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Restricción selectiva del crecimiento intrauterino en embarazo monocorial

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Definición

- No bien establecida
- Varía en los distintos estudios

- Gratacos:
  - EPF <p10 en un feto
  - Discordancia > 25% ((a-b)x100/a)

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Introducción

- Afecta a 12-25% de embarazos monocoriónicos
- Incidencia similar en DC y MC
- Alto riesgo de muerte fetal intrauterina y alteraciones neurológicas

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- **Etiología**
  - Asimetría placentaria
  - Anastomosis vasculares intergemelares
  - A mayores discordancias placentarias → mayores anastomosis → mayor dependencia de gemelo menor de la circulación proveniente de gemelo mayor (mecanismo protección para gemelo menor)

Prenat Diagn 2010; 30: 719–726.

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Combinaciones posibles

- ↑discordancia placentaria y ↓ anastomosis → mal pronóstico
- ↑ anastomosis con ↓ discordancia (buen pronóstico) → se comporta como emb DC
- Gran discrepancia placentaria y grandes anastomosis AA → pronóstico depende de las grandes anastomosis por donde pasa mucha sangre (menor discrepancia fetal que placentaria por las grandes anastomosis)
  - Crea un sistema hemodinámico inestable y mayor riesgo episodios agudos de TFF, y muerte

Prenat Diagn 2010; 30: 719–726.

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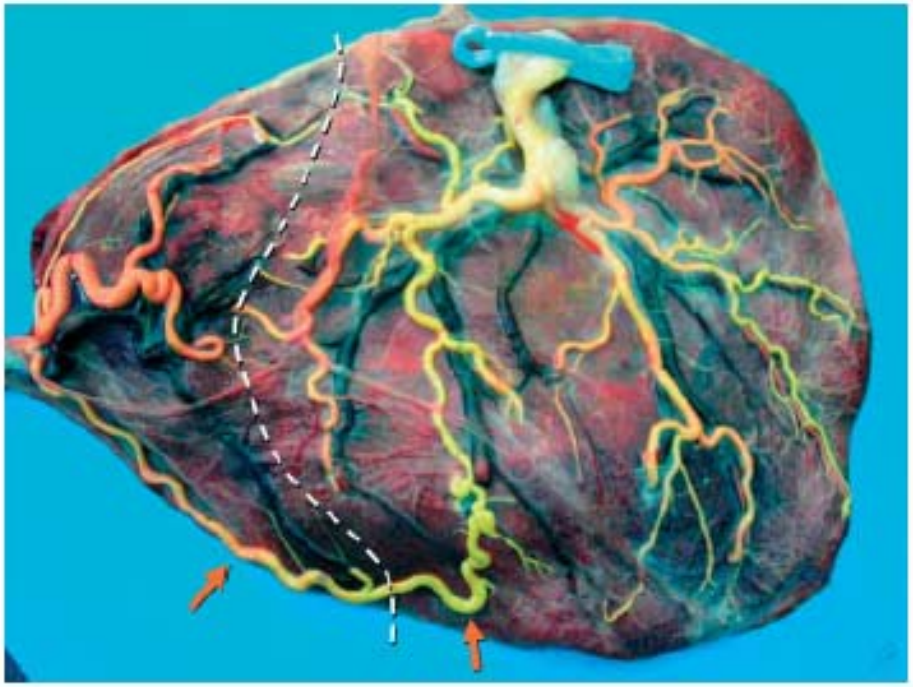

Figure 1—Monochorionic placenta in a type III sIUGR. The dotted white line indicates the vascular equator. Note the small placental area of the IUGR fetus, which is connected to the larger one through a large AA (red arrows), which connects directly the umbilical cords and allows transfer of large amounts of blood to the smaller fetus. While the ratio of the larger to smaller placental territory was 3.5 to 1, the ratio in fetal weights was to 1.75 (1750 and 1010 g, respectively). This difference illustrates the influence of the monochorionic placenta in the natural history of growth restriction. Placenta perfused with dye courtesy of Dr Maria Angeles Gomez, Buenos Aires

Clasificación

Ultrasound Obstet Gynecol 2007; 30: 28–34
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A classification system for selective intrauterine growth restriction in monochorionic pregnancies according to umbilical artery Doppler flow in the smaller twin

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Prospectivo, por 3,5 años

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Medidas en asa libre, ángulo de isoniación 0

- **Tipo I**
  - **Flujo diastólico presente en AU**
- **Tipo II**
  - **Flujo diastólico ausente o reverso constante**
- **Tipo III**
  - **Flujo diastólico ausente o reverso intermitente**

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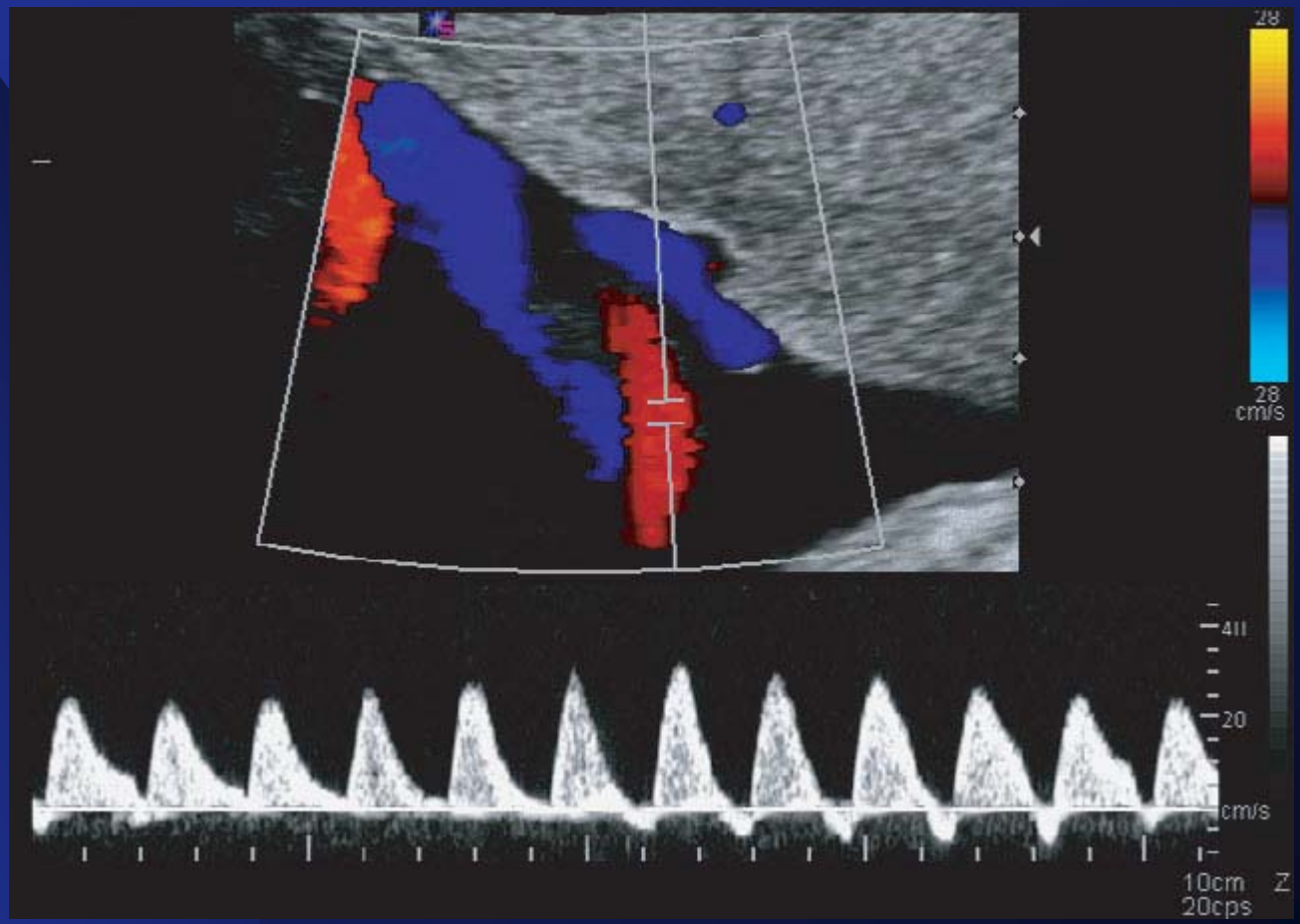

Clasificación

- Doppler de AU estaría influenciado por anastomosis vasculares intergemelos
  - Transferencia desde el gemelo mayor al menor a través de anastomosis AA
  - Doppler generalmente se mantiene igual hasta a resolución de embarazo

Por lo tanto doppler observado al diagnóstico de RCIUs serviría para predecir evolución

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Table 1 Pregnancy course and perinatal outcome according to umbilical artery Doppler classification

Parameter	*Normal* (n = 76)	*Type I* (n = 39)	*Type II* (n = 30)	*Type III* (n = 65)
GA at diagnosis (weeks, mean (range))	—	23 (16–27)	20 (16–25)	22 (16–26)
GA at delivery (weeks, mean (range))	35.5 (30–38)	35.4 (16–38)	30.7 (27–40)*	31.6 (23–39)*
Birth weight (g, mean (range))				
Larger twin	2439 (1450–3530)	2385 (1200–3350)	1468 (760–2900)*	1713 (930–3450)*
Smaller twin	2187 (1260–3233)	1688 (800–2400)	787 (390–1360)*	1017 (450–2130)*
Fetal weight discordance (%, mean (range))	10 (1–22)	29 (25–37)*	38 (25–58)*	36 (25–64)*
In-utero deterioration of IUGR fetus (*n* (%))	—	0/39 (0)	27/30 (90.0)†	7/65 (10.8)
Unexpected IUFD (*n* (%))				
Larger twin	—	1/39 (2.6)	0/30 (0)	4/65 (6.2)
Smaller twin			0/30 (0)	10/65 (15.4)§
Intraventricular hemorrha				
Larger twin			1/30 (3.3)	2/61 (3.3)
Smaller twin			3/21 (14.3)‡	3/50 (6.0)
Parenchymal brain damag				
Larger twin			1/30 (3.3)	12/61 (19.7)§
Smaller twin			3/21 (14.3)‡	1/50 (2.0)

Interrupción:
- <28 sem: flujo atrial (-) o reverso en DV
- >28 sem: flujo diastólico reverso persistente en AU, DV con IP↑, alteración monitoreo cardiaco o PBF

*$P < 0.0001$ vs. uncompli 1; §$P < 0.05$ vs. Type I and Type II.
GA, gestational age; IUFD, intrauterine fetal death; IUGR, intrauterine growth restriction.

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Unexpected IUFD (*n* (%))				
Larger twin	—		)	4/65 (6.2)
Smaller twin	—		)	10/65 (15.4)§
Intraventricular hemorrhage (*n* (%))				
Larger twin	—		.3)	2/61 (3.3)
Smaller twin	—		4.3)‡	3/50 (6.0)
Parenchymal brain damage (*n* (%))				
Larger twin	—	0/38 (0)	1/30 (3.3)	12/61 (19.7)§
Smaller twin	—	0/38 (0)	3/21 (14.3)‡	1/50 (2.0)

Fetos con ACM y DV normales previamente.
EG: 24 sem
5 días del último doppler

*$P < 0.0001$ vs. uncomplicated and Type I; †$P < 0.0001$ vs. Type I and Type III; ‡$P < 0.05$ vs. Type 1; §$P < 0.05$ vs. Type I and Type II.
GA, gestational age; IUFD, intrauterine fetal death; IUGR, intrauterine growth restriction.

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- **Examen de placentas**
  - Evaluar anastomosis AA, AV, VV, AA > 2 mm (valor escogido arbitrariamente por estudios anteriores)
  - Calculo de discordancia placentaria mediante fotografias
  - Calculo del tamaño relativo de placenta por feto

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Table 2 Placental features and proportion of the types of placental anastomoses according to umbilical artery Doppler classification

Parameter	*Normal* (n = 76)	*Type I* (n = 23)	*Type II* (n = 22)	*Type III* (n = 50)
FW ratio (mean (range))	1.1 (1.0–1.29)	1.4 (1.3–1.6)*	1.6 (1.3–2.3)*	1.6 (1.3–2.7)*
PT ratio (mean (range))	1.3 (0.6–3.0)	1.8 (1.1–2.6)	2.6 (1.6–4.2)*	4.4 (1.8–19.0)‡
FW ratio/PT ratio (mean (range))	0.94 (0.58–1.73)	0.79 (0.57–1.37)	0.71 (0.48–1.05)†	0.44 (0.08–0.91)‡
Arteriovenous anastomoses (*n* (%))	71 (93)	22 (96)	22 (100)	44 (88)
Arterioarterial anastomoses (*n* (%))	61 (80)	18 (78)	16 (73)	50 (100)‡
Arterioarterial anastomoses of > 2 mm (*n* (%))	42 (55)	16 (70)	4 (18)*	49 (98)‡
Venovenous anastomoses (*n* (%))	15 (20)	5 (22)	3 (14)	12 (24)

Data on placental anastomoses represent the proportion of cases with at least one such type of anastomosis. *$P < 0.01$ vs. uncomplicated or Type I; †$P < 0.05$ vs. uncomplicated; ‡$P < 0.01$ vs. uncomplicated, Type I and Type II. FW, fetal weight; PT, placental territory.

Peso fetal/territorio placentario: si es bajo indica que la transfusión sanguínea interfetos tiene un efecto benéfico en proteger al feto con RCIU de la insuficiencia placentaria y prolongar su sobrevida

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Conclusiones

- Doppler de AU
  - En embarazo MC con sRCIU evalúa insuficiencia placentaria y anastomosis vasculares
- Tipo I: menor severidad, buen pronóstico
  - Si se presenta flujo diastólico positivo → feto probablemente tendría un buen pronóstico.
  - Mayor EG y peso, menor discordancia fetal, daño cerebral (0%) y muerte intrauterina (<3%)
- Tipo II:
  - Deterioro fetal en el 90%. Sin muerte inesperada.
  - Siguen un patrón de deterioro progresivo y predecible

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- **Tipo III**
  - **Presenta grandes anastomosis AA→ facilitan la ocurrencia de episodios agudos de transfusión feto-fetal lo que produciría variaciones en FC y PA de los fetos**
    - **El menor: sobrecarga aguda de volumen → muerte**
    - **Mayor periodos hipovolémicos → daños neurológico**
  - **Evolución menos predecible. Muerte fetal inesperada: 15% (debido a inestabilidad hemodinámica secundaria a grandes anastomosis AA)**

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Efectos neurológicos

Ultrasound Obstet Gynecol 2004; **24**: 159–163
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Prevalence of neurological damage in monochorionic twins with selective intrauterine growth restriction and intermittent absent or reversed end-diastolic umbilical artery flow

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- **Ecografía cerebral antes de los 4 días y luego a las 28 +- 7 días**

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Table 1 Perinatal outcome in the study groups

	Dichorionic	*Monochorionic no IUGR*	*Monochorionic selective IUGR*	P
n (%)	29	32	42	
Gestational age at delivery (weeks, median (range))	29.9 (26.1–33.6)	30.6 (26.6–33.4)	30.7 (27.2–33.5)	0.08
Birth weight (g, median (range))				
Larger twin	1467 (590–2400)	1547 (610–2370)	1507 (920–2200)	0.35
Smaller twin	1298 (550–2260)	1395 (570–2210)	972 (390–1650)	<0.0001
Weight discordance (%, median (range))	11 (1–24)	10 (2–23)	37 (25–64)	<0.0001
Intrauterine death (%)				
Overall	0/58 (0)	0/64 (0)	9/84 (10.7)	<0.001
Larger twin	0/29 (0)	0/32 (0)	3/42 (7.1)	0.1
Smaller twin	0/29 (0)	0/32 (0)	6/42 (14.2)	<0.01
At least one	0/29 (0)	0/32 (0)	6/42 (14.2)	<0.01
Intraventricular hemorrhage (%)				
Overall	6/58 (10.3)	10/64 (15.6)	4/75 (5.3)	0.13
Larger twin	4/29 (13.8)	5/32 (15.6)	2/39 (5.1)	0.31
Smaller twin	2/29 (6.9)	5/32 (15.6)	2/36 (5.5)	0.31
Parenchymal brain damage (%)				
Overall	1/58 (1.7)	0/64 (0)	9/75 (12.0)	<0.002
Larger twin	1/29 (3.4)	0/32 (0)	8/39 (20.5)	<0.005
Smaller twin	0/29 (0)	0/32 (0)	1/36 (2.8)	0.42

IUGR, intrauterine growth restriction.

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Table 2 Perinatal outcome and incidence of neurological damage in monochorionic twins with selective intrauterine growth restriction according to the presence or absence of intermittent absent or reversed end-diastolic flow velocity (A/REDV)

	Intermittent A/REDV		
	No	*Yes*	P
n (%)	20	22	
Intrauterine death (%)			
Overall	0/40 (0)	9/44 (20.5)	< 0.001
Larger twin	0/20 (0)	3/22 (13.6)	< 0.2
Smaller twin	0/20 (0)	6/22 (27.3)	< 0.05
At least one	0/20 (0)	6/22 (27.3)	< 0.05
Gestational age at delivery (weeks, median (range))	30.1 (27.2–33.4)	31.8 (28.6–33.5)	0.09
Intraventricular hemorrhage (%)			
Overall	2/40 (5.0)	2/35 (5.7)	1.0
Larger twin	1/20 (5.0)	1/19 (5.3)	1.0
Smaller twin	1/20 (5.0)	1/16 (6.3)	1.0
Parenchymal brain damage (%)			
Overall	2/40 (5.0)	7/35 (20.0)	0.07
Larger twin	1/20 (5.0)	7/19 (36.8)	< 0.05
Smaller twin	1/20 (5.0)	0/16 (0)	1.0

IUGR, intrauterine growth restriction.

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Conclusiones

- sRCIU: asociado a alto riesgo de muerte fetal de feto con RCIU y a daño neurológico de feto mayor
- La muerte del feto menor esta asociado a mayor riesgo de daño neurológico para feto mayor
- Leucomalacia ventricular se debería a una isquemia prenatal secundaria a AAA grandes

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Morbilidad neonatal

- Morbilidad neurológica
  - Hemorragia intraventricular
  - Leucomalacia periventricular
  - Infarto cerebral
- Morbilidad cardiovascular
  - Miocardiopatía hipertrófica
- Morbilidad pulmonar
  - Necesidad de ventilación mecánica
  - Distress respiratorio
  - Signos sugerentes de displasia bronco pulmonar
- Morbilidad intestinal
  - ECN
  - Perforación intestinal

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Table 4 Neonatal morbidity in subgroups of monochorionic and dichorionic twin pregnancies

Children (*n*)	Monochorionic					Dichorionic		
	220					205		
	Uncomplicated	TTS		sIUGR		Uncomplicated		sIUGR
	190	14	*	16	*	195	*	10
NICU	23/190 (13%)	6/14 (43%)	0.007	12/16 (75%)	0.001	22/195 (11%)		2/10 (20%)
Morbidity								
Neurological	1/190 (0.5%)	3/14 (21%)	0.001	3/16 (19%)	0.001	1/195 (0.5%)		0
Periventricular leukomalacia	0	0		0		0		0
Intraventricular hemorrhage	1/190 (0.5%)	2/14 (14%)	0.013	2/16 (12%)	0.016	1/195 (0.5%)		0
Cerebral Infarction	0	1/14 (7%)	0.069	0		0		0
Respiratory	17/190 (9%)	6/14 (43%)	0.002	8/16 (50%)	0.001	15/195 (8%)		1/10 (10%)
Mechanical ventilation	7/190 (4%)	5/14 (36%)	0.001	6/16 (38%)	0.001	8/195 (4%)		1/10 (10%)
Bronchopulmonary dysplasia	3/190 (2%)	2/14 (14%)	0.039	3/16 (19%)	0.007	0	0	0
Gastrointestinal	6/190 (3%)	1/14 (7%)	0.397	2/16 (12%)	0.120	3/195 (1%)		1/10 (10%)
Necrotizing enterocolitis	2/190 (1%)	1/14 (7%)	0.193	2/16 (12%)	0.031	2/195 (1%)		1/10 (10%)
Cardiovascular	6/190 (3%)	4/14 (29%)	0.002	4/16 (27%)	0.004	5/195 (2%)		1/10 (10%)
Persistent ductus arteriosus	1/190 (0.5%)	3/14 (29%)	0.001	2/16 (12%)	0.016		0	0

*P value as compared to uncomplicated MC, calculated by Chi squared. NICU = need of neonatal intensive care unit.

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Tratamiento

- Manejo expectante
- Termino de embarazo
- Oclusión del cordón umbilical
- Fotocoagulación con laser

- Tipo I
  - Manejo expectante. Seguimiento con doppler
  - Cada 1-2 sem
  - Interrupción electiva a las 34-35 semanas
- Tipo II
  - Interrupción electiva a las 32 semanas
  - Generalmente hay un deterioro del feto con RCIU antes. Factores pronósticos de deterioro no han sido bien establecidos. Se sugiere: diagnóstico temprano, alta discordancia, mayores alteraciones al doppler
  - Monitoreo
  - Interrupción frente a DV alterado(flujo atrial ausente o reverso)
  - Manejo expectante v/s activo

Prenat Diagn 2010; 30: 719–726.

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- **Tipo III**
  - Si se mantiene estable se podría interrumpir a las 32-34 semanas
  - Alto riesgo de muerte inesperada y daño neurológico
  - Conversar con padres:
    - Manejo expectante:
    - Manejo activo

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- Oclusión cordón: sobrevida feto: 80-85%
  - No legal en chile
- Coagulación con laser
  - No se han evidenciado diferencias significativas con manejo conservador.
  - Aumentaría sobrevida de gemelo mayor, y aumentaría muerte de gemelo menor

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