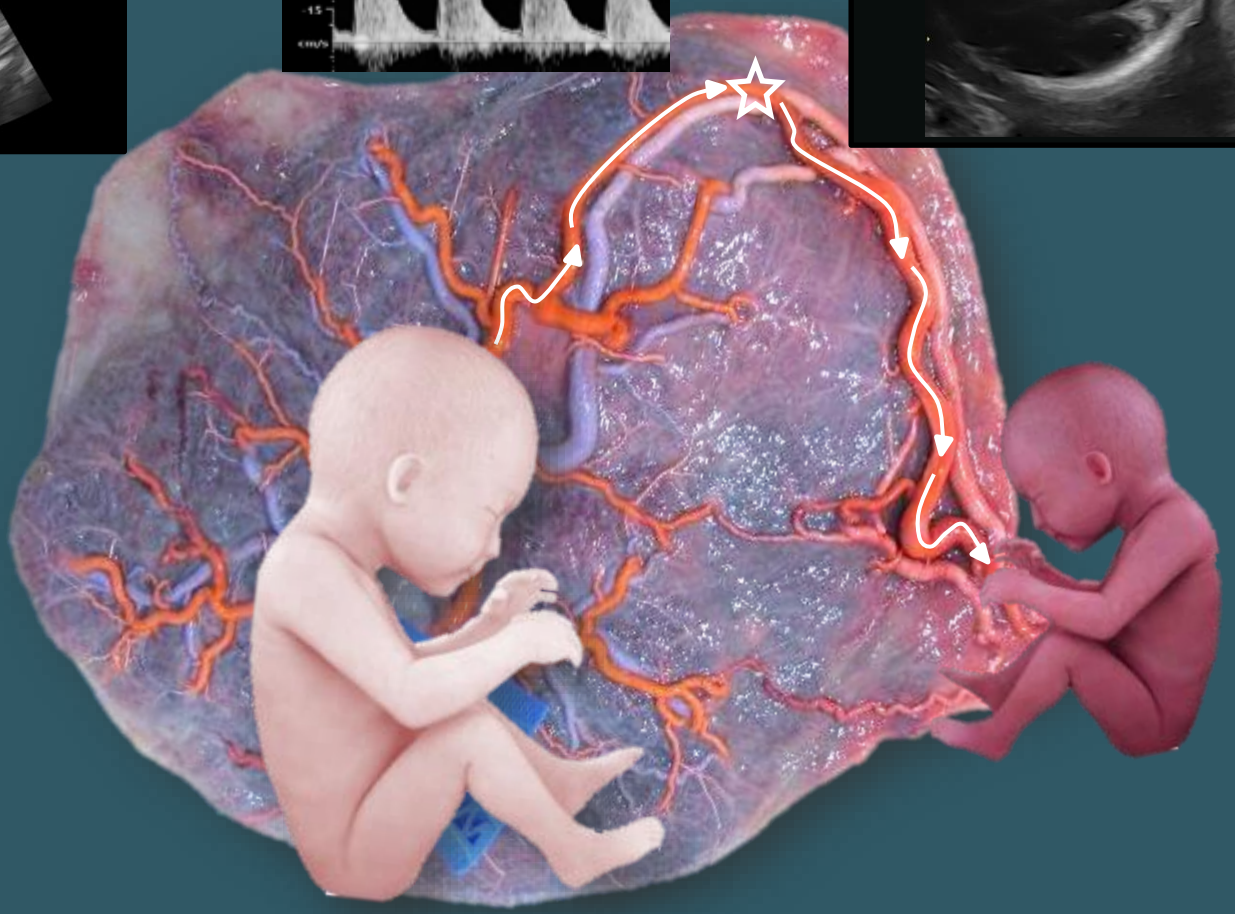
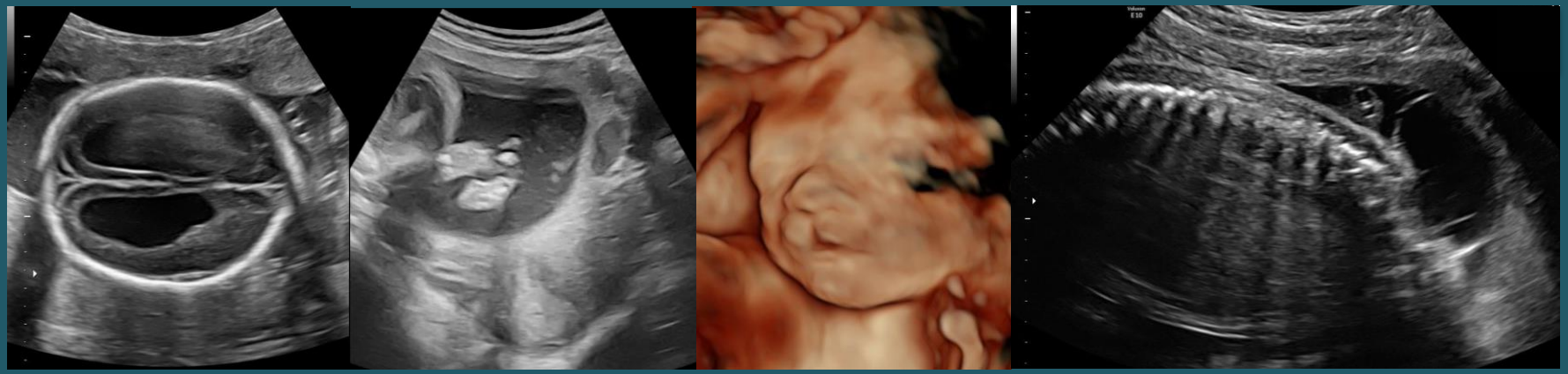






Sebire N, BJOG 1997; Bajoria R, Hum Reprod 1999; Mackie FL, BJOG 2019

2nd – 3rd trimester: Screening for structural anomalies



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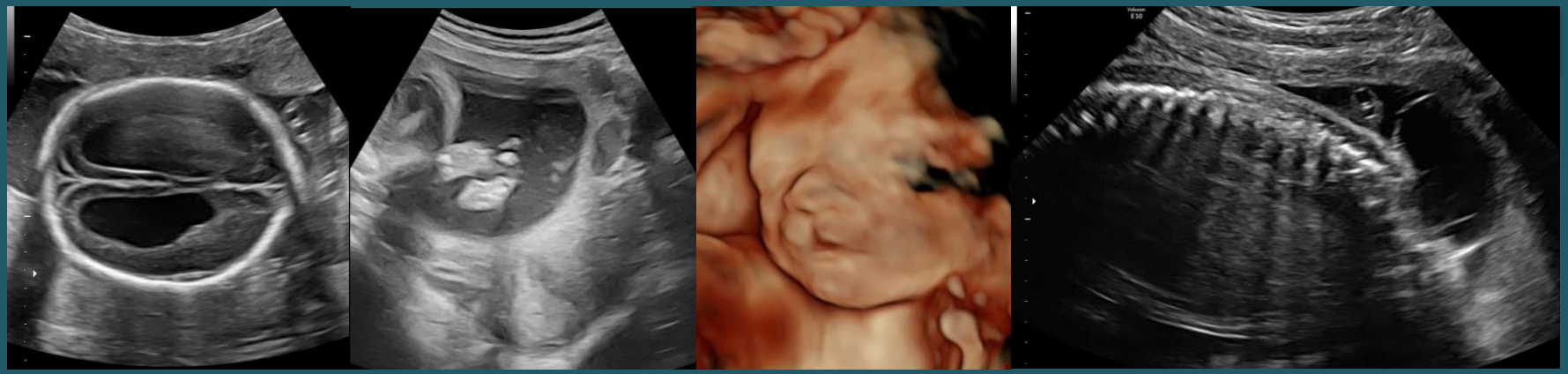


isuog.org

GUIDELINES

ISUOG Practice Guidelines (updated): performance of the routine mid-trimester fetal ultrasound scan

IVan Mieghem T, AJOG 2014; ISUOG Practice Guidelines 2022; NICE 2019; Syngelaki A, UOG 2019; Couck I, UOG 2020

2nd – 3rd trimester: Selective reduction in DC twins

1st TRIMESTER DIAGNOSIS

1st trimester REDUCTION

5% loss rate
5% birth before 32 weeks

2nd – 3rd trimester: Selective reduction in DC twins

1st TRIMESTER DIAGNOSIS

1st trimester REDUCTION

5% loss rate
5% birth before 32 weeks

2nd TRIMESTER DIAGNOSIS

NONLETHAL anomaly

hydrocephaly, spina bifida

2nd trimester REDUCTION

15% loss rate
20% birth before 32 weeks

LATE REDUCTION
Between 28-30 weeks

No procedure-related loss
Small risk birth before 32 weeks

LETHAL in fetal life

Severe Ebstein's, lethal monosomy X

EXPECTANT management

No procedure-related loss
No iatrogenic preterm birth

LETHAL in early neonatal period

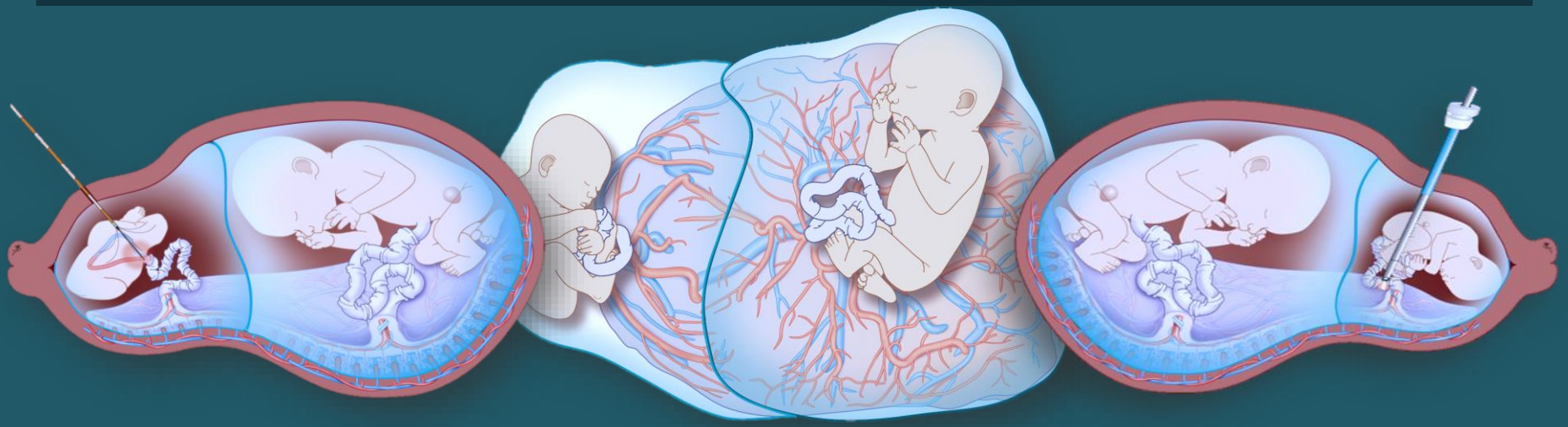
HLHS, bilateral renal agenesis

COMFORT CARE

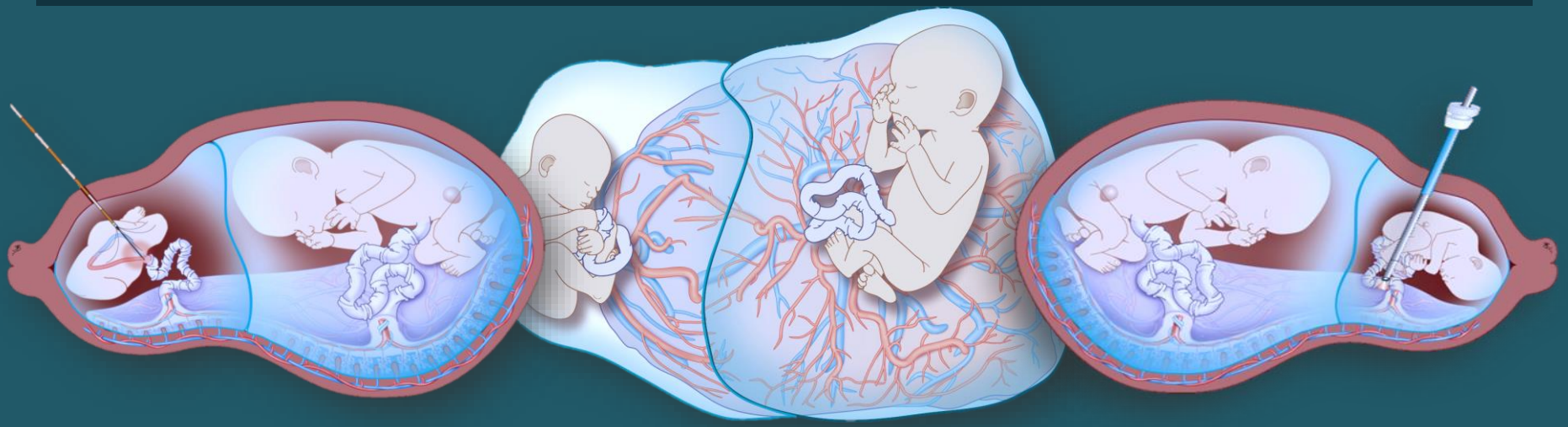
No procedure-related loss
No iatrogenic preterm birth

Evans MI, AJOG 1994 ; Evans MI, AJOG 1999; Shalev J, Fert Steril 1999; Stone J, AJOG 2008

2nd – 3rd trimester: Selective reduction in MC twins



2nd – 3rd trimester: Selective reduction in MC twins

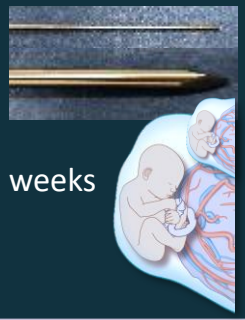


RISK co-twin

TRAP, lethal monosomy X, Ebstein's, TTTS

IMMEDIATE REDUCTION
From 16 weeks onward

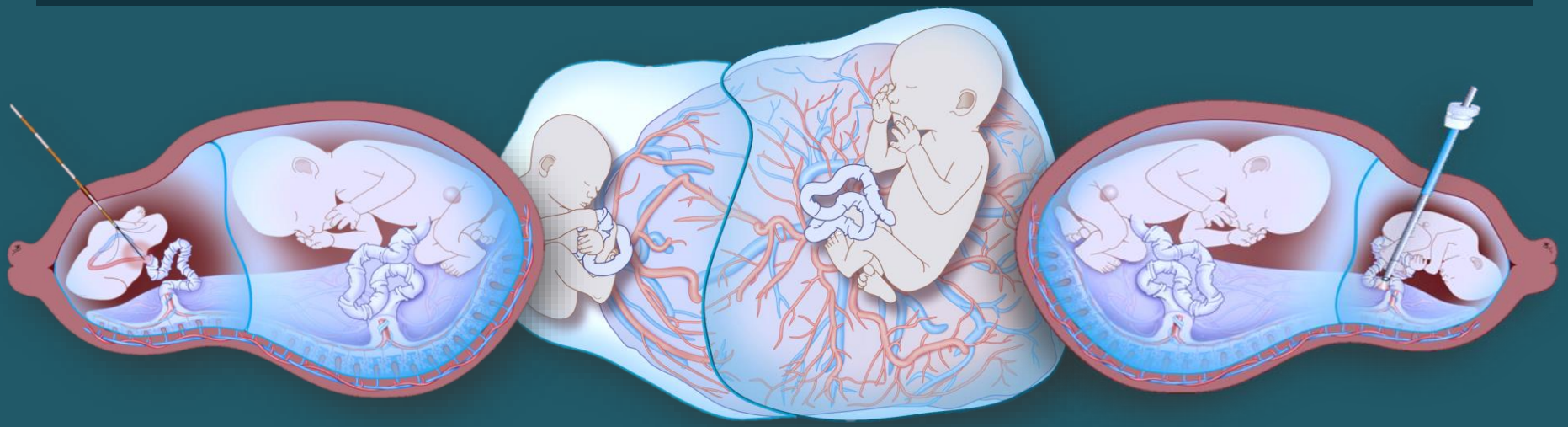
80% survival
- 10% fetal demise
- 10% miscarriage



20% birth before 32 weeks
- 10% 24-28 weeks
- 10% 28-32 weeks

Lewi L, AJOG 2006; Hillman SC, Obstet Gynecol 2011; Gaerty K, AJOG 2015; Own series (n=18) FMF congress Slovenia 2017

2nd – 3rd trimester: Selective reduction in MC twins



RISK co-twin

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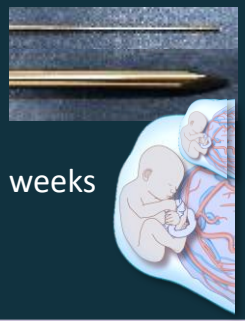


20% birth before 32 weeks
- 10% 24-28 weeks
- 10% 28-32 weeks

NO RISK co-twin and NONLETHAL

hydrocephaly, spina bifida, Dandy walker

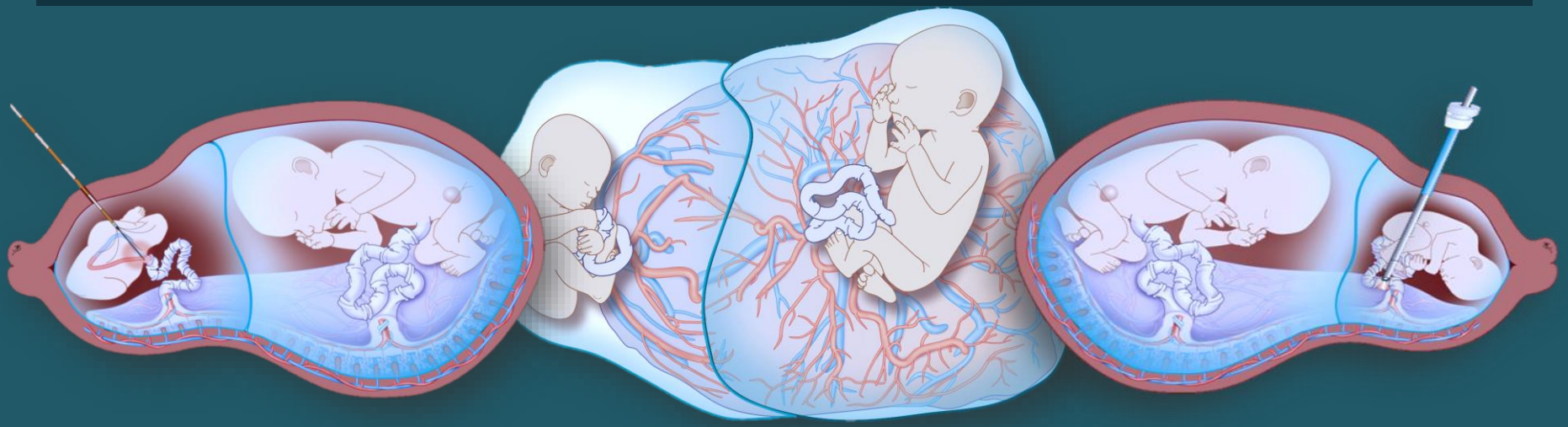
LATE REDUCTION
Between 28-30 weeks

No procedure-related loss

20% birth before 32 weeks
- 0% 24-28 weeks
- 20% 28-32 weeks

Lewi L, AJOG 2006; Hillman SC, Obstet Gynecol 2011; Gaerty K, AJOG 2015; Own series (n=18) FMF congress Slovenia 2017

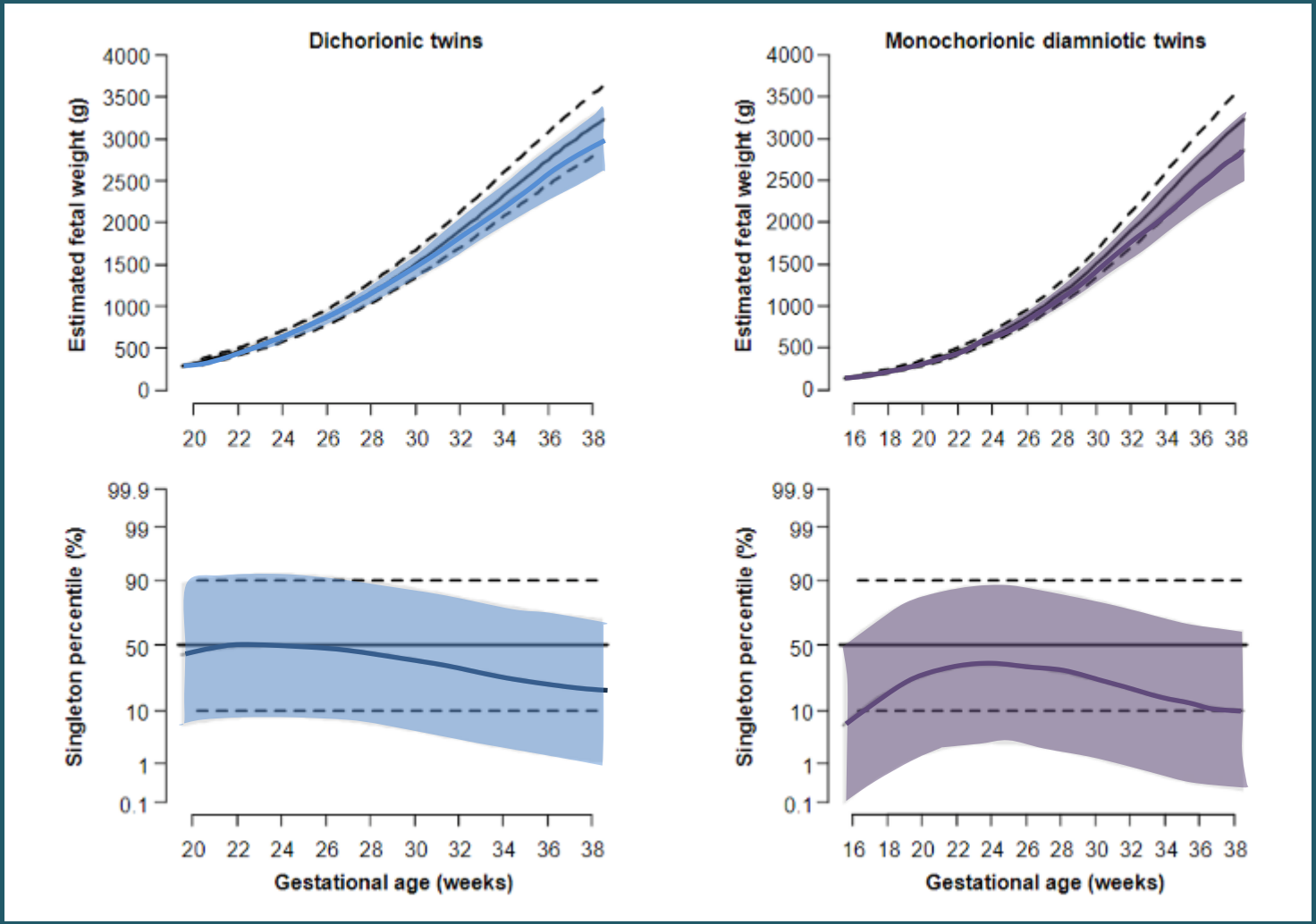
2nd – 3rd trimester: Selective reduction in MC twins



RISK co-twin	NO RISK co-twin and NONLETHAL	NO RISK co-twin and LETHAL in early neonatal period
TRAP, lethal monosomy X, Ebstein's, TTTS	hydrocephaly, spina bifida, Dandy walker	HLHS, bilateral renal agenesis
IMMEDIATE REDUCTION From 16 weeks onward	**LATE REDUCTION** Between 28-30 weeks	**COMFORT CARE** After birth
80% survival 10% fetal demise 10% miscarriage	No procedure-related loss	No procedure-related loss
20% birth before 32 weeks 10% 24-28 weeks 10% 28-32 weeks	20% birth before 32 weeks 0% 24-28 weeks 20% 28-32 weeks	No iatrogenic preterm birth

Lewi L, AJOG 2006; Hillman SC, Obstet Gynecol 2011; Gaerty K, AJOG 2015; Own series (n=18) FMF congress Slovenia 2017

2nd – 3rd trimester: Poor growth in twins



Ananth CV, Obstet Gynecol 1998; Blickstein I, Obstet Gynecol Clin North Am. 2005; Wright A, UOG 2023

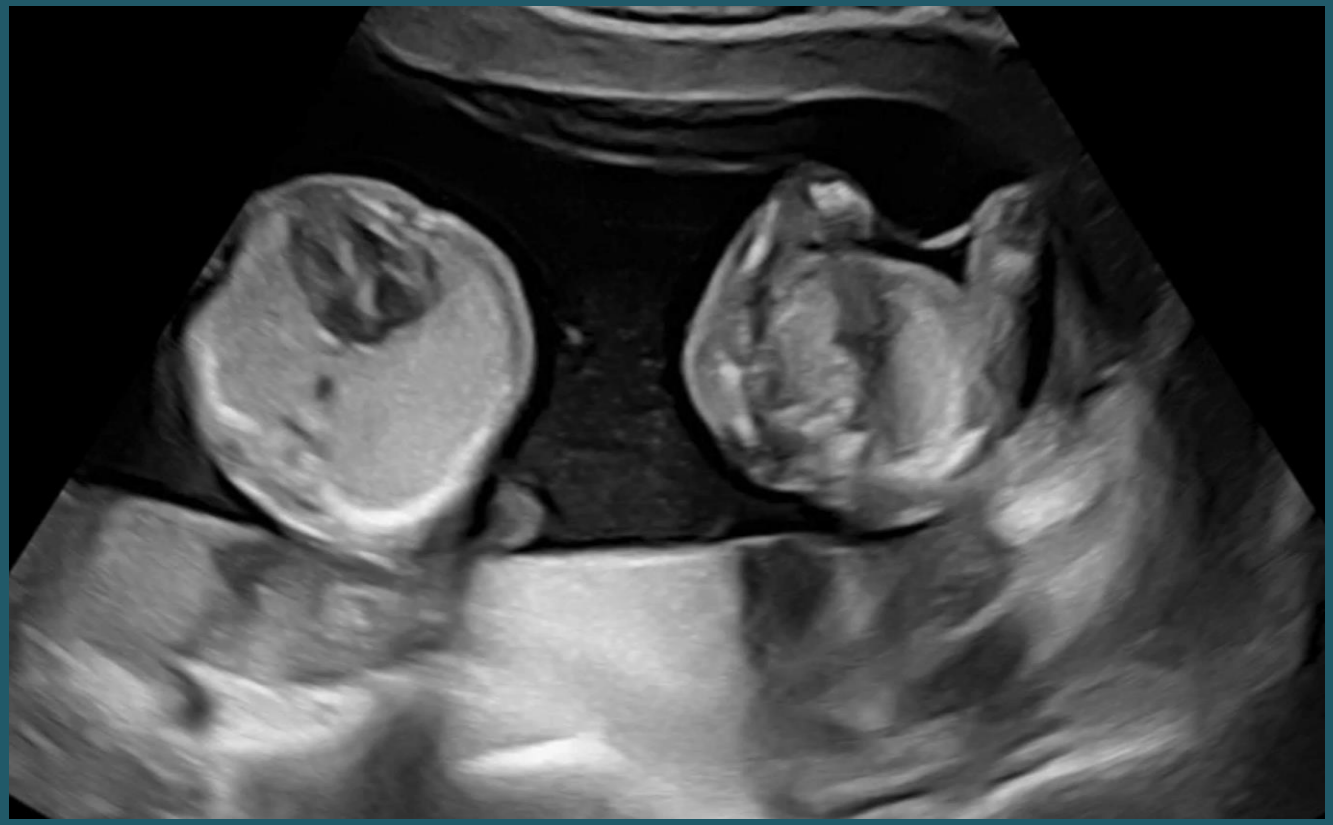
2nd – 3rd trimester: sIUGR in DC twins

2nd – 3rd trimester: sIUGR in DC twins

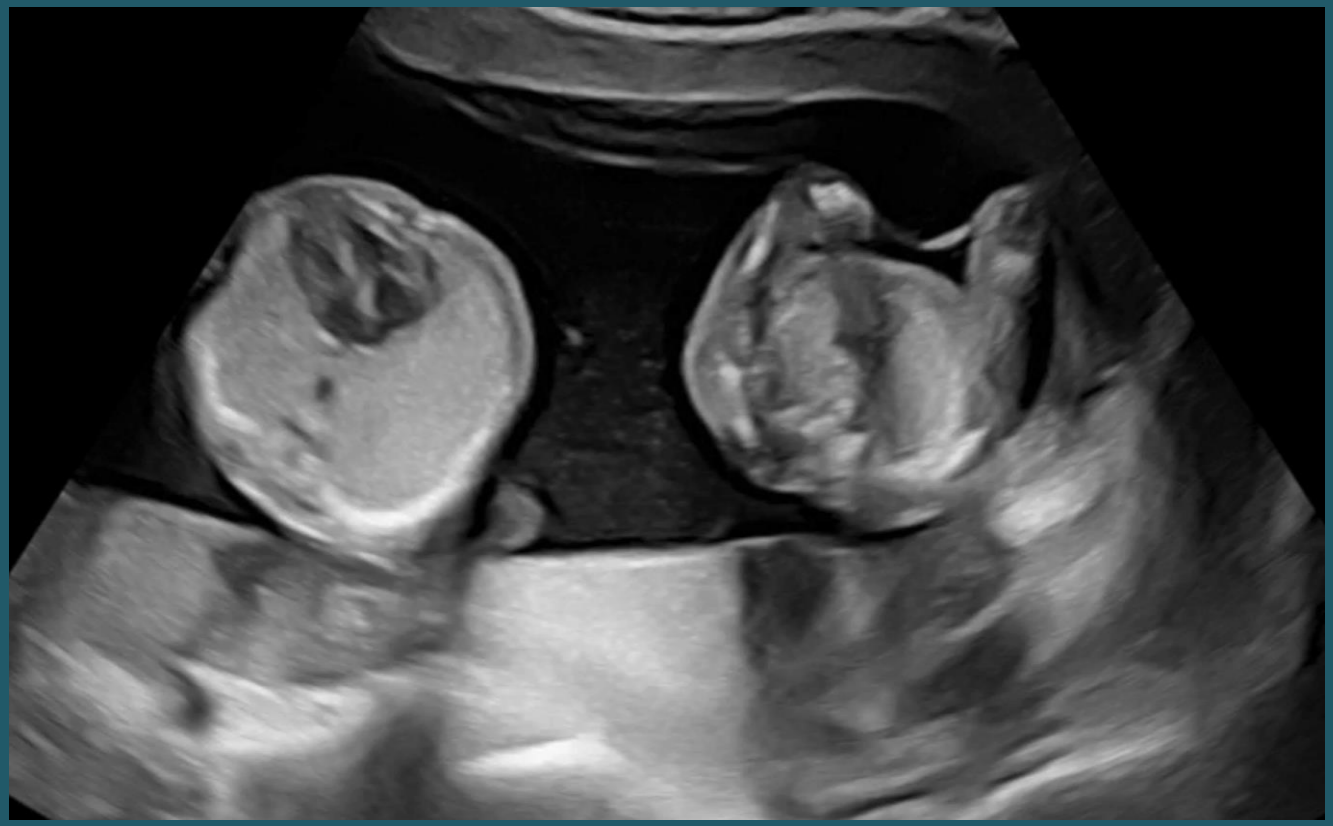
- Aneuploidy or infection may explain poor growth of 1 twin
- Fetal demise of the small twin should not directly affect the large twin
- Timing of birth will depend on the chances of survival of both twins

Sebire NJ, Arch Dis Child Fetal Neonatal Ed. 1997; Khalil A, UOG 2019; ISUOG Practice Guidelines for SGA and FGR, UOG 2020; Cimpoca B, UOG 2020

2nd – 3rd trimester: sIUGR in MC twins



2nd – 3rd trimester: sIUGR in MC twins

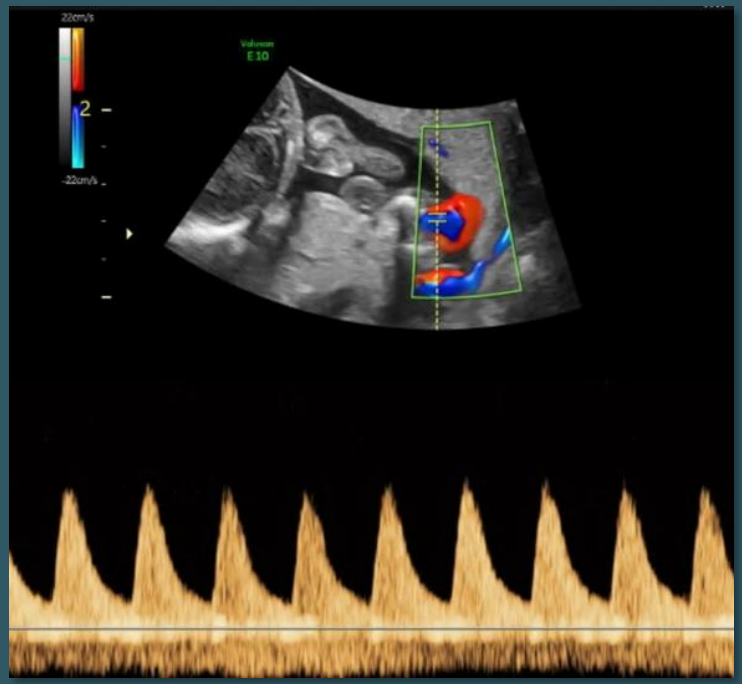


- Aneuploidy or infection is unusual to explain poor growth of 1 twin
- Fetal demise of the small twin will directly affect the large twin
- Timing of birth will depend on the risk of demise of the smaller twin

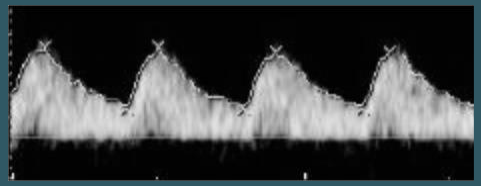
Sebire NJ, Arch Dis Child Fetal Neonatal Ed. 1997; Khalil A, UOG 2019; ISUOG Practice Guidelines for SGA and FGR, UOG 2020; Cimpoca B, UOG 2020

2nd – 3rd trimester: sIUGR in MC twins

20% ≠ in size



Type I



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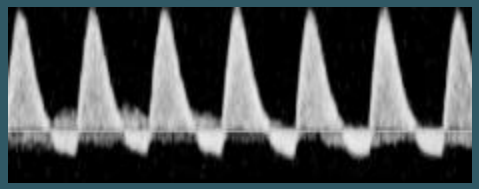
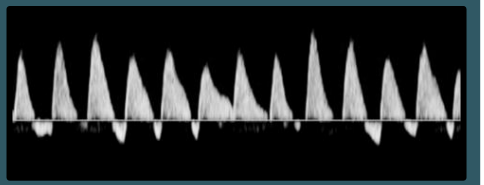
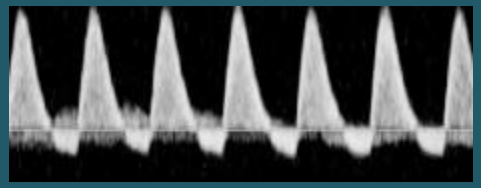


Type III



Gratacos E, Ultrasound Obstet Gynecol 2004; Gratacos E, Ultrasound Obstet Gynecol 2007; Couck I, Ultrasound Obstet Gynecol 2020

2nd – 3rd trimester: sIUGR in MC twins



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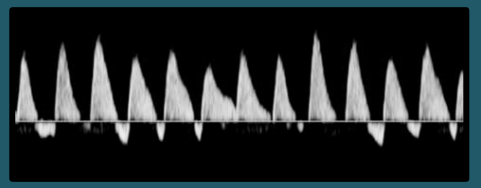
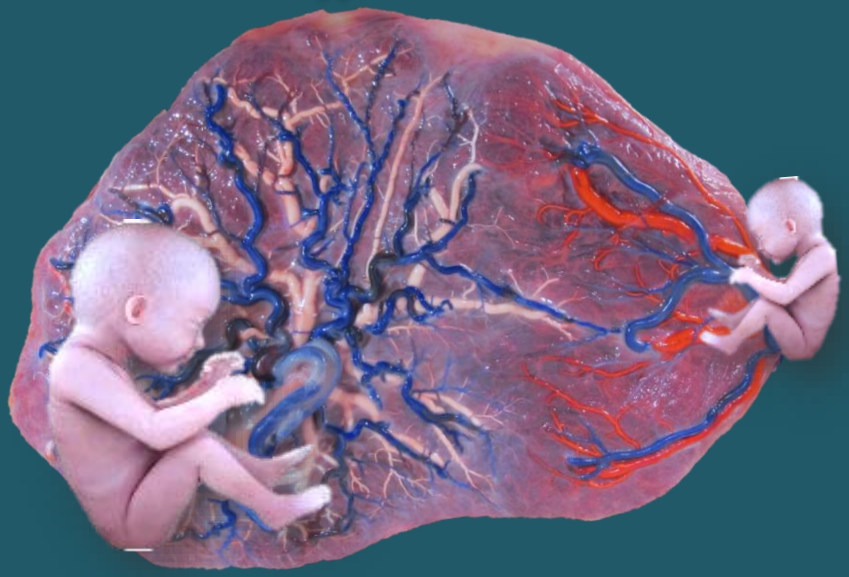
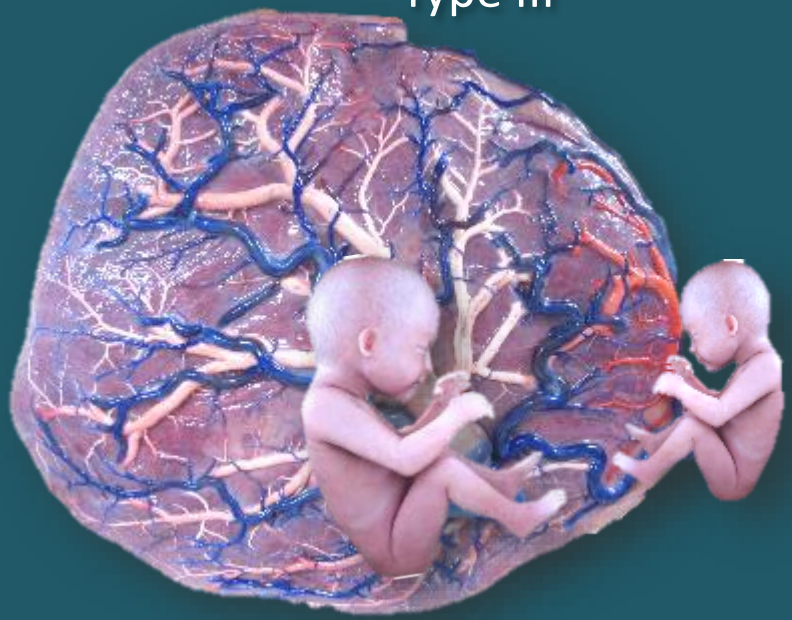
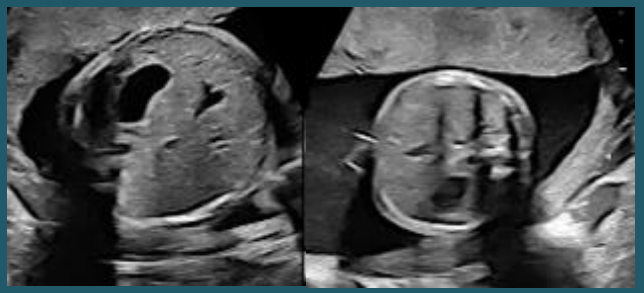


Type III







Couck I, Placenta 2022; Groene S, AJOG 2022

2nd – 3rd trimester: management of sIUGR in MC twins

Expectant

Type II
60% survival

Type III
85% survival

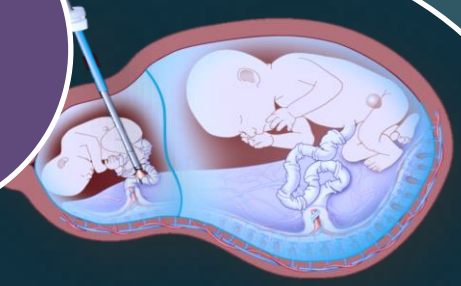
2nd – 3rd trimester: management of sIUGR in MC twins

Expectant

Type II
60% survival

Type III
85% survival

40% survival



Selective reduction

- Discordant anomalies
- Worsening type II - III
- Parental request

2nd – 3rd trimester: management of sIUGR in MC twins

Expectant

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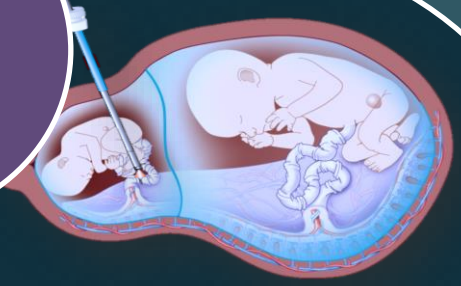
60% survival

Type III
85% survival

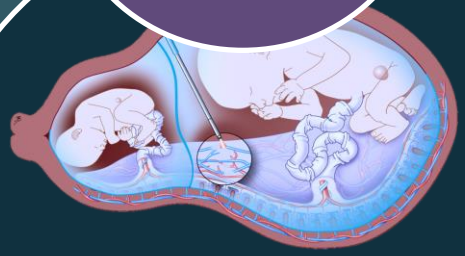
40% survival



Selective reduction

- Discordant anomalies
- Worsening type II - III
- Parental request

25-60% survival



Fetoscopic laser surgery

- To protect the larger twin

2nd – 3rd trimester: management of sIUGR in MC twins

Expectant

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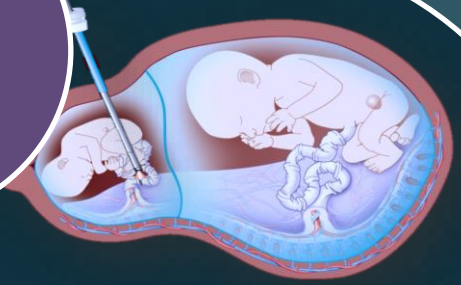
60% survival

Type III
85% survival

40% survival



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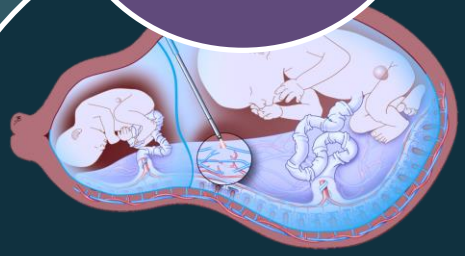
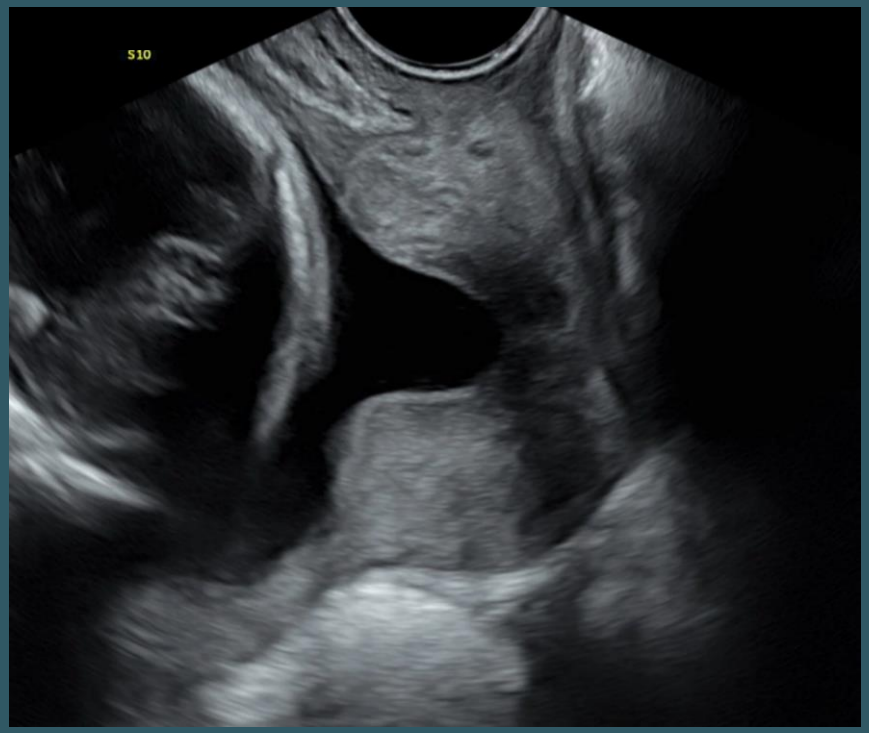


Fetoscopic laser surgery

- To protect the larger twin

2nd – 3rd trimester: cervical length management

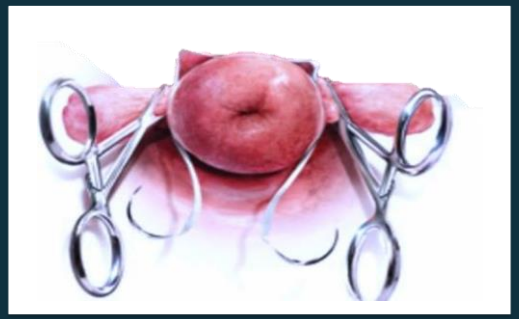
10% delivers before 32 weeks



2nd – 3rd trimester: cervical length management

10% delivers before 32 weeks

CL ≤ 25 mm
TWIN- cerclage trial



CL ≤ 15 mm or dilated cervix

Romero R, UOG 2017-2022; Roman A, AJOG 2020; Rehal A, AJOG 2021; D'Antonio F, PlosOne 2023

Take home message

DICHORIONIC

MONOCHORIONIC

11-14 wks

- Chorionicity
- Dating
- Labeling
- Early anatomy
- Screening T21

11-14 wks

Take home message

DICHORIONIC

MONOCHORIONIC

11-14 wks

- Chorionicity
- Dating
- Labeling
- Early anatomy
- Screening T21

11-14 wks

20 wks

- Anatomy
- Growth
- Cervical length

24 wks

28 wks

- Growth
- Cervical lenght

32 wks

34 wks

36 wks

37-38 wks

- Birth

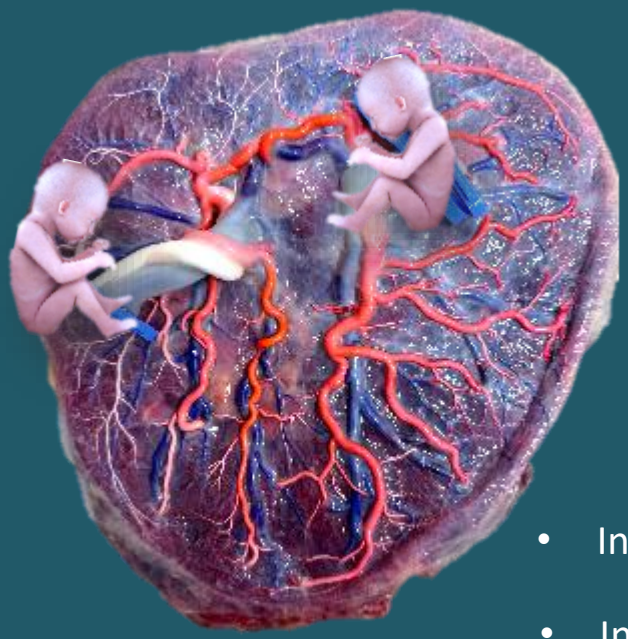
Take home message

DICHORIONIC		MONOCHORIONIC
11-14 wks	• Chorionicity • Dating • Labeling • Early anatomy • Screening T21	11-14 wks
		16 wks
		18 wks
20 wks	• Anatomy • Growth • Cervical length	20 wks
		22 wks
24 wks		24 wks
		26 wks
28 wks		28 wks
	• Growth • Cervical lenght	30 wks
32 wks		32wks
34 wks		34 wks
36 wks		36 wks
37-38 wks	• Birth	36-37 wks

• Screening TTTS
• Screening TAPS

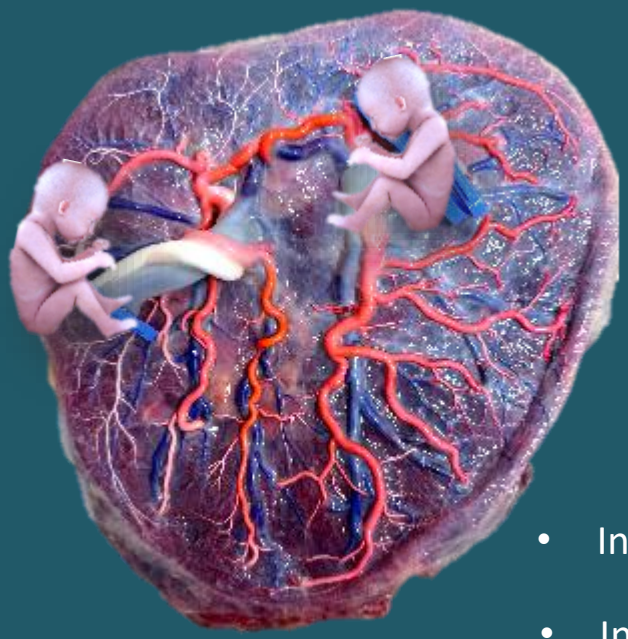
NICE 2019, Updated ISUOG guidelines 2023; Canadian guidelines 2023

MCMA TWINS



- Increased risk of sudden fetal demise
- Increased risk of a structural anomaly

MCMA TWINS



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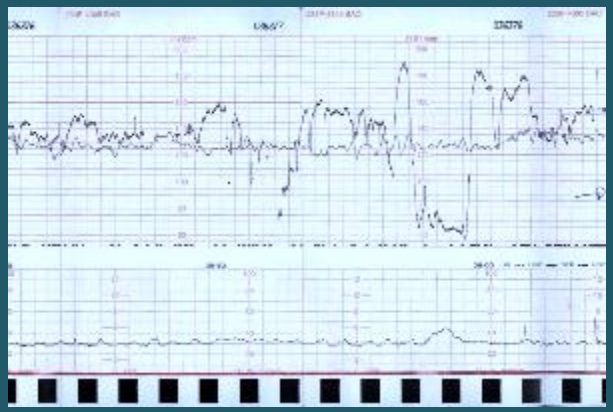
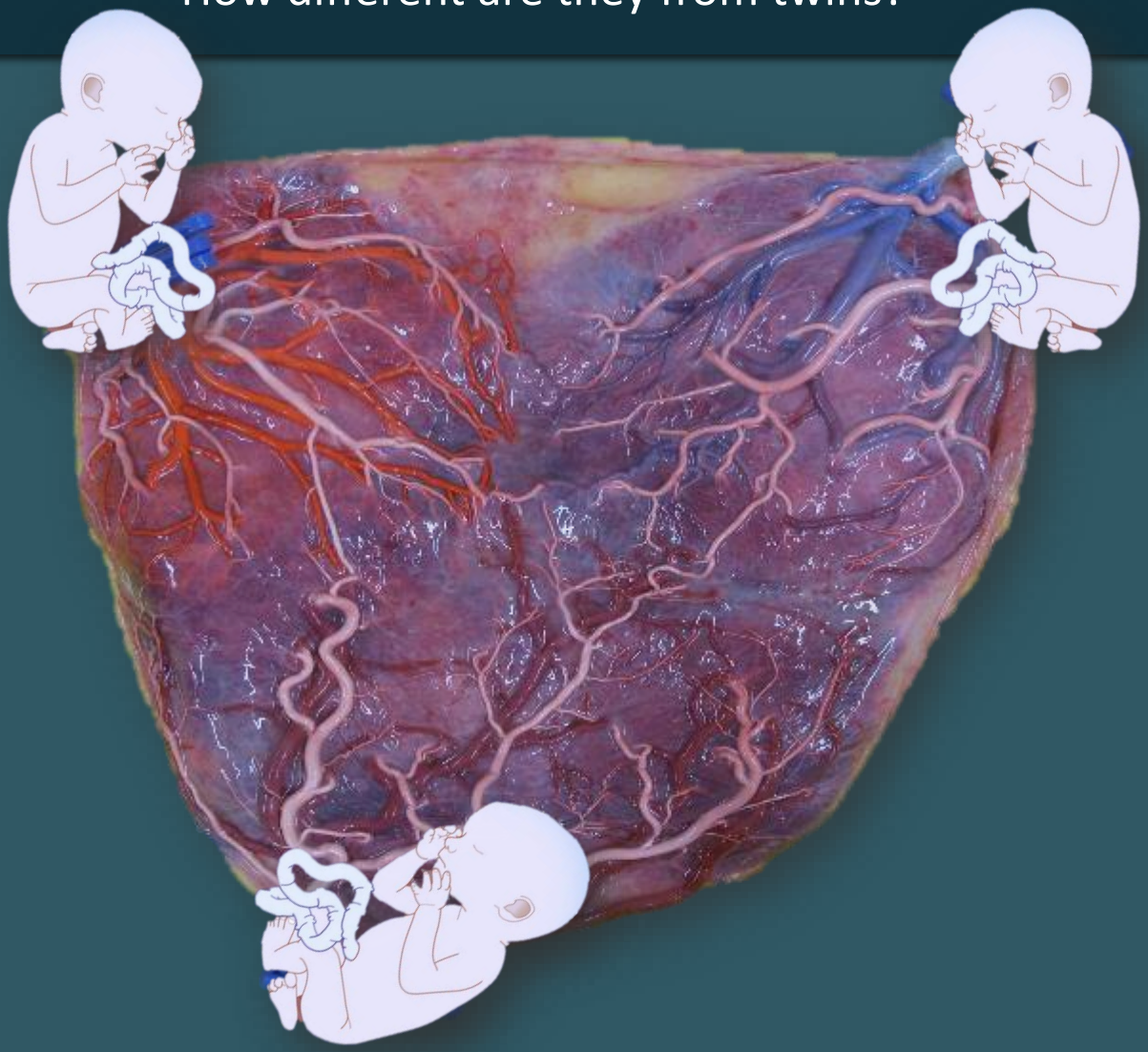


Survival in MCMA is 78% *versus* 88% in MCDA twins

Bajoria R, AJOG 1998; Hack KE, Placenta 2009; Lewi L, UOG 2010; Van Mieghem T, Obstet Gynecol 2014; Van Audenhoven C, Fet Diagn Ther, 2022

Triplet Pregnancies

How different are they from twins?



Epidemiology of multiple pregnancies

Natural incidence	twins	1 in 89	pregnancies
	triplets	1 in 89^2 or ≈8000	pregnancies
	quadruplets	1 in 89^3 or ≈700000	pregnancies
Hellin's law	N-tuplets	1 in 89^{n-1}	pregnancies

USA 2021 triplets 1 in 1315 pregnancies

Flanders 2023 triplets 1 in 4307 pregnancies

SPE report 2023; Osterman MJK, Natl Vital Stat Rep. 2022 Natl Vital Stat Rep 2023

Typical features of triplet pregnancies from a fetal perspective

Increased risk of preterm birth

Singleton: 39-40 weeks

Twin: 35-36 weeks

Triplet: 33-34 weeks

Increased risk of poor growth and growth discordance, esp. if nulliparous or DC-MC

$$\frac{\text{Largest - Smallest}}{\text{Largest}}$$

30% ≥ 20% ≠

10% ≥ 40% ≠

From 28 weeks, growth velocity starts to decline so that by 35 weeks, triplets are on average growth restricted

3 babies at risk of ELBW (<1000g), neonatal mortality/morbidity and long-term handicap

✓ Perinatal mortality= 7% in triplets *versus* 3% in twins *versus* 0.7% in singletons

✓ Risk of cerebral palsy is 1 in 20 in triplets; 1 in 100 in twins and 1 in 500 in singletons

Jones JS, AJOG 1991; Pharoah POD, Arch Dis Child 1996; Blickstein I, Curr Opin Obst Gyn 2003; CDC Births: Final data for 2009; Fichera A, UOG 2018; Glinianaia SV, UOG 2021

Typical features of triplet pregnancies from the mother's perspective

1 in 25 risk of major obstetric hemorrhage or other acute life-threatening morbidity

Need for caesarean section to be offered from 35.0 weeks onward if not yet delivered

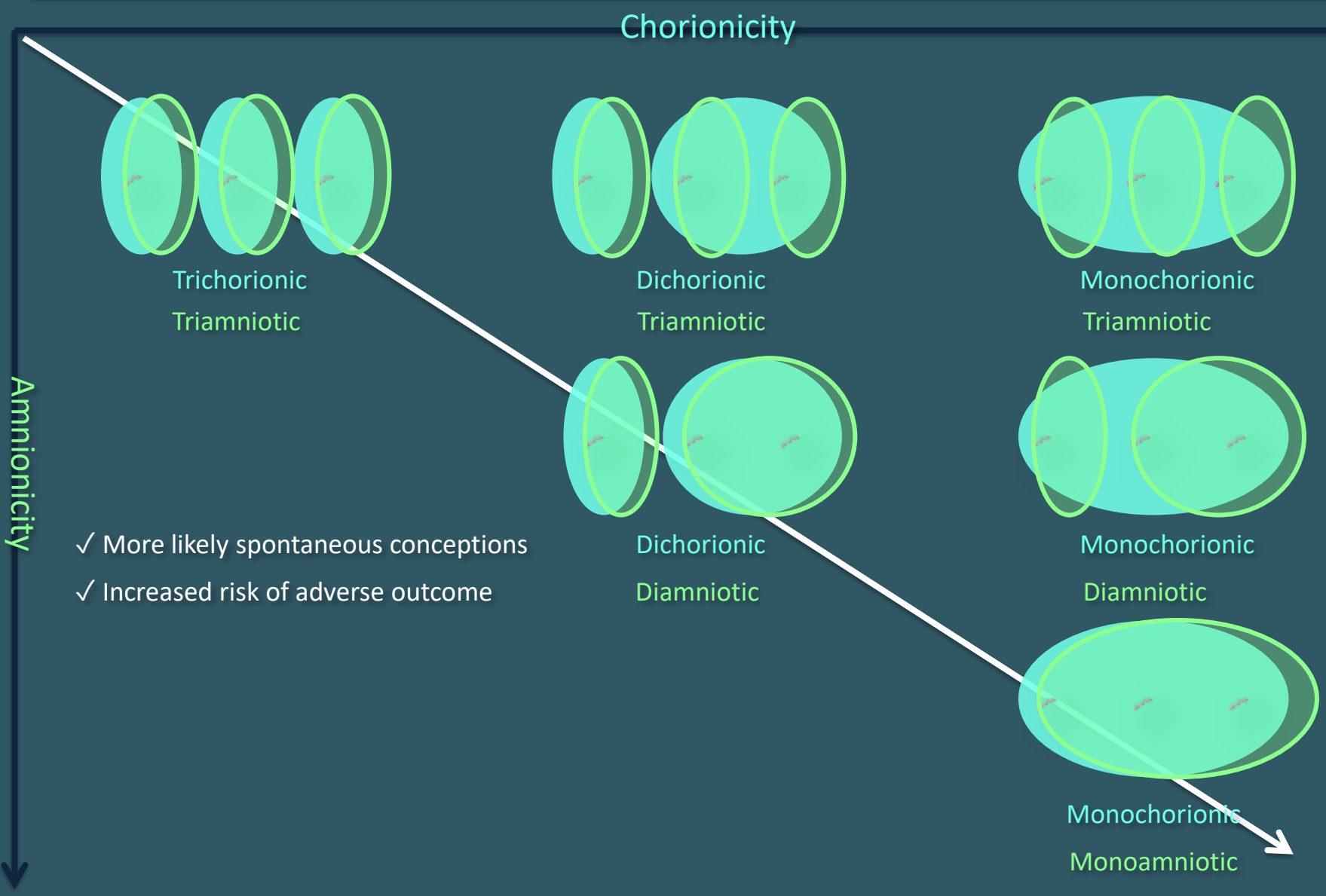
Increased risks of pre-eclampsia, diabetes, cholestasis, anemia

Physical discomfort, especially from 24 weeks onwards

Financial and emotional burden to look after 3 baby's: depression – marital strain

Sivan E, Obstet Gynecol 2002; Luke B, AJOG 2008; Wenze SJ, Arch Womens Ment Health 2015; Lappen JR, Am J Obstet Gynecol 2016; Witteveen T, Am J Obstet Gynecol 2016

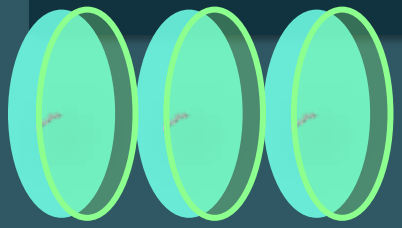
Different type of triplet pregnancies



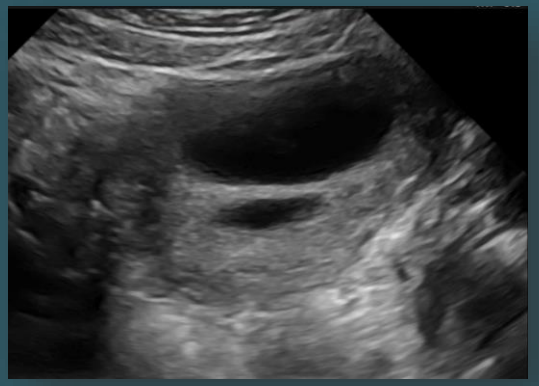
✓ More likely spontaneous conceptions

✓ Increased risk of adverse outcome

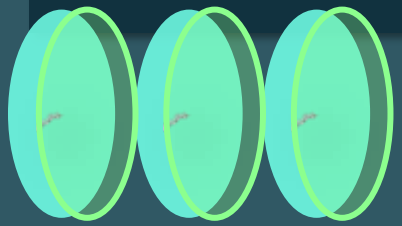
Outcome and management of trichorionic triplets



	TCTA N=411
% ART	90-95%
Survival	90%
GA at birth	34 wks
Birth < 32 wks	30%
Birth < 28 wks	10%



Outcome and management of trichorionic triplets



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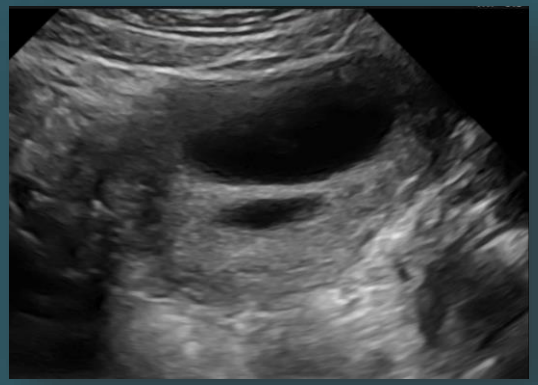


✓ 1st trimester screening for aneuploidy usually done by maternal age and US variables

NT measurement and other markers for aneuploidy – allocate sufficient time!

✓ 1st trimester discussion of pro's and con's of fetal reduction, usually from 3 to 2

Birth < 32 wks from 30% to 10% with extra miscarriage of about 5%

12w — 20 w — 24 w — 26 w — 28 w — 30 w — 32 w — 34 w

Perdigao JL, Am J Obstet Gynecol 2016; Peress DA, Am J Perinat 2016; Anthoulakis C, Hum Reprod 2017; Multiple Pregnancy, NICE Clinical Guideline 2019

Take home messages!

✓ Most TCTA triplets result from ART

✓ Triplets are born at 33-34 wks with perinatal death in 7% and cerebral palsy in 5%

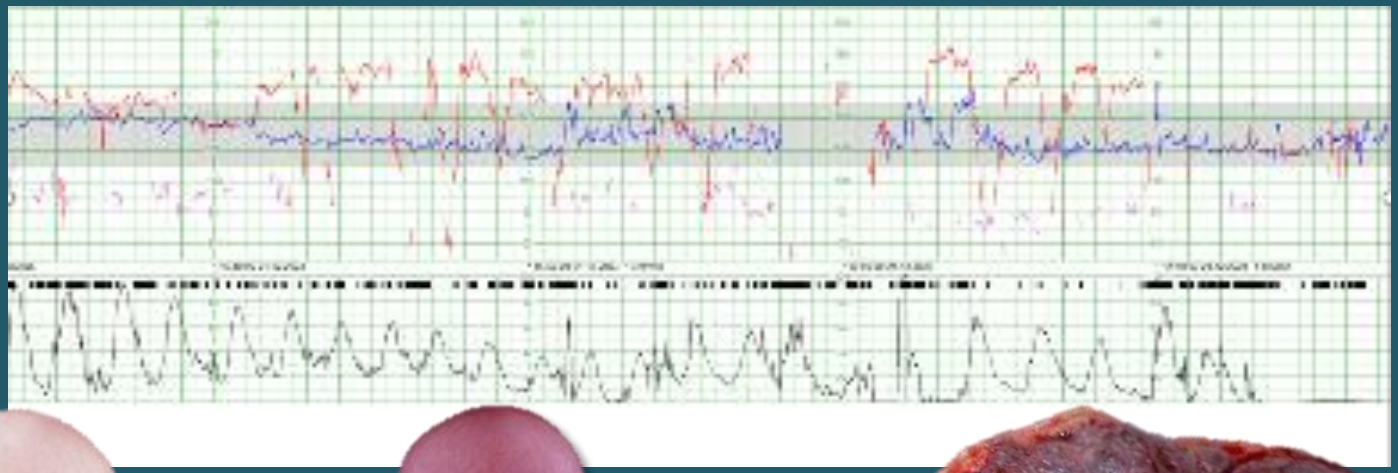
✓ Mothers have a 4% risk of life-threatening morbidity

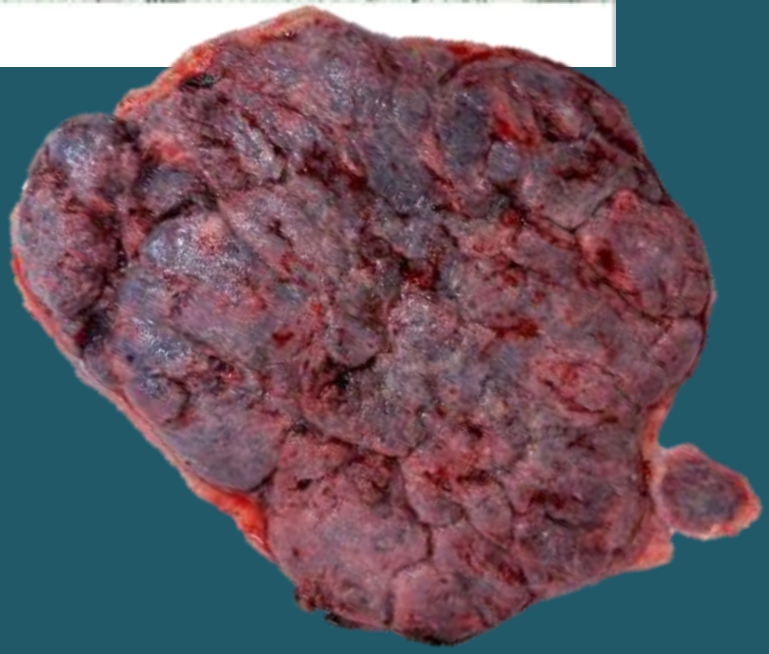
✓ The more the triplets share - the higher the risks

✓ What is the long-term outcome? East Flanders Prospective Twin Survey on Triplets

What is your diagnosis? Case 1

- Induction @36w1d



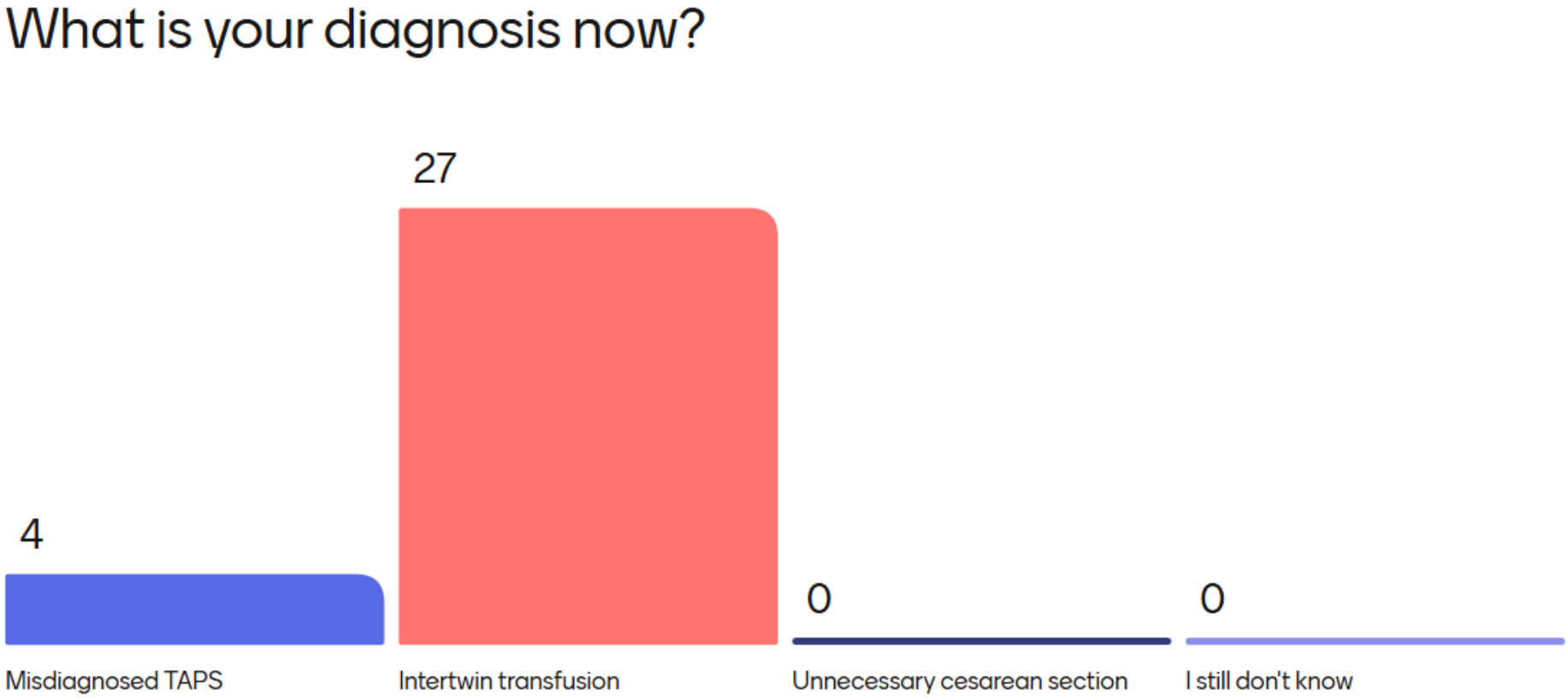


- pH 7.18
- Hb 12 gr/dL

- pH 7.22
- Hb 21 gr/dL

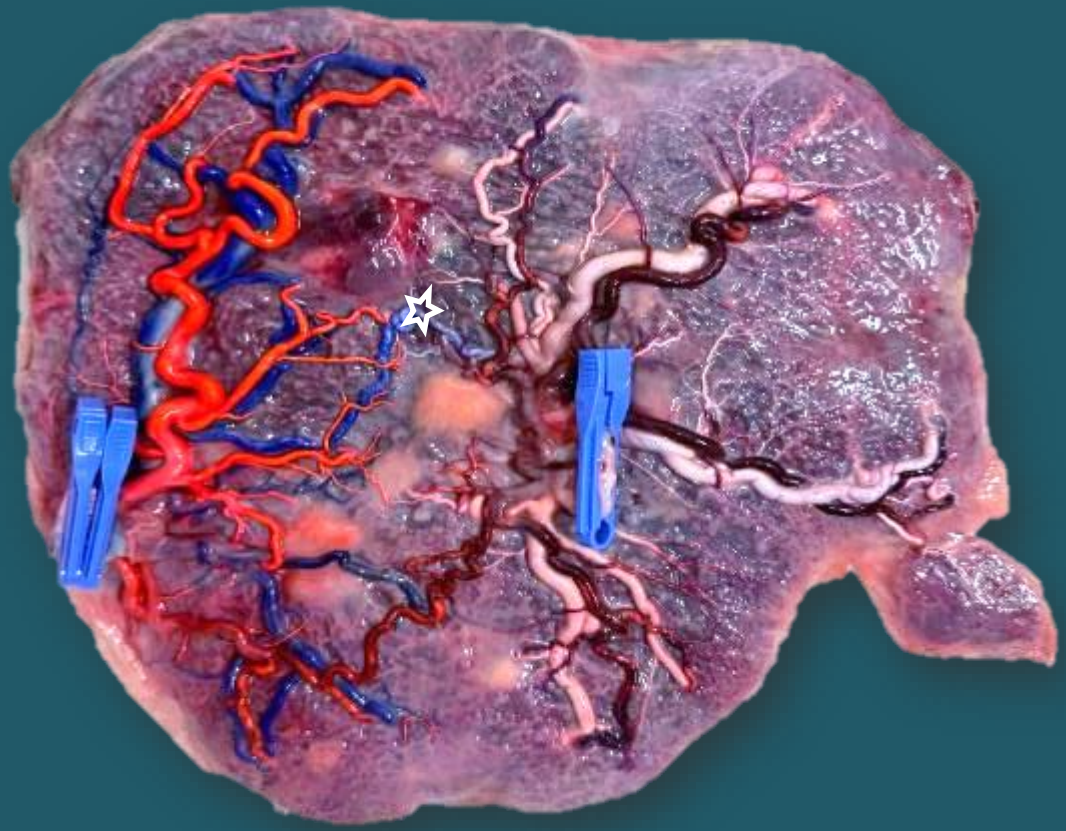
What is your diagnosis now? Case 1

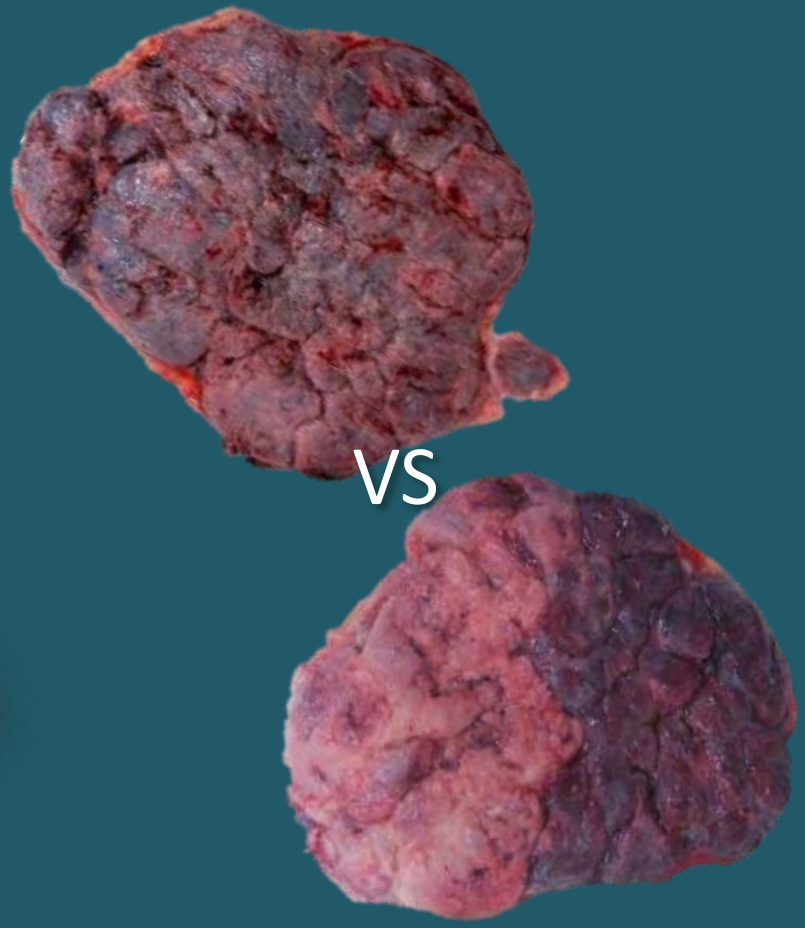
What is your diagnosis now? Case 1



What is your diagnosis? Case 1

Acute intertwin transfusion



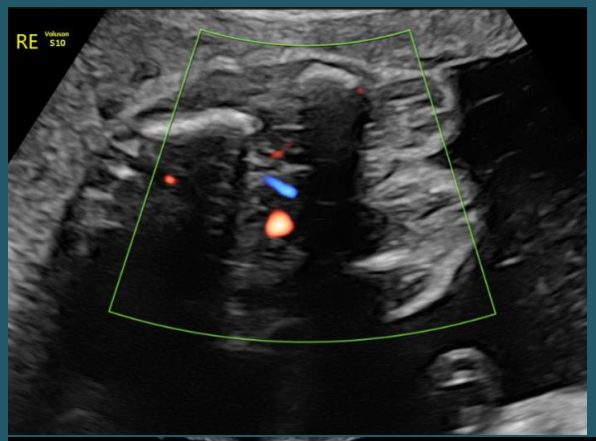


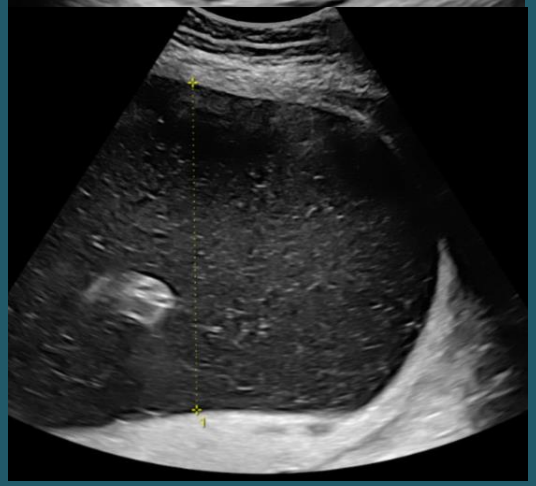
2x low reticulocyte count

What would you do? Case 2

- G2P1, spontaneous MCDA twins
- Concordant growth and amniotic fluid

- @25w2d: TTTS st 2





What would you do? Case2

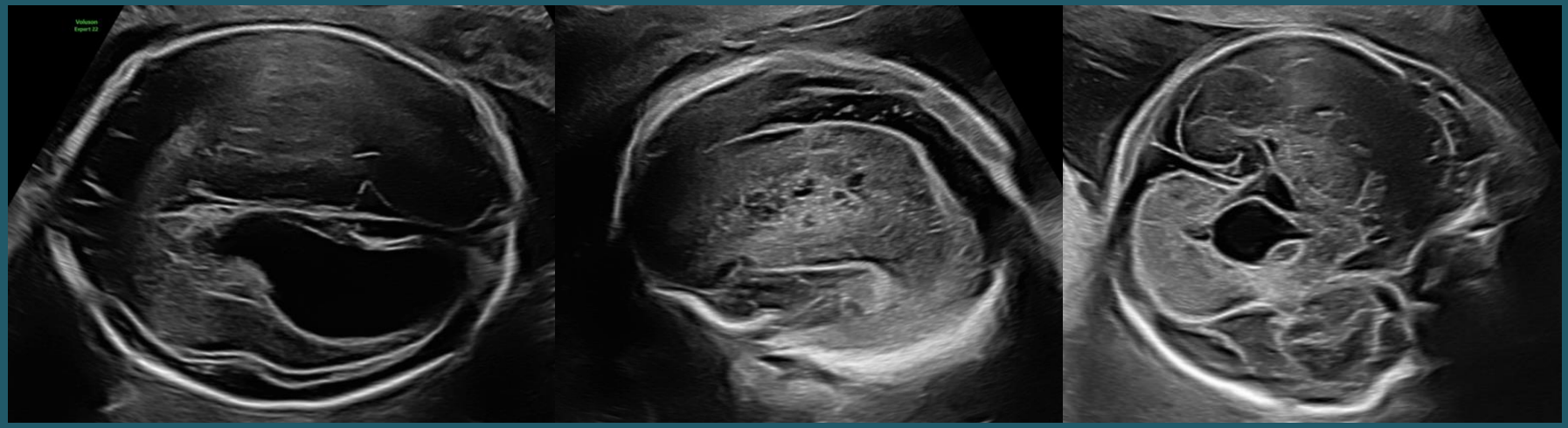
- fMRI: no signs of bleeding or ischemia
- Parents opt for laser therapy

- @25w3d:

What would you do? Case 2

US @27w5d

- Fetus 1 (ex-donor): normal amniotic fluid and dopplers
- Fetus 2 (ex-recipient): severe ventriculomegaly right with atrophy of the cortex, periventricular cysts, abnormal corpus callosum and hyperechogenic brain



- Broad CMS and septostomy

What would you do? Case 2

- MRI @27w5d:

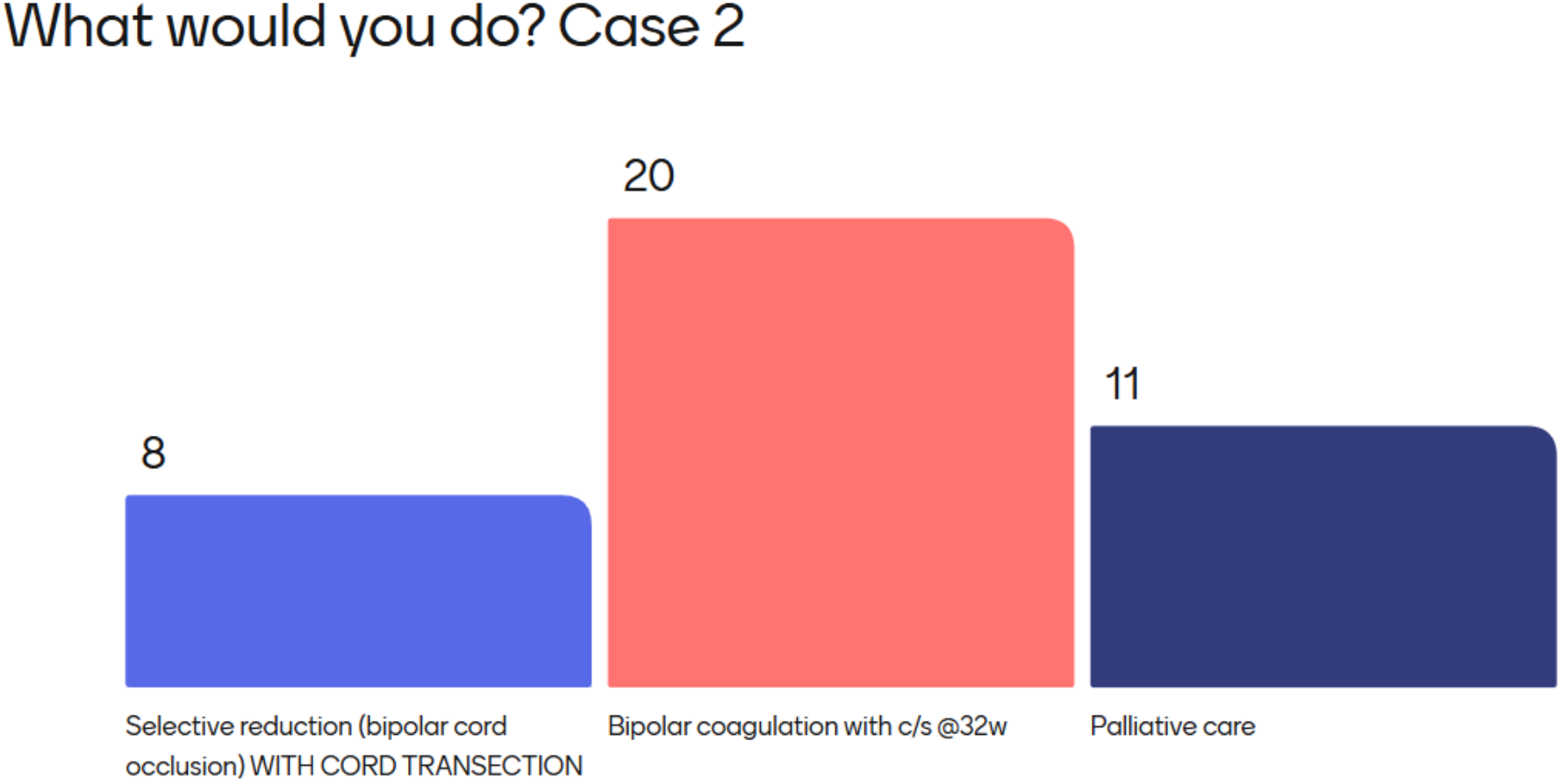
  Fetus 2: Broad parenchyma loss, compatible with ischemia, Severe ventriculomegaly right

- The parents ask for sTOP

- Selective reduction (bipolar cord occlusion) WITH CORD TRANSECTION
- Bipolar coagulation followed by c/s @32w
- Palliative care

What would you do? Case 2

What would you do? Case 2



What would you do? Case 2

- Hospitalization @29w0d due to PPROM
- Management: section + reduction planned @32w, palliative care for fetus 2 if earlier labor

- @30w0d: C/S for abnormal CTG fetus 1

- Baby 1: 1100 gr, good start, CPAP
- Baby 2: 1370 gr, good start, palliative care
- Removal of amniotic bands during extraction

What would you do? Case 2

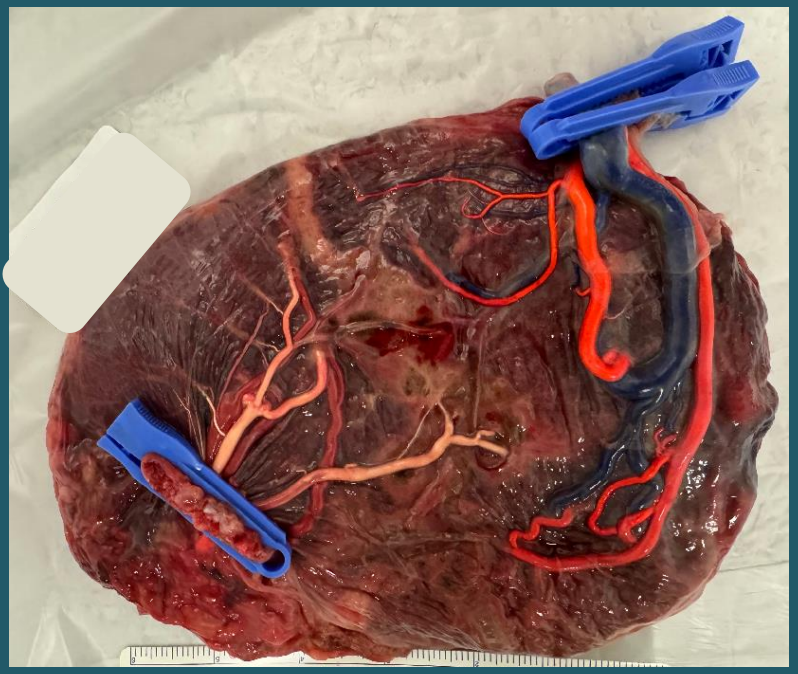
- Baby 1:

Transfer to peripheric hospital @20d

High flow 4L

Vena porta thrombosis

Full enteral feeding @14d



- Baby 2

Good respiratory adaptation after birth

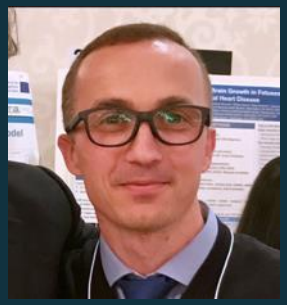
Deceased @d3

Liesbeth Lewi

UZ LEUVEN

KU LEUVEN

Roland Devlieger



Hannes Vandermerwe

Thank you!

Jan Deprest